

## **Terms of Use**

The copyright of this thesis is owned by its author. Any reproduction, adaptation, distribution or dissemination of this thesis without express authorization is strictly prohibited.

All rights reserved.

ASCERTAINING PATIENT CONDITION:  
A GROUNDED THEORY STUDY OF  
DIAGNOSTIC PRACTICE IN NURSING

LEE KOK LONG JOSEPH

DOCTOR OF PHILOSOPHY

LINGNAN UNIVERSITY

SEPTEMBER 2002

ASCERTAINING PATIENT CONDITION:  
A GROUNDED THEORY STUDY OF  
DIAGNOSTIC PRACTICE IN NURSING

by  
LEE Kok Long Joseph

A thesis  
submitted in partial fulfillment  
of the requirements for the Degree of  
Doctor of Philosophy

Lingnan University

September 2002

# ABSTRACT

---

Ascertaining Patient Condition:  
A Grounded Theory Study of Diagnostic Practice in Nursing

by

LEE Kok Long Joseph

Doctor of Philosophy in Social Sciences

In the past decade, much research has been conducted on the practice nurses engage in diagnosing the clinical condition of patients. Many of the studies suggest that diagnostic practices of nurses in simulation settings follow a hypothetical deductive model that similar to the clinical decision-making or diagnostic reasoning process. A second line of inquiry claims that experience used in conjunction with intuition form the major core of diagnostic practice in nursing. However, these studies either assume nurses are reasoned in a primarily rationalist fashion or offer no conclusive explanations of the details on how intuition directs diagnostic practices. In particular, the distinctive processes when nurses engage in diagnosing the clinical condition of patients in acute clinical environments still remain largely undefined, under documented and essentially invisible.

Within the tenets of grounded theory, a research study was therefore conducted to generate a substantive theory to provide comprehensive explanations of the following question: “What exactly is going on when nurses diagnose patients’ clinical conditions in acute clinical environments?” Underpinned by the constant comparative method, data were derived from twenty-eight theoretically sampled in-depth informal interviews of nurses who were working in acute medical or surgical settings of a regional hospital during a twenty-month period. With the use of coding and memoing, a three-stage social-psychological process identified as

*ascertaining patient condition* emerged. It conceptualized diagnostic practice in nursing as a series of purposeful actions where by nurses, through interacting with patients and the environment, articulated their professional skills, knowledge, experiences and perceptions to find out the clinical condition of patients. Stage one was the stage of attending the patient, where nurses started approaching and interacting with the patient. Stage two, the stage of perceiving the situation, began when nurses solicited information from all possible sources to augment their understanding of the patient. The last stage, unfolding the picture, was the stage at which nurses transformed data into facts, and articulated these facts into a sensible pattern that reflected the clinical condition of patients. Each of these stages was a theoretically complete unit comprising of unique strategic behaviors. The stages were interdependent; each was a consequence of the former and pre-requisite for the next. Each stage was equally necessary to insure adequate and thorough ascertaining. Besides, these stages also emerged to be context dependent and closely associated with a number of psycho-socio-structural variables, which, in turn, either facilitated or hampered the process of ascertaining patient condition.

This study generates a practice theory, which uncovers that diagnostic practice in acute clinical settings goes beyond the analytic rational model and intuitive reasoning. It is a dynamic integration of cognitive, psychosocial and interpersonal behaviors where by nurses, through interacting with patients and the environment, articulated their professional skills, knowledge, experiences and perceptions to diagnose their patient's clinical condition. It is through *ascertaining patient condition* that nurses develop solid platforms to ground their interventions to protect patients from vulnerability to harm and to support recovery. The findings of this study, in the long run, shed light to inform the pedagogical and clinical practices of the nursing profession in Hong Kong.

I declare that this thesis 《 Ascertaining Patient Condition: A Grounded Theory Study of Diagnostic Practice in Nursing 》 is the product of my own research and has not been published in any other publications.

---

LEE Kok Long Joseph  
September 2002

CERTIFICATE OF APPROVAL OF THESIS

ASCERTAINING PATIENT CONDITION:  
A GROUNDED THEORY STUDY OF  
DIAGNOSTIC PRACTICE IN NURSING

by

LEE Kok Long Joseph

Doctor of Philosophy

Panel of Examiners:

\_\_\_\_\_ (Chairman)  
Dr. Peter BAEHR

\_\_\_\_\_ (External Member)  
Prof. Ann MACKENZIE

\_\_\_\_\_ (Internal Member)  
Prof. Alfred C.M. CHAN

\_\_\_\_\_ (Internal Member)  
Dr. William K.M. LEE

Chief Supervisor:

Prof. Alfred C.M. Chan

Co-supervisor:

Prof. David Phillips

Approved for the Senate:

\_\_\_\_\_  
Prof. Mee-Kau NYAW  
Chairman, Research and Postgraduate Studies Committee

26 October 2002

# TABLE OF CONTENTS

---

	Page
<b>CHAPTER 1: INTRODUCTION</b>	1
Background of the Study	1
Setting the Hong Kong Scene in Perspective	4
Aim and Significance of the Study	5
<b>CHAPTER 2: LITERATURE REVIEW</b>	7
Concepts of Diagnostic Practice	8
Literature on Diagnostic Practice	12
Literature on statistical theories	13
Literature on information processing theory	20
Literature on intuitive reasoning	31
Variables influencing diagnostic practice	40
Knowledge	40
Experience	41
Discipline	43
Task and cue	43
Psychosocial cultural factors	45
Concluding remarks	47
Conceptual Framework of the Study	50
<b>CHAPTER 3: RESEARCH METHODOLOGY</b>	52
Philosophical Perspective and Paradigm of Inquiry	52
The Grounded Theory	55
An overview	55
Theoretical foundation	59
Canons and methods	63
Data source	64
Theoretical sampling	65
Theoretical saturation	68
Theoretical sensitivity	69
Constant comparative method	71
Coding	73
Memoing	81

Identification of core category	84
Rigor, legitimation and trustworthiness	86
Critical challenges	89
The Glaser-Strauss schism	91
The Grounded Theory Applied	95
Data collection	95
Pilot study	96
The setting	98
The informants	99
Procedure and technique	99
Data analysis	102
Concept formation and development	103
Concept modification and integration	105
Identification of core category	107
Verification of the results	109
Level 1 - Informant checking	109
Level 2 - Expert substantiation	110
Level 3 – Nurses’ survey	111
Ethical Considerations	112
Summary	113
<b>CHAPTER 4: FINDINGS</b>	115
Section One: Generating a theory for diagnostic practice in nursing	115
Background of informants	115
Ascertaining patient condition – the core category	116
Stage I: Attending the patient	120
Behaviours of attending the patient	121
Variability of the attending behaviours	123
Stage II: Perceiving the situation	130
Information sources	130
Strategies of perceiving the situation	133
Variability of the perceiving strategies	136
Stage III: Unfolding the picture	145
Fracturing information	147
Comparing categories	148
Piecing together	150
Factors affecting stage III	151
Summary of the findings	154
Section Two: Results of theory verification	156

Demographic profile of the sample	156
The core category – ascertaining patient condition	158
Stage I – Attending the patient	159
Stage II – Perceiving the situation	160
Stage III – Unfolding the picture	161
Summary of verification	163
<b>CHAPTER 5:DISCUSSION</b>	164
The Juxtaposition of the Identified Theory and Normative Models	164
Comparing with the normative models	165
Critical features	165
Influential variables	172
Concluding remarks	179
The Stages in Relations to Relevant Literature	181
The Stage I: Attending the patient	181
The Stage II: Perceiving the situation	191
The Stage III: Unfolding the picture	198
Epilogue	206
Implications for Nursing	207
Implications for nursing practice	208
Implications for nursing research	210
Implications for nursing education	212
Summary of Discussion	213
<b>CHAPTER 6: CONCLUSION</b>	215
Reflection of the Research Process	215
Planning the study	216
Collecting and analysing data	217
Verifying the results	222
Limitations	223
Epilogue	227
<b>APPENDICES</b>	228
Appendix I – Letter of approval of access	229
Appendix II – Diagnostic practice questionnaire	230
<b>REFERENCES</b>	235

## LIST OF TABLES

---

Table 4.1. Demographic profile	157
Table 4.2. Ascertaining patient condition – the core category	158
Table 4.3. Stage I: Attending the patient	160
Table 4.4. Stage II: Perceiving the situation	161
Table 4.5. Stage III: Unfolding the picture	162

## LIST OF FIGURES

---

Figure 3.1. An analytic diagram of attending the patient	107
Figure 3.2. Client type-patient group-attending behaviour matrix	107
Figure 3.3. A diagrammatic illustration of the core category	109
Figure 4.1. The process of ascertaining patient condition	119
Figure 4.2. The effect of ward round and patient group on attending behaviour	124
Figure 4.3. The connection between hand over report and patient type with attending behaviour	126
Figure 4.4. The association of client type and patient group with attending behaviour	128
Figure 4.5. The effect of patient load, hand over report and patient group on perceiving strategy	138
Figure 4.6. The association of client type and patient group with perceiving strategy	140
Figure 4.7. The connection between visitors' presence and symptom verbalisation and perceiving strategy	142
Figure 4.8. The relationship between attending behaviour and perceiving strategy	144
Figure 4.9. The phases in the stage of unfolding the picture	146

## PRESENTATIONS

---

*Findings of this project have been presented in the following conferences:*

- (1) Joseph K.L. Lee (1999)  
Title: *Theorising Diagnostic Practice in the Clinical Nursing Context*  
Event: The International Nursing Research Conference, Canada  
Date: June 1999
  
- (2) Joseph K.L. Lee (2001)  
Title: *Ascertaining: a Theory for Diagnostic Practice in Nursing*  
Event: Qualitative Health Research Conference 2001, Korea  
Date: June 2001

*Findings of this project have been accepted for presentation in the following conference:*

- (1) Joseph K.L. Lee (2002)  
Title: *Attending the Patient: a Critical Junction of Ascertaining Patient Condition*  
Event: The Second Pan-Pacific Nursing Conference, Hong Kong  
Date: November 2002

## ACKNOWLEDGMENTS

---

I wish to thank my supervisors, Professor Alfred Chan and Professor David Phillips, for their guidance, patience and support throughout all my years of study.

My appreciation also goes to my nursing colleagues who have participated in the study. Without their assistance and cooperation, this study would not have been a reality.

My warm and special thanks to my wife, Diana, who was always there when I needed help and support.

## **CHAPTER 1: INTRODUCTION**

---

This study is concerned with the question of what exactly is going on when nurses diagnose patients' clinical conditions in acute clinical environments. In this introductory chapter, the background and nature of the problem are discussed, and the aims and significance of the study are highlighted. An outline of how the study is conducted is also provided.

### **Background of the Study**

With the introduction of total patient care concept and primary nursing approach in contemporary nursing practice; assessment, planning, implementation and evaluation become an essential framework in delivering daily nursing care to patients. Nurses are expected to ground their practices on this framework. Nurse clinicians are encouraged to utilize these components to frame their nursing care. Nurse educators are advised to anchor their curricular and pedagogical practices on this framework. Parallel to all these changes and developments is the call for an emphasis in responsibility, autonomy and accountability in judgement and decision in the delivery of daily nursing care to

patients. These changes bring about an escalating need for sound and skilled practice in diagnosing patient's clinical condition. It is agreed that effective and efficient diagnostic skills to assess and identify patient's clinical condition are the bedrock of subsequent planning and implementation of high quality nursing care. Hence, skilled diagnostic practice becomes an increasing concern of the nursing profession.

Early literatures in medicine and nursing describe diagnostic practice as clinical judgment (Elstein, Schulman & Sprafka, 1978; Engelhardt, 1979; Marriner, 1983; Arkes & Hammond, 1886; Tanner, 1987). Recent scholars and researchers conceptualise the practice as diagnostic reasoning (Kassirer, 1989; Radwin, 1990; Rogers & Holm, 1991; Cholowki & Chan, 1992; Carnevali and Thomas, 1993) or clinical decision making (Baumann & Deber, 1989; Jones, 1992; Minick, 1995; Catolico, Navas, Sommer & Collins, 1996).

In the past decades, attempts have been made to foster understanding of diagnostic practice in nursing. It is suggested that statistical theories, such as Bayesian theorem and decision analysis, are capable of capturing the diagnostic process and offer an effective means to predict diagnostic decision (Hammond, Kelly, Scheider & Vancini, 1967; Hammond, 1971; Schwartz, Gorry, Kassirer & Essig, 1973; Grier, 1976; Aspinall, 1979; Gordon, 1980; Doubilet & McNeil, 1985). Studies underpinned by the

information processing theory (Newell and Simon 1972) argue that diagnosing patient's condition followed a hypothetico-deductive model that consists of specific stages (Elstein, Schulman & Sprafka, 1978; Tanner, 1982; Carnevali, 1984; Mitchell, 1984; Tanner, Padrick, Westfall, & Putzier, 1987; Itano, 1989; McFadden & Gunneett, 1992). Those who hold a phenomenological perspective remark that there is yet another form of diagnostic practice: intuitive reasoning, which plays an important role in diagnosing patient's clinical condition (Benner & Tanner, 1987; Rew & Barrow, 1987; Young, 1987; Burnard, 1989; Harbison, 1991; Orme & Maggs, 1993; Polge, 1995; Offredy, 1998; McCutcheon & Pincombe, 2001). Besides, other related studies also suggest that diagnostic practice is contingent on some personal, psychosocial, and structural variables (Marriner, 1983; Mishel, 1988; Joseph & Patel, 1990; Cholowski & Chan, 1992; Jenks, 1993).

Yet, these studies have failed to offer conclusive explanations to delineate diagnostic practice in nursing because they are largely inferred from other discipline's theoretical perspectives and are mostly conducted in simulation settings. Thus, how do nurses diagnose patients' clinical conditions in real-world situation? Will nurses follow a model that is similar to those discussed earlier? What variables are influencing diagnostic practice in real-world settings? Without comprehending the answers to these questions, any attempt to integrate the above discussed models to

inform nurses' diagnostic practice in real-world clinical settings would be meaningless, and may, in turn, further widen the theory-practice gap of the nursing discipline. Therefore, the generation of a substantive theory that uncovers the diagnostic practice in real clinical setting is fundamental and essential.

### **Setting the Hong Kong Scene in Perspective**

Without any exception, in the past decade, the prevalence of the total patient care concept and the shift of focus of care from functional based to primary care approach in the health care delivery system of Hong Kong has progressively demanded for competence in diagnostic practice in nursing. Yet, it remains a question as to what current pre and post registration nursing education curricula have offered to facilitate the development and acquisition of such clinical skill. Many a times, instead of learning how the practice of diagnosing patient's clinical condition is initiated and refined, and how nursing care management decisions are made, the use of standard protocol care plan are the mainstream curricular practice. Limited pedagogical activities have been put into action to foster the development of skilled diagnostic practice in nursing.

Given this situation, the author, as a nurse educator and an academic, has an immense concern to incorporate appropriate strategies to develop and foster diagnostic practice in Hong Kong. However, the author understands that to indiscriminately adopt any proposed models and theories to teach the practice of diagnosing patient's clinical condition might neither be effective nor applicable. Most importantly, the author also find that little has been done in Hong Kong concerning diagnostic practice in real-world clinical settings. In view of this, it is necessary and fundamental for the author to generate a substantive theory that can elucidate the nature and characteristics of diagnostic practice in nursing. As a result, the integration of appropriate theoretical framework into pedagogical and clinical practice would become possible. This could lead to high quality nursing care planning and implementation.

### **Aim and Significance of the Study**

The purpose of this study is to uncover diagnostic practice of nurses in real-world clinical settings. Hence, a substantive theory that explains how nurses diagnose patients' clinical conditions is generated. More specifically, the study attempts to provide answers for the following questions:

- ♦ How do nurses carry out diagnostic practice in real-world clinical environment?

- ♦ What are the critical components of diagnostic practice in nursing?
- ♦ How similar are these components to those that have been described in the literature?
- ♦ What variables are influencing diagnostic practice in real-world settings?
- ♦ How and to what extent do these variables influence diagnostic practice?

To achieve this, the tenets of Grounded Theory Methodology are adopted to conduct a study in an acute hospital in Hong Kong. Underpinned by the Constant Comparative method, data is derived from theoretically sampled in-depth informal interviews with nurses who are working in acute medical or surgical settings. With the use of coding and memoing, a substantive theory of diagnostic practice in nursing is surfaced.

It is hoped that the discovery of diagnostic practice in real-world clinical nursing environment can, ideally, in the long run shed light to the development of pertinent curricular and pedagogical practices to inform nurses' diagnostic practices. Ultimately, betterment of patient care in Hong Kong can be achieved.

## CHAPTER 2: LITERATURE REVIEW

---

Review of the relevant literature in a grounded theory study serves to enhance theoretical sensitivity, and offers insight into reality (Glaser, 1978; Weust, 2000; Morse, 2001). Nevertheless, this review should be performed with caution in order not to unduly influence the theory which is to evolve from the data (Chenitz & Swanson, 1986; Bartlett & Payne, 1997; Glaser, 1998; Chicchi, 2000). The review does not simply take place before the study, but is ongoing and continuous during and after data collection, being directed by the concept identified from the data, so as to help validate the emerging theory. This chapter reviews the literature relevant to the process of making diagnosis and develops a conceptual framework for this study. By exploring the general concept of diagnosis, it sets the conceptualization of diagnostic aspect of nursing practice into context. This is followed by a review of normative models that attempt to represent the process of diagnosing patient's condition. The third section highlights the possible variables which influence nursing diagnostic practice. The chapter ends with a conceptual framework guiding the further understanding of the diagnostic aspect of nursing practice in acute clinical environment.

## **Concepts of Diagnostic Practice**

This study is concerned with the generation of a theory to explain the practice that nurses are involved in the course of diagnosing patient's condition in acute clinical environment in Hong Kong. It is therefore necessary to explore and clarify the concepts related to such practice before further attempts are made to pursuit on the process of theory development. In this respect, the following discussion will serve the above mentioned purpose.

Having reviewed the relevant literatures, the conceptualizations that are related to the diagnostic aspect of nursing practice become apparent.

Roberts, While and Fitzpatrick (1995) point out that diagnosis is one of the components of the assessment process in which the identification of the health status of clients becomes possible after an orderly collection and analysis of data.

According to Kozier, Erb and Blais (1997), diagnosis is a cognitive process of analysis and synthesis. Analysis is the separation into components, i.e., breaking down the whole into its parts. Synthesis is the opposite, i.e., putting together the

parts into the whole. The cognitive skills required for analysis and synthesis are objectivity, critical thinking, decision making, and inductive and deductive reasoning.

Kassirer (1989) argues that the process in which clinician makes a series of inferences about the nature of malfunctions of the body is referred to as diagnostic reasoning. According to Kassirer, this process involves the use of various clinical reasoning strategies and is seen as a form of diagnostic problem solving.

Roger and Holm (1991) and Cholowski and Chan (1992) further add that diagnostic reasoning is an active problem solving process whereby nurses engage in diagnosing client problems, and subsequently arriving at certain diagnostic conclusions. It is a sequence of cognitive activities that involves the creation of clinical image of the patient through cue acquisition, hypothesis generation, cue interpretation, and hypothesis evaluation.

Carnevali and Thomas (1993) point out that diagnostic reasoning is a process of information processing in which a series of clinical judgments is made during and after data collection, culminating in informal judgments or formal diagnoses. According to them, diagnostic reasoning enables an observer to assign meaning and

to classify phenomena in clinical situation by integrating observations and critical thinking.

However, in describing how nurses and doctors exercise their cognition, knowledge and experience to review and organize clinical data so as to offer a diagnosis or prognosis regarding the client's situation, Arkes and Hammond (1986), and Tanner (1987) name this process as clinical judgment.

In addition, Jones (1995) argues that the process of diagnostic reasoning, in which clinicians identify and classify phenomena in presenting clinical situations, is a model of decision making. She refers this model as diagnostic decision making.

Following this similar line of thought, some authors refer the process whereby clinician evaluate and define the state of patient as clinical decision making (Tanner, Padrick, Westfall & Putzier, 1987; Baumann & Deber, 1989; Kassirer & Kopelman, 1991; Jones, 1992; Minick, 1995; Catolico, Navas, Sommer & Collins, 1996). According to these authors, clinical decision making process is a form of intellectual and problem solving skills that involves diagnostic reasoning and clinical judgment. It encompasses a number of steps and certain sets of cognitive activities.

From the above discussion, it is interesting to note that though these authors' conceptualizations of the diagnostic aspect of nursing practice are very much parallel to one another, they use different terminologies to describe the process of making diagnosis. Most importantly, analysis of these conceptualizations reveals that there is an obvious underlying assumption among these discussions: diagnosis related nursing practice is essentially a mental process that involves a series of cognitive activity.

Nevertheless, Frauman and Skelly (1999) argue that the diagnostic decision making process of identifying a disease or disorder must be made in a patient encounter. It is a course of action that involves assessment, interaction, therapy and evaluation. Besides, Fuller and Schaller-Ayers (2000) also point out that to arrive at a diagnostic conclusion, mutual input from both nurses and clients is essential. According to them, the diagnostic process is therefore, to a large extent, collaboration between nurses and clients in sharing their appraisal of the problem.

Obviously, from these authors' perspectives, the process of making diagnosis is a practice that is more than a series of cognitive activity. The diagnostic aspect of nursing practice also involves human interaction and possibly other psychosocial elements.

In view of this, it is logical to conclude that the process of diagnosing patient's clinical condition encompasses nursing practice that ranges from psychosocial activities to cognitive functioning. From this vantage point, the basis for conceptualizing nursing diagnostic practice of this study becomes apparent.

### **Literature on Diagnostic Practice**

As mentioned earlier, the process of diagnosing patient's clinical condition is being conceptualized as diagnostic reasoning, clinical judgment, and clinical decision making. Therefore, review of the relevant literature is performed along the line of these conceptualizations. In the course of reviewing the related literature, it is noted that a number of changes have occurred in the conceptual discussions and research studies on the process of making diagnosis over the past decades. Whilst discussions in the 70s are predominately framed by the statistical theories, literature in the 80s is largely underpinned by the information processing theory. In the 90s, it is apparent that reports on the impact of intuitive reasoning on the diagnostic process are rapidly expanding.

For ease of discussion, these three distinctive camps of literature will be considered in turn. Major assertions and findings will be summarized and a critique will conclude each section.

### *Literature on statistical theories*

Nurses in the 70s believed that nursing had to maintain a rationalist perspective for decision making in order to accord well with the trend toward rationale-based nursing, research and accountability. This rational approach to decision making maintained that analysis of the situation should be carried out, subsequent actions should be rational and logical, and decision makers should be able to make their knowledge and judgment explicit. Hence, literature was written to describe rational decision making; studies were conducted to replicate the process of decision making.

A number of authors attempted to incorporate statistical theories, such as Bayesian theorem and probability theory to describe clinical decision making.

Suppes (1979), and Wolf, Cruppen and Billi (1988) asserted that the Bayesian theorem could be used to predict the likelihood of a patient who will be having a

specific diagnosis. According to them, the Bayesian theorem provided a rational and normative means of formulating a differential diagnosis, and selecting the most probable diagnosis. They attempted to incorporate the Bayesian logic into the diagnostic context as the following: the conditional probability that a patient had a particular disease, given the presence of a set of particular symptoms and signs, was determined by or equal to (1) the prevalence of the disease or the probability of having the disease in the relevant patient population, times (2) the probability of having this particular set of symptoms and signs, given the presence of the disease being considered, divided by (3) the probability of having this particular set of symptoms and signs, given the presence of the disease being considered, and further divided by (4) the probability of the occurrence of the symptoms and signs. They argued that this mathematical formula modeled the diagnostic process. It helped prescribing appropriate diagnostic decision, and illustrating the way in which judgment or diagnosis could be revised optimally in light of new information.

It was also suggested that the concept of decision analysis, which relied heavily on the probability theory, enhanced individuals to reach a decision, and could be incorporated in the context of diagnostic reasoning. (Doubilet & McNeil, 1988; Arkes & Hammond, 1986; Jones, 1988). Accordingly, the use of decision analysis involved a number of steps: first, construct a decision tree which displays the

available decision options and the possible outcome of each; second, assign probabilities to the options, i.e. consider the likelihood of occurrence of each option; third, assign utilities to each potential outcome, i.e. the desirability attached to each outcome; fourth, compute the expected utility of each option, i.e. multiply the utility of the option by its probability; fifth, select the optimal outcome, i.e. the option with the highest expected utility. Such approach to decision making provided a procedure for synthesizing these components into an overall measure of the attractiveness of each possible option so that the optimal option can be selected (Arkes & Hammond, 1986). Schwartz, Gorry, Kassirer and Essig (1973) further remarked that decision analysis provided a good understanding of the risks and benefits of adopting a particular medical procedure, and permitted the establishment of guidelines for dealing with various classes of patient and complex clinical situations. Jones (1988) also pointed out that this approach seek to break down the diagnostic task into simple components which could be analyzed individually before being recombined into a logical temporal sequence. This restructuring, for her, displayed the crucial points in the task where a choice from a number of options was necessary. According to Jones, it also provided information necessary to make that choice and showed the consequences of each of the options.

Accordingly, a couple of studies underpinned by these statistical theories

were then conducted to capture diagnostic decisions.

Warner, Toronto and Veasy (1964) integrated the Bayesian model into a computer programme, and the programme was used to diagnose congenital heart disease. He found that the computer programme was able to classify new patient with accuracy close to that of an experienced cardiologist. He concluded that the use of the Bayesian model in diagnosis was an effective and positive measure.

Hammond, Kelly, Scheider and Vancini (1967) applied the Bayesian framework to investigate six nurses' clinical judgment. Each of them was presented with hypothetical patients and possible patient conditions. The nurse-subjects were told to collect data and revise their diagnostic decisions about the patients' condition as new data were gathered. The final nursing diagnoses were then compared with the calculated probabilities that the patients had the named conditions. The obtained results indicated that whilst consistently reviewing their diagnostic decisions, the nurse-subjects tended to be 'cognitively cautious' in their manipulation of probabilities and revision of diagnostic decision even when they were faced with a new set of data. The results also suggested that though nurses were capable of manipulating probabilities in a self-consistent manner in the face of new data, their diagnostic decisions were departed from those prescribed by the Bayesian theorem.

Nevertheless, the researchers maintained that the Bayesian model helped nurses to improve their diagnostic accuracy in revising their clinical judgments.

In a study to investigate students' learning of how to resolve a complex task, Hammond (1971) found that the provision of a graphic analysis similar to that of a decision tree helped students to 'weight' the options and to learn predicting the answer more effectively than just providing outcome feedback. He concluded that decision analysis in graphic form helped learners use information correctly and effectively.

Grier (1976) used decision analysis to investigate forty-seven registered nurses' decision about providing care to hypothetical community health patients. She found that nurses chose outcomes of their actions according to the desirability and likelihood of occurrence. She concluded that decision analysis was applicable to the selection of nursing actions.

Drawing on the concept of Bayesian theorem and decision analysis, Aspinall (1979) conducted a study to determine if the use of a diagnostic search tree or a decision tree would improve accuracy of diagnosis. She calculated the probabilities that patients had specific conditions given the presence of specific data. Three

probabilities were used to construct a branched diagnostic search tree. The experimental group nurses were given a set of this tree by which they used to diagnose a hypothetical patient. She found that the experimental group was more consistently correct than the control group who did not use the diagnostic search tree. She concluded that the use of a decision tree, which was underpinned by both decision and probability theories, significantly improved diagnostic accuracy.

Gordon (1980) used simulation to examine the strategies nurses used to scan hypotheses in the process of making diagnosis. Sixty nurses were asked to collect information and determine the 'state-of-patient' from a set of 32 possible states of complication. The hypothesis selection and elimination strategies were recorded, and the obtained data were analyzed statistically. Gordon found that most nurses began the diagnostic task by testing a few complications simultaneously, and eliminating the unlikely surgical complications. According to Gordon, the findings also revealed that in the second half of the diagnostic task, nurses focused on the direct testing of the high probability hypotheses and discarded those unconfirmed ones. Gordon concluded that nurses were using predictive strategy to attain a concept of the 'state-of-patient' in the diagnostic task. Gordon further added that this strategy was a type of probability judgment similar to decision analysis.

In a study to analyze nursing decision on the titration of pain relief, Corcoran (1986a) found that nurses followed a step-by-step process, which was similar to decision analysis, in making pain relief decisions.

In summary, these conceptual discussions and studies give a general impression that statistical theories, such as Bayesian theorem and decisional analysis, can explicitly describe and model diagnostic decision. They also suggest that these models are capable of capturing the clinical decision making policy and, in turn, offer an effective mean to predict diagnostic decision.

However, there is considerable debate with regard to the usefulness of this model in diagnostic decision. It is argued that majority of clinical decision encountered by nurses cannot fit into the assumptions and rigid procedures of this approach. Nor does this approach lend itself to the type of prompt decisions that are characteristic of nursing (Donahue & Martin, 1995). As the amount of information available is usually limited in actual clinical environment, nurses do have difficulties to generate all the possible alternatives (Habrisson, 1991). Besides, not all alternatives lend themselves to quantification in terms that will allow for easy comparison (Carnevali & Thomas, 1993). Moreover, this approach is not useful for rapid and crisis decision making, such as handling clinical emergencies (Baumann

and Deber, 1989). Also, nurses have limits to calculate alternatives because computing and assigning probabilities to options have not been part of the traditional educational preparation of nurses (Thompson, 1999). Most importantly, the ethos of nursing is not to predict correct diagnosis through the use of mathematical modeling as physicians do (Harbison, 2001). Indeed, this type of clinical decision making is a positivist approach, which only offers potential for improving decision making rather than describing the reality of clinical practice (Fishchoff and Beyth-Marom, 1983). It is more a method for rationalizing decision makers' behaviour than for explaining how they actually behave (Buckingham & Adams, 2000). The very feature of this statistical approach is more on prescription; it lacks of descriptive 'fit' (Thompson, 1999).

Seemingly, the beauty underlying statistical conceptualisation of diagnostic decision making is precision and accuracy. Yet, these core values require considerable mathematical calculations, clinical application in nursing diagnostic practice may be limited.

### *Literature on information processing theory*

Having recognized the dissonance between statistical theories and nursing

practice, nurses in the 80s resorted to other theoretical perspective to continue their pursuit on rational diagnostic reasoning and clinical decision making.

Using the information processing theory (Newell & Simon, 1972) as theoretical framework, Elstein, Shulman and Sprafka (1978) carried out a series of investigation to describe the cognitive processes of physicians to reach diagnostic decisions. In their studies, videotape-simulated recall method and think aloud technique were used to elicit and collect data. The videotapes were than transcribed into written protocols for further analysis. Their analysis revealed the following important points: (a) diagnostic performance was case specific, i.e. proficient diagnosis was dependent on the content of the medical problem than on the characteristics of the patients; (b) medical diagnostic process followed a hypothetico-deductive model; (c) physicians formulated diagnostic hypotheses early in the clinical encounter on the basis of limited data, and that subsequent data were gathered to evaluate those hypotheses; (d) physicians were generally capable of considering not more than five diagnostic hypotheses simultaneously. They concluded that, firstly, creativity and inspiration in clinical reasoning appeared to be less crucial than the organization of memory and the structure of the task; secondly, diagnostic process was a kind of hypothetico-deductive activity that early problem formulations partly guided subsequent data collection; thirdly, the phenomena of

early generation of diagnostic hypothesis was an universal feature; lastly, the number of medical diagnoses generated was closely linked with the measures of ‘chunking’ obtained in other studies of working memory. Based on these results, they suggested the following sequential model to represent the diagnostic process: (1) cue acquisition; (2) hypothesis generation; (3) cue interpretation; (4) hypotheses evaluation.

Kassier and Gorry (1978) used a similar method to study six experienced physicians’ clinical problem solving behavior. Data was obtained by the use of introspective reflection technique, and was analyzed by the protocol analysis method. They found that the subjects generated one or more working hypothesis early in the history-taking stage, and only a small number of active hypotheses were maintained by all the physicians at any one time. Kassier and Gorry also found that these physicians explicated a common set of behavior in evaluating the hypotheses, which included: (1) requesting and assessing new information; (2) rejecting some of the initial hypotheses; (3) substituting specific hypotheses for more general ones; (4) selecting a few specific hypotheses for detailed critical testing or refinement. They concluded that physicians used case-building approach in diagnostic problem solving, which consist of utilization of hypothesis-driven strategies to collect patient information, and hypothesis testing strategies to evaluate and refine hypotheses.

The studies of Elstein et al. (1978) and Kassier and Gorry (1978) provided an important platform for nurses to frame and investigate their clinical decision making and diagnostic reasoning process based on information processing theory.

Building on the work of Elstein and associates (1978), Carnevali (1984) had further advanced a rational model of diagnostic reasoning for nursing. They defined the diagnostic reasoning process for nurses as a complex, sometimes unconscious integration of critical thinking and data collecting processes nurses used to identify and classify phenomena in presenting clinical situations. According to Carnevali and Thomas (1993), this was a hypothetico-deductive process model which consisted of complex cognitive activities such as, the retrieval and consideration of diagnostic possibilities, making diagnostic judgments, and adjusting interventions. They remarked that the components of this model was best described as follows: (1) exposure to pre encounter data; (2) entry to data search field and shaping the direction of data gathering; (3) coalescing of cues into clusters or 'chunks' ; (4) activating possible diagnostic explanations (hypotheses); (5) hypothesis and data directed search of the data field; (6) testing diagnostic hypothesis for goodness of fit; (7) confirming diagnosis.

A number of studies were identified that investigate the different components of nurses' diagnostic process based on the hypothetico-deductive model.

Mitchell (1984) used simulation to analyze the diagnostic reasoning process of four nurse practitioners working in different health care settings. She found that there were commonalities of the diagnostic process between these nurses. Each subject was acting in accordance with the following steps: (1) scanning of the pre-encounter patient data; (2) entering into the data search field and shaping of the direction of data gathering; (3) coalescing of data into cluster of chunks; (4) activating possible diagnostic hypothesis; (5) testing and refining of diagnostic hypothesis; (6) selecting diagnostic classification. She concluded that the process, by which nurse practitioners arrived at nursing diagnosis, was similar to the diagnostic reasoning model that had been proposed by Carnevali (1984).

Tanner et al. (1987) conducted a study to examine the diagnostic strategies used by nurses and nursing students in deriving nursing diagnosis. Simulated patient situations were used to elicit the diagnostic reasoning process. Forty-three nurse-subjects were asked to think aloud during the diagnostic task. Their responses were taped and transcribed. The transcriptions were analyzed by the protocol analysis method and statistical analysis. Tanner and associates found that

nurse-subjects were consistent across cases in having a tendency to ask a large number of questions and to direct those questions towards certain aspect of the situation during the data acquisition phase of the diagnostic process. They also found that the nurse-subjects generated hypotheses early when diagnosing hypothetical patients. Although nurses and nursing student did not statistically differ in the number of diagnostic hypotheses generated early in the diagnostic task, nurses were found to generate more cognitively complex hypotheses than the students. Tanner and associates concluded that the diagnostic reasoning processes of nurses and nursing students were similar to the model developed by Elstein et al. (1978). The nurse-subjects used both hypothesis-driven and cue-based strategies in gathering information about patient condition, and nurses were more 'efficient' and 'proficient' in hypothesis generation than the nursing students.

McFadden and Gunneett (1992) used written simulation cases and think aloud to examine the data collecting and interpreting phases of the diagnostic reasoning process used by thirty-four practicing pediatric nurses. They found that having identified information that was related to the child's physical need, the subjects asked further specific questions to validate possible inferences before planning their interventions. They concluded that the diagnostic reasoning of pediatric nurses reflected the characteristics of a hypothetico-deductive model.

Using computer and interactive video simulations, White, Nativio, Kobert and Engberg (1992) investigated twenty-seven families and obstetric-gynecologic nurse practitioners' process of clinical decision making. They found that these nurse practitioners were involved in a process of clinical decision making in which data acquisition was driven by diagnostic hypotheses. The obstetric-gynaecologic nurse practitioners were more likely to develop lists of diagnostic hypotheses which reflected the patient's chief complaint, while the family nurse practitioners were more likely to acquire subjective and objective data that did not appear to be hypothesis driven. They concluded that these findings indicated that subjects applied the hypothetico-deductive process in clinical decision making.

Matthew and Gual (1979) studied how nurses and nursing students determined nursing diagnosis for patient in a case study. They found that even though the subjects categorized data as historical, physiological and behavioral, none of the subjects used all the available information when formulating nursing diagnosis. They also found that nurses identified more diagnoses than nursing students.

When examining the clinical judgment process of experienced registered nurses and nursing students, Itano (1989) found that, when diagnosing patient

problem, both experienced nurses and nursing students were similar in categorizing the cues collected. The nurse-subjects collected data of the present state most frequently, followed by health history data, contextual data, and data concerning past social background history. Itano (1989) concluded that following a specific pattern in gathering information and data of the present state was most useful when nurses were diagnosing the present state of patients.

Using hypothetical diagnostic task to investigate one hundred and eighty nurse subjects' diagnostic reasoning process, Cianfrani (1984) found that diagnostic errors increased as the amount of information provided were increased. Besides, he also found that there was a statistically significant decrease in diagnostic accuracy when low relevant information was used. Cianfrani concluded that the amount and relevance of data collected affected the accuracy of identifying patients' health problems. When insufficient data were collected, incorrect hypotheses were more likely to be selected as final diagnoses.

Tanner (1982) examined hypothesis generation strategies of nursing students in the diagnostic process. She found that students generated from one to five initial hypotheses in simulated diagnostic tasks. The students were more often accurate when the correct diagnosis was induced in the initial group of possible diagnoses.

Thus, Tanner remarked that it was important to include all possible diagnoses within the original set of hypotheses generated.

Gordon (1987) examined the application of predictive strategies in diagnostic tasks. She found that hypothesis testing was a key component of the diagnostic process. She pointed out that hypothesis testing involved the confirmation or elimination of the diagnostic hypotheses under consideration. According to Gordon, a diagnostic hypothesis was retained or rejected depending on its congruence with the information gathered. She remarked that hypotheses testing required nurses' awareness of the highly valid and reliable information associated with the hypotheses under consideration. Gordon also found that there were two different ways of hypothesis testing: single hypothesis testing used to evaluate one diagnostic possibility at a time; multiple hypothesis testing simultaneously evaluated more than one possibility. Subjects used a mixed way to test hypothesis during identification of hypothetical post-operative patients' complications. Multiple hypothesis testing occurred most frequently in the first halves of the diagnostic tasks; single hypothesis testing peaked in the second halves of the tasks.

Radwin (1989) studied how clinical nurse specialists used information when diagnosing hypothetical patients in pain. She found that accurate subjects differed

from inaccurate subjects in the type of information collected and the use of information in hypothesis testing. While majority of the accurate subjects used multiple-hypothesis testing, inaccurate subjects tend to use single hypothesis testing. These differences were found to be statistically significant. Radwin concluded that nurses were using mixed strategies in testing the diagnostic hypotheses.

In short, the information processing theory offers discrete stages around which to organize research. Guided by this theory, investigators can study the ways in which information is gathered and used, and hypotheses generated and tested. Besides, it appears that these studies on clinical decision making, clinical judgment and diagnostic reasoning support the claim that the process of making diagnosis consists of a series of rational and analytic cognitive processes, which is hypothetico-deductive in nature. In addition, it undoubtedly promotes communicability in the decision making process (Thompson, 1999).

However, not all researchers view this model favorably. Some argue that the hypothetico-deductive model underpinned by the information processing theory is of limited usefulness because it over simplifies the diagnostic process, fails to capture all the variables involved, and, most importantly, provides only 'incomplete' picture which does not represent the reality of clinical practice (Jenkins, 1985;

McGuire, 1985; Radwin, 1990; Lauri & Salantera, 1995; Thompson, 1999).

The implicit assumption underpinning these studies that nurses reason in a primarily rationalist fashion is being questioned. Concerns are raised with regard to the fact that those factors, such as emotions, affect and context, which may, in fact, be relevant as nurses make diagnosis, are largely de-emphasized by this model (Gardner, 1985; Radwin, 1990; Cholowski & Chan, 1992; Tanner, Benner, Chesla, & Gordon, 1993).

Besides, the claim made by these studies that diagnostic reasoning is the result of a unitary generic process used by all nurses at all times is also being seriously challenged (Radwin, 1995; Greenwood, 1998). It is argued that more than one method of decision making may play a role in clinical reasoning (Benner, 1982; Corcoran et al, 1988; Radwin, 1990). Diagnostic reasoning processes may be problem specific and differ depending on the clinical situation ( McGuire, 1985; Tanner, 1987; Castledine, 1995; Greenwood, 1998).

Other criticisms are largely methodological in nature. Most of these studies predominantly used simulations, think aloud and protocol analysis as data collection and analysis methods. It is argued that the use of these methods to describe

cognitive processes has not only affected subjects' performance, it is also not sufficiently approximating real-life clinical situation as it occurs in practice. Hence, although significant relationships between types and amounts of information collected and the specific strategies used to generate and test hypothesis were identified in some of these studies; the fidelity of these findings in terms of generalization and applicability to real-world diagnostic process is questionable (Hogarth, 1981; McGuire, 1985; Dreyfus & Dreyfus, 1986; Funder, 1987; Padrick, 1990; Orme & Maggs, 1993; Dela Cruz, 1994; Radwin 1995, Roberts, While & Fitzpatrick, 1996; Greenwood, 1998).

It is apparent that the strength of explicating diagnostic reasoning in terms of the information processing theory lies in the heart of logic, objectivity, and rationality. Nevertheless, the questionable assumptions and methodological flaws of this approach render the possibility of applying the research findings to real work diagnostic practice debatable.

### *Literature on intuitive reasoning*

In contrast to the rationalist perspectives, those who hold a phenomenological perspective argued that patient problems were not amenable to any systematic,

formal or analytical modeling. In the process of reducing patient situations to discrete elements for analysis, nurses' sensitivity was lost and the basis for decision making was thus weakened. The use of formal rational analytical thought was therefore limited. Clinical decision making was indeed resided in the ability to synthesize task without resorting to formal analysis. The role intuition plays in nurses' diagnostic practice should be acknowledged (Benner & Tanner, 1987; Rew & Barrow, 1987; Young, 1987; Burnard, 1989; Harbison, 1991). Hence, in the 90's those who shared with this view attempted to unfold the intuitive aspects of diagnostic practice in nursing.

Benner and Tanner (1987) used Dreyfus and Dreyfus' (1986) model of intuitive judgment to examine the nature and role of intuition in nurses' clinical judgment. They interviewed and observed twenty-one nurses who had a minimum of five years experience in a single setting, and who were identified as expert by their peers. In analyzing the transcriptions, they found that there were rich examples of nurses' intuitive judgment which were similar to that described by Dreyfus' six key aspects of intuition, i.e. pattern recognition, similarity recognition, commonsense understanding, skilled know-ho, sense of salience and deliberative rationality. They concluded that intuition played an important role in the expert nurses' clinical practice, and that the patterns of intuition identified were working together in

synergy when the nurses make intuitive judgment.

In a study to examine fifty-six nurses' intuitive experiences in decision making, Rew (1988) attempted to use Loye's (1983) framework of intuition to categorize the types of intuition in nursing from the interviewed data. Though there was evidence that nurses recognized intuition as a valuable component of their decision making process, Rew found it difficult to differentiate the types of intuition in accordance with Loye, i.e. cognitive inference, gestalt intuition and precognitive intuition.

In a qualitative study of sixteen critical care nurses' clinical practice during ventilator weaning of adult patients, Jenny and Logan (1992) identified a cognitive and relational process by which the study participants determined salient aspects of patient situation. They referred to this process as 'knowing the patient'. According to them, the process of 'knowing the patient' involved a number of nursing actions: envisioning, communicating, self-presentation and showing concern. Jenny and Logan remarked that these actions enabled the nurses to make judgment about the nature of the patients and their clinical status.

Orme and Maggs (1993) conducted a qualitative study of how nurses make

decisions in clinical practice. The samples included twelve nurse practitioners from various settings and a focus group interview approach was used. The group explored clinical decision, identified processes at work and attempted to illuminate the importance of nurse intuition when collecting information prior to reaching a decision. Orme and Maggs found that gut reactions were often present when the practitioner made decisions, and intuition was reported to be useful to the practitioners when they interpreted clinical situations. Orme and Maggs argued that intuition was a domain of practice for nurses. Following this theme, McCormack (1993) conducted a qualitative study to explore intuitive incidents amongst student nurses. The findings indicated that though students had difficulties in using concrete words to express their intuitive thoughts, they recognized that they often had 'gut feelings' or 'instinct' about their patients. McCormack maintained that the results of this study suggested that there was a crucial aspect of judgment in students other than the conscious elements of decision making: intuition.

Polge (1995) conducted a quantitative postal survey to investigate the relationship between the use of intuition in clinical judgment and characteristics of the nurse. A random sample of five hundred critical care nurses were sent a simulated patient case study and questionnaire to determine the self-reported level of nursing proficiency of participant. The case study was left vague to enable the

nurses to make their own judgment according to their level of proficiency. They were then directed to choose from five short statements which best described the way they would make clinical judgments based on the situation. The findings indicated that as the nurses' level of expertise and years of experience increased so did the use of intuition in making clinical judgments. Polge (1995) concluded that the use of intuition was correlated with nurses' expertise and experience.

Using think aloud and protocol analysis to explore three critical care nurses' reasoning strategies when caring for unstable postoperative patients in intensive care settings, Fisher and Fonteyn (1995) found that these nurses employed four distinct reasoning strategies when caring for patients within their area of domain expertise. These strategies were identified as: (a) anchoring: formulating hunches from initial clinical data to anticipate the likelihood of future clinical events; (b) attending: distinguishing the most relevant indicators from all the available patient data; (c) focused questioning: checking hunches to assist in making sense of the data; and (d) listing: taking a cognitive inventory of relevant information to organize and plan care. However, in view of the limited sample size, they remarked that the findings were tentative and of insufficient depth to permit generalizability.

Offredy (1998) used retrospective verbalization and observation method to

explore the decision making process of twenty nurse practitioners in general practice. Data were transcribed verbatim and were analyzed using content analysis. Offredy found that participants repeatedly stated that they relied on their intuition to assist in clinical situations. They described aspects of their 'intuitiveness' in both general and specific terms which, according to Offredy, could be allocated to two of Loye's (1983) three types of intuition: cognitive inference and gestalt intuition. Offredy concluded that intuition was a decision strategy commonly used by clinician, but was seen to be more often associated with experienced nurse practitioners.

Parker, Minick and Kee (1999) used a phenomenological approach to reveal the processes of clinical decision making by perioperative nurses. Six nurses with a minimum of five years experience were asked to describe any perioperative clinical situation in which they had a sense of something about to happen, and if they believed that their interventions made a difference in patient outcomes. Interviews were transcribed and analyzed by content analysis. They found that in every situation described, 'seeing the big picture' was presented as the main concern in the process of decision making. Three themes were also identified within nurse's main concern when making decision on patient's condition: making a connection, embodied knowing and comprehensive patient advocacy. However, the interconnections between these themes and how they were related to the main

concern were not clearly identified.

Using the Delphi survey technique and focus group interviews, McCutcheon and Pincombe (2001) examined the use of intuition and its impact on nursing practice. Two hundred and sixty-two nurses were involved in the survey and twenty-nine of these nurses participated in the focus group interviews. They found that intuition was not just something that ‘happens’. It was the synergy that occurs through interaction of knowledge, experience and expertise. The data also revealed that the environment in which the nurse was working could either support the use of intuition or suppress it. Besides, participants in the study indicated that they considered that personality was also related to the individual’s intuitive perceptions. Moreover, some nurses considered that a relationship with a client was required before they were able to be intuitive about that person’s situation. McCutcheon and Picombe concluded that intuition existed and had an important role in nursing. According to them, intuition was a result of a complex interaction of attributes, including experience, expertise and knowledge, along with personality, environment, acceptance of intuition as a valid ‘behavior’ and the presence or absence of a nurse/client relationship.

Hallett, Austin, Caress and Luker (2000) conducted a study to examine

community nurses' perceptions of quality in wound care. One of the main themes of the study was focused on decision making as an element of quality. The interviews of sixty-two community nurses were semi-structured, and were tape recorded, fully transcribed and content analyzed. The interpretation of data suggested that the clinical decisions made by community nurses in the area of wound care appeared largely intuitive, yet were also closely related to the cognitive activities of a diagnostic reasoning process. They concluded that theories in clinical decision making might be more compatible than that had hitherto been supposed in the context of wound care in community setting.

King and Macleod Clark (2001) carried out a constructivist qualitative study to explore sixty-one qualified nurses' expertise through their assessment of patients following major surgery in surgical wards and intensive care units. Nonparticipant observations and semi-structured interviews were used to surface nurses' perceptions of the nature of their decision making process and how their expertise had developed. They found that intuitive awareness appeared to become an increasingly powerful aspect in some these nurses' decision making. Intuition appeared to act as a trigger, sparking an analytical process that involved the nurses in a conscious search to acquire data that would confirm their sense of change in the patient's status. Beginners had little ability accurately to identify the basis of their intuitive concern

and few analytical skills to interpret their importance in relation to the patient's condition. The most fluent and effective use of intuitive and analytical components of decision making was found in the expert group. King and Macleod Clark concluded that both intuitive and analytical components should be recognized as an integral nature of nurses' decision making. The difference between expert and beginner decision making appeared to lie in the ability to use intuition much more skillfully and effectively, and, this ability was dependant upon the depth of the knowledge/experiential base of expert practitioners.

To this end, it seems that these studies argue that there is yet another form of reasoning which plays an important role in nurses' diagnostic practice - intuition. Some of the studies also suggest that experience and knowledge play an essential role in intuitive reasoning. Nevertheless, an inherent weakness of most of these studies is the inability to provide detailed explanations on how nurses arrived at a particular clinical judgment or diagnostic decision when using intuition in clinical settings (English, 1993). Besides, it is apparent that less agreement exists about terms and methods among researchers studying intuitive reasoning in diagnostic practice, and definitive conclusions about the critical components of intuitive diagnostic reasoning are generally lacking. Hence, summarizing the results of the work on intuition becomes difficult, and, most importantly, establishing common

grounds to describe intuitive diagnostic practice is highly unlikely. Moreover, findings of some of the recent studies even add more confusion to the use of intuitive reasoning by suggesting that diagnostic practice may consist of both analytical and intuitive components.

### *Variables influencing diagnostic practice*

The review of literature on clinical decision making, diagnostic reasoning and clinical judgments suggested that a couple of variables were being repeatedly mentioned as having influences on the diagnostic process.

#### *Knowledge*

Carnevali (1984) pointed out that one could not possibly diagnose what one does not recognize or understand. In studying the relation of task complexity and nursing expertise, Corcoran (1986) found that the lack of knowledge had led to incomplete and erroneous diagnosis. Joseph and Patel (1990) examined the role of domain knowledge in the process of hypothesis generation during diagnostic reasoning. They found that significant differences were found in the links or relations between the cues, with the high-domain knowledge group used more relations to connect important information. Besides, according to them, even the

low-domain knowledge subjects also generated accurate diagnostic hypotheses but were eventually unable to discriminate between and eliminate alternative hypotheses. In a study to investigate the diagnostic reasoning process of the one hundred and sixty nine nursing students, Cholowski and Chan (1992) found that nurse-subjects with more knowledge were likely to attain a higher level of logical reasoning, and, subsequently, were more likely to diagnose at a systemic level.

### *Experience*

Radwin (1990) remarked that experience played an important role in diagnostic reasoning. Matthew and Gaul (1979) examined the cognitive processes utilized in nursing diagnoses. They found that graduated nursing students identified significantly more diagnoses than undergraduate nursing students did. In studying nurses' perceptual awareness of critical practice incidents, Benner and Wrubel (1982) found that experienced nurses grasped patients' problems more rapidly. Balla (1982) studied the use of critical cues and prior probability of experienced physicians and medical students in clinical decision making. He found that students had more difficulties in attaching correct weights to cues than physicians. In a study to investigate the nurses' capability in activating diagnostic hypotheses, Westfall, Tanner, Putzier and Padrick (1986) found that registered nurses were more proficient

and efficient than nursing students in generating hypotheses about hypothetical patients. In a similar study, Tanner, Padrick, Westfall and Putzier (1987) also found that the more experienced the subjects were, the more focused and systematic they were in the acquisition of data. A couple of qualitative studies that examined the role of nurses' experience in intuitive clinical decision making also suggested that experience gained from time spent in nursing and exposures from practice not only facilitated nurses' confidence in performing diagnostic tasks, but also enhanced their intuitive insights by sharpening their recognition of patient characteristics (Schraeder & Fiscer, 1987; Alexaner, 1991; Benner, Tanner & Chesla, 1992; Jenny & Logan, 1992; MacLeod, 1993; Radwin, 1998). However, Aspinall (1976) discovered that there was a decline in diagnostic accuracy performance in nurse-subjects who were having more than ten years clinical experiences. Tanner (1984) also pointed out that experience could also bias the diagnostic process, especially in the assessment of probabilities. According to her, there were three main types of biases: (1) frequency of occurrence in experience influenced the diagnostic process by altering the diagnostic possibilities considered; (2) recency of experience referred to the tendency to oversample more recent experiences and to undersample or ignore less recent experiences; and (3) profoundness of memory referred to the tendency to oversample events that were dramatic.

## *Discipline*

Carnevali (1984) asserted that one's discipline-specific training always pre-set the cues one would notice, and also determined the diagnostic labels that one would use to organize, classify and explain the data. McLaughlin, Cesa, Johnson, Lemons, Anderson, Larson and Gibson (1979) investigated the difference on aspects of diagnostic judgment between physician and nurse. They also found that physicians' were more pathophysiological oriented, where as nurses tended to focus more on psychosocial aspects. In studying uncertainty in illness, Mishel (1988) found that nurses who have specialized in human response to uncertainty inclined to look more at these aspects of the patient and family situation. Coincidentally, O'Toole, O'Toole, Webster and Lucal (1996) investigated nurse's diagnostic work on physical child abuse also reported that nurse's specialization influenced the choice of information in making a diagnosis.

## *Task and cue*

Tanner (1984) stated that the complexity of diagnostic tasks exerted influence on the diagnostic process. According to her, the complexity included (1) the number of cues: the greater the number of cues represented, the more complex the

task; (2) dependability: the greater the dependability of the available cues, the fewer the number of cues needed and the less the cognitive strain; (3) redundancy: the greater the redundancy, the easier the task; (4) overlapping cues: the more the cues overlapped in differential diagnoses, the more complex the task would be; and (5) irreducible uncertainty: the more irreducible the uncertainty, the more complex the task would be. In a series of investigation to study the diagnostic process of physician, Elstein et al. (1978) found that there was a positive correlation between diagnostic accuracy and the use of critical cues. They concluded that diagnostic performance was dependent on the content of the medical problem. Cianfrani (1984) examined one hundred and eighty nurse subjects' diagnostic reasoning found that diagnostic errors increased as the amounts of cues were increased or when low relevance information was provided. In a study to examine task complexity and nurse expertise, Corcoran (1986) also pointed out that the more difficult the diagnostic task, the more difficult the decision making was and the higher the likelihood that an incorrect decision would be made. Moreover, Gordon (1987) remarked that relevance of data added validity to information, which was important in the processing of cues. According to her, the addition of irrelevant information to relevant cues could increase the number of errors made as well as rendered the task more difficult.

### *Psychosocial cultural factors*

Clark, Potter and McKinlay (1991) remarked that the process of diagnosing patient was likely to be influenced by a couple of psychosocial and cultural factors such as, role, relationship, attitude and mood.

In studying the sociological influence on decision making by clinicians, Eisenberg (1979) found that clinicians performed according to the norms expected by their colleagues and the patients. Mitchell (1984) and Woolley (1990) also argued that the reasoning process of nurses might be hindered when the reality of individual's role within the clinical environment failed to match that of the individual's expectation or perception of the role.

Jenks (1993) examined the pattern of personal knowing in nurses' clinical decision making and found that nurses reported feeling of insecurity and were less certain about their ability to make appropriate decisions when good relationships with colleagues and patients, in particular, did not exist. She concluded that the relationship the nurse had with colleagues and patients influenced their decision making ability. In a study to investigate the decision making strategies of 'knowing the patient', Radwin (1995) found that the decision making process of nurses was

also largely influenced by how well they knew their patients.

Marriner (1983) pointed out that prejudicial perceptions, such as stereotyping, labeling and preoccupation often decreased nurses' perceptiveness, which, in turn, weakened the accuracy of cues interpretation and diagnosis formulation. In a study to examine factors influencing nurses' pain assessment and interventions in children; Hamers, Huijer Abu-Saad, Halfens and Schumacher (1994) found that nurses who had negative feelings about pain medication such as drugs were harmful or had side-effects, symptoms might be suppressed by medications, or a fear that something would go wrong, inclined to delay the administration of analgesics as long as possible. They concluded that the attitudes of nurses influenced their decision on pain assessment and implementation of subsequent interventions. Luker, Hogg, Austin, Ferguson and Smith (1998) studied the decision making process in the context of nurse prescribing and found that nurses inclined to write prescriptions if they knew the financial circumstances of the patients were poor. They argued that the social background of patients was a major influence on the attitude of nurses in their deciding to prescribe or not.

Flett, Pliner and Blankstein (1989) conducted a study to examine the effect of depression on information processing. They noticed that people made decisions

more slowly, and with more complex causal attributions when they were in negative mood. In studying the influence of mood on cognitive categorization, Murray, Sujan, Hirt and Sujan (1990) also found that happy people made decisions quickly, worked quickly at simple tasks, and grouped more varied things together into same category.

In short, these studies suggest that the effectiveness and efficiency of diagnostic practice are contingent on some personal, psychosocial, and structural variables. However, it is found that these discussions are inconclusive in offering detailed explanations on how these variables exert influences on the diagnostic process. Besides, the findings of most of these studies are based on simulation methods to distinguish the influences. The possibility of capturing the distinctive impacts of these determinants on diagnostic practice in real clinical environment is thus questionable. In addition, given that the reality of clinical practice is so complex, it may be possible that variables other than those that have been mentioned will also have some influences on the diagnostic practice as well.

### ***Concluding remarks***

In the past decades, much research has been conducted on the practice that nurses have engaged in diagnosing the clinical condition of patients. Many of the studies have been guided by either the statistical theories or the information processing theory. These studies suggest that diagnostic practice of nurses follow a systematic, analytic and rational model. Some criticisms have been made of studies based on these rationalist theoretical perspectives. First, an overwhelming number of the researches is conducted in simulation settings that do not approximate real-world clinical situations sufficiently well to evoke nursing practice as it occurs in diagnosing the clinical condition of patients. Second, questions have been raised about the assumption that nurses reason in a primarily rationalist fashion. Third, psychosocial and structural variables, such as mood, context and culture, which diagnostic practice are contingent upon have been largely de-emphasized in most of these studies. A second line of inquiry, which adopts a phenomenological perspective, claims that intuition forms the major core of diagnostic practice in nursing. However, none of the studies offer conclusive explanations of the details on how intuitive reasoning directs diagnostic practices. Obviously, the transferability of findings from these intuitive studies is likely to be limited.

It is therefore apparent that despite the substantial volume of research literature in the field of decision making, clinical judgment, diagnostic reasoning,

and nursing intuition, the distinctive process that nurses engage in diagnosing the clinical condition of patients in acute clinical environments still remain largely undefined, under documented and essentially invisible. Indeed, the literature creates more questions than provides answers to this problem:

- ♦ How do nurses carry out diagnostic practice in real-world clinical environment?
- ♦ What are the critical components of diagnostic practice in nursing?
- ♦ How similar are these components to those that have been described earlier?
- ♦ What variables are influencing diagnostic practice in real-world settings?
- ♦ How and to what extent do these variables influence diagnostic practice?

Given that the real-world clinical situation is so complex, and, as discussed earlier, the conceptualization of diagnostic practice in nursing is largely encompassing behavioral activities ranging from psychosocial interaction and cognitive functioning; diagnostic practice should not be just concerned with reasoning. It must essentially goes beyond mental activities. In view of these, studies are deemed necessary to surface some conceptual explanations of the underlying structures and processes in diagnostic practice in real-world clinical settings where nurses inevitably involve themselves in making conclusion about their patient' s clinical status.

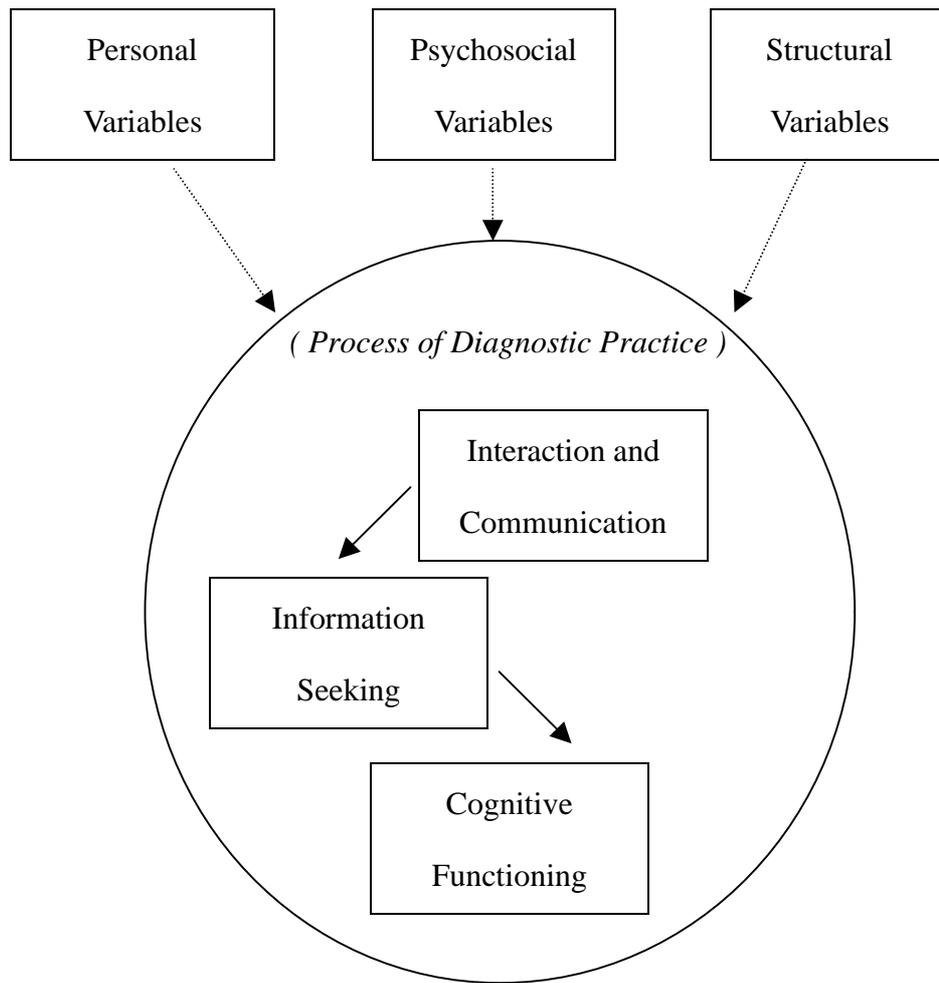
Following this line of thought, a study was therefore conducted to generate a substantive theory to provide comprehensive explanations of the following question:

*“What exactly is going on when nurses diagnose patients’ clinical conditions in acute clinical environments?”* More specifically, the objectives of this study are:

- a. to unfold the salient patterns of diagnostic practice among nurses;
- b. to surface the critical components of diagnostic practice;
- c. to identify variables considered to be influential in diagnostic practice;  
and
- d. to delineate the relationships between the critical components and the influential variables.

### **Conceptual Framework of the Study**

Based on the above discussions, the following conceptual framework of diagnostic practice in nursing is proposed:



The proposed framework has no intention to provide conclusive and full-fledged explanation on nurses' diagnostic practice. Rather, it is hoped that the development of this model will further crystallize the researcher's understanding of the research problem, and sharpen his theoretical sensitivity. As a result, the focus and direction of the study can be put into perspectives.

## **CHAPTER 3: RESEARCH METHODOLOGY**

---

This chapter explains and justifies the use of grounded theory as the method of inquiry for the present study. The characteristics of grounded theory and its philosophical assumptions are discussed. The application of grounded theory to the present study is outlined and the ethical and practical issues involved are described.

### **Philosophical Perspective and Paradigm of Inquiry**

Any process of research inquiry is guided by a set of ‘basic beliefs’. These beliefs, which form the foundation of a research paradigm, are designed to answer three questions: ‘what is the nature of reality?’, ‘what is the relationship between the researcher and knowledge?’, and ‘how should the inquirer go about finding out knowledge?’ (Guba, 1990; Bailey, 1997). Annells (1996) further remarks that the actual formulation of the research question is dependent on the researcher’s notions about the nature of reality, the relationship between the knower and what can be known, and how best to discover reality. The selection of research method can therefore be viewed as arising from the basic philosophical beliefs about inquiry as

held by the researcher. It is therefore imperative that whatever research method is chosen its philosophical basis and inquiry paradigm should be congruent with the researcher's epistemological focus and relevant to the research problem (Field & Morse, 1985).

Since this study emphasizes understanding of human experiences and generation of theory rather than measurement, analysis, and prediction of causal relationships between variables, quantitative methodology is inappropriate. In the present study, hypotheses have not been formulated and no attempts at casual inference have been made. It is indeed not the intention of this study to degrade the quantitative methodology in order to justify the use of other research methods. Rather, it is a matter of deciding which method is most relevant to the research problem under consideration. The present study is concerned with understanding and discovery and therefore warrants a method which is flexible and allows for exploration of new areas of knowledge and for development of insight into the nature of the problem.

Despite the substantial volume of research literature in the field of decision making, clinical judgment, diagnostic reasoning, and nursing intuition, the distinctive process when nurses engage in diagnosing the clinical condition of patients in acute clinical environments still remains largely undefined and under documented. This

study seeks to understand and explain this process. Diers (1979) contends that when the research question requires a response based on understanding and explanation, the researcher is seeking answers to questions such as 'what is going on here?', 'how does this person feel about this?' or 'what does the experience mean?'. This suggests attempts are being made to probe beneath the surface of an issue in search of meaning which enhances the understanding of behaviour.

Munhall (1998) points out that qualitative research uses an inductive approach which lends itself to going out and finding out what's going on and leads to theory development. In using qualitative methods the researcher is seeking to discover knowledge and to uncover new insights, meaning, and understandings from the authentic source and is looking at the whole within context. Thus, according to Munhall (1998), the use of qualitative methods is appropriate when: (1) virtually nothing seems known about a topic or phenomenon; (2) what seems to be known or believed somehow does not seem accurate; (3) inconsistencies and biases are present and time has changed what is believed; (4) feelings arise such as 'something doesn't ring true', 'that's not real life', and 'something's going on here and I'm not quite sure what it is'; (5) the researcher wonders what it would feel like to experience something he or she knows nothing about.

Indeed, qualitative methodology is of particular value in situations when little is known about a domain, when the researcher suspects that the present knowledge or theories may be unclear, or when their research question pertains to understanding or describing a particular phenomenon or event about which little is known or understood (Field & Morse, 1985). The emphasis of qualitative research is on determining ‘how things are’ from individuals’ perspectives so as to gain an understanding of the complex world of lived experience from the point of view of those who live it (Melia, 1982; Schwandt, 2000). The researcher seeks to understand behaviour as the participants understand it, learn about their world, and share their interpretations their definitions (Chenitz & Swanson 1986).

Grounded theory, a well established qualitative method that provides a systematic analytic approach to qualitative studies (Charmaz, 2000; Morse, 2001), was chosen as the appropriate methodological approach for this study.

## **The Grounded Theory**

### *An overview*

Grounded theory was developed by two sociologists, Glaser and Strauss (1967), in their efforts to provide a new scientific method of analysis capable of legitimizing the treatment of qualitative data (Chicchi, 2000). These sociologists came from very different backgrounds. Glaser was trained in quantitative research (Smith & Biley, 1997) whereas Strauss was strongly influenced by the Chicago School of Sociology and the symbolic interactionist perspective (Kendall, 1999). Despite their differences in background, Glaser and Strauss were both troubled by the analytical processes used to arrive at theoretical explanations in qualitative studies (Glaser & Strauss, 1967; Robrecht, 1995). Their goals were therefore to produce research method that would be of value to practitioners and to develop theory that fitted with reality. They sought to resolve this problem by developing a specific methodology that encompassed systematically collected data leading to a multivariate conceptual theory that captured a fuller explanation of the reality (Glaser, 1999). They claimed that to generate a theory starting from data meant that many hypotheses and concepts were not only based on data, but that they were also systematically extrapolated from the data during the process of research (Glaser & Strauss, 1967). The resulting theory was therefore a substantive theory that was grounded in the reality of the social world and close to the world of the practitioners. Indeed, grounded theory produces situation-specific substantive theories that are rich and meaningful for the understanding of intermingled types of work (Strauss & Corbin, 1994), yet remains

faithful to individuals' experiences (Kearney 1998). Hence, the term 'grounded' is used to describe the nature of theory that originates in data from real world situations (Mullen, 1986).

Grounded theory is thus a methodological package that provides a series of systematic and exact methods, which transform data into concepts, and concepts into core categories that can be used to formulate scientifically valid and theoretically plausible research results (Glaser, 1999). The rigor of grounded theory arises from a set of clear guidelines that help to build explanatory frameworks about the relationships among concepts. The strategies of grounded theory include: (a) simultaneous collection and analysis of data; (b) a two-step data coding process; (c) comparative methods; (d) memo writing aimed at the construction of conceptual analyses; (e) sampling to refine the researcher's emerging theoretical ideas; (f) integration of the theoretical framework (Charmaz, 2000).

Indeed, the strength of grounded theory is its ability to describe patterns of behaviour or typologies, while retaining the individual (Morse, 2001). With its conceptual freedom from time, place, and received concepts, grounded theory offer a method which yields research that 'fits, works, is relevant, and is readily modifiable'. One of grounded theory's greatest strengths is the challenge it presents to researchers

to actively seek variation. While remaining focused on the concept, the researcher's deliberate listing of all data characteristics, comparing and contrasting, coding and verifying, and the purposeful seeking of negative cases leads to saturation of categories, rich data, and comprehensive results. The complete theory is thus presented as a balanced and well-rounded explanatory model (Morse, 2001).

For these reasons, grounded theory is particularly useful for research in situations that have not been previously studied extensively, where existing research has left major gaps, and where a new perspective might be desirable to identify areas for interventions in practice (Schreiber & Stern, 2001). It is appropriate for analyzing complex processes (Morse, 2001). Grounded theory may go beyond description and may help to generate theoretical models of individuals' perspectives on a given phenomenon or to explain the process or strategies used to resolve or cope with the problem in a distinct and bounded context (Strauss & Corbin, 1998). The purpose of grounded theory is thus to generate substantive mid-range theories through the process of constant comparison. Collected data are analyzed through the process of coding. Memos are written to further conceptualize properties of the theoretical ideas and constructs. As similarities and differences in the codes are conceptualized, a coding scheme reflecting theoretical constructs is refined by clustering codes together to make categories. Conceptual saturation is reached when no new categories are

generated from the open codes, and the remaining gaps in the emerging conceptual scheme are filled. The categories are then examined for their relationships to each other. The integration and interrelationships of categories, especially the core categories, form the basis of the grounded theory (Kendall, 1999). Indeed, grounded theory is designed for discovery of the basic social-psychological or social-structural processes that are used by persons or social group in response to specific social problems (Glaser & Strauss, 1967; Kearney 1998). It offers a way to include processes and actions in the analysis of how participants create and respond to experiences (Schreiber & Stern, 2001). Grounded theory is thus the method of choice if the research puts its emphasis upon theory development (Strauss & Corbin, 1998).

### *Theoretical foundation*

Grounded theory arises directly from the symbolic interactionist tradition (Corbin & Strauss, 1990; Kearney, 1998). There are three basic premises underlying this tradition: (1) that people act and react on the basis of the meanings that objects and other people in their environment have for them; (2) that these meanings are based on social interaction and communications; (3) that these meaning are established through an interpretive process undertaken by each individual (Polit & Hungler, 1999). Symbolic interactionism focuses on the manner in which people make sense of social

interactions and the interpretations they attach to social symbols.

Symbolic interactionism has developed, in part, in response to the grand functionalist theories that dominate sociological thought during the end of the 19<sup>th</sup> century and the early to mid 20<sup>th</sup> century (Kendall, 1999). Symbolic interactionism challenges functionalist thinking by stating several theoretical objections: (a) functionalist theory is inherently normative, evaluative, and conservative and is unable to account for periods of rapid social change; (b) functionalist theory is perceived to be a much more logical and orderly account of social life than supported by empirical observation; (c) a functionalist theoretical perspective views the role individuals occupied to maintain the greater system, be they family or society, as the basic unit of analysis. The result of a functionalist perspective is that individuals are often reduced to a set of structures, functions, and mechanisms whose purpose is to keep society homeostatic and orderly, static, and conventional (Bowers, 1988). Hence, symbolic interactionism maintained that there is a need for special methodology for the study of human behavior, apart from the highly positivistic method of functionalism (Kearney, 1998).

Drawing on Mead's (1962) postulation of social nature and origin of self, symbolic interactionism emerges as an alternative account of social life that views

society as a fluid and dynamic process of ongoing activity that varies with reciprocating interactions (Blumers, 1969). It assumes that the distinctive character of human relationships is having the ability to construct and share meaning (Bowers, 1988). The tenets of symbolic interactionism are: (a) individuals will act towards other human beings, inanimate objects, or situations in terms of the meaning they have for these things; (b) meanings are central to the understanding of behaviour. Meanings are social products formed through or created from defining activities of people as they interact i.e. social interactions, during which symbolic actions and languages are perceived; (c) the use of meaning is an interpretive process. The individual first perceives that something (human being, situation, or action) has meaning and then organizes and makes sense of that meaning in order to determine what actions will be taken. Hence, when individuals associate with one other, they are involved in interpretive interaction (Blumer, 1969).

Symbolic interactionism is therefore a perspective that is concerned with the generation, persistence, and transformation of meaning, and claims that meaning is only be established through interaction with others (Schwandt, 1998). Thus, within symbolic interactionism, the notions of “with whom”, “with what”, and “how one interacts” become the major determinants in how one perceives and defines reality (Blumer, 1969).

This classic conception of symbolic interactionism is criticized for focusing exclusively upon the individual in society, and ignoring influences from factors such as culture and class struggle upon the interpretation of meaning (Annells, 1996). There is a need to approach symbolic interactionism by increasing the influence of these insights upon the interpretation of meaning. Thus, modern interpretations of symbolic interactionism involve not only the studying of human behaviour, but also the consideration of how issues such as culture, power, and gender may shape this behaviour within the society (Denzin, 1989).

It is from this theoretical basis that the methodology of grounded theory was formulated and introduced (Glaser & Strauss 1967). Grounded theory developed as both a research methodology derived from the assumptions and theoretical underpinnings of symbolic interactionism and a method for systematically deriving empirically based theories of human behaviour and the social world through an ongoing process of comparative analysis (Benoliel, 1996).

Indeed, grounded theory is rooted in symbolic interactionism (Stern, 1994). Its method is based on the concept that behaviour occurs within a social setting, influenced by socially derived concepts of self, other, and group (Mullen, 1986).

Grounded theory is therefore the method of choice when the problem being examined is considered a dynamic process (Stern, 1996). The areas of interest for investigation by grounded theorists are the basic processes that people use to deal with social situations to which they must adapt (Benoliel 1996).

### *Canons and methods*

For substantive mid-range theories that are genuinely grounded in data and phenomena, the following criteria are important: (a) fit the substantive study area by faithfully representing the data, i.e. theoretical categories are developed from analysis of the collected data, and these categories explain the data they subsume; (b) be useful in daily situations and applicable to that area studied by providing a useful conceptual rendering and ordering of the data which explains the studied phenomena; (c) make sense to the participants, and to practitioners within the area studied by offering analytic explanations of actual problems and basic processes in the practice setting; (d) be able to account for variation by allowing modification of their emerging or established analyses as conditions change over time or further data are gathered (Glaser & Strauss, 1967; Glaser, 1978; Glaser 1992; Strauss & Corbin, 1998).

Research underpinned by the grounded theory should satisfy these criteria otherwise the theory produced may only be able to claim that it used some of the procedures. (Glaser & Strauss, 1967; Stern, 1980; Strauss & Corbin, 1990; Glaser, 1992; Benoliel, 1996; Backman & Kyngas, 1999). As a method of theory development, grounded theory provides components for systematic synthesis of social processes (Glaser, 1978). These components include suitable data source, theoretical sampling, theoretical saturation, theoretical sensitivity, constant comparative analysis, and identification of core categories.

#### *Data source*

Grounded theory data should be presented in a continuous form by which the process and its structure can be readily identified (Morse, 2001).

Regarded as one of the major sources of data in qualitative work, observational data allows the researcher to gain insights into the behaviour of those being studied in the natural setting (Field & Morse, 1985). However, observational data is only a snap-shot of a process. Field notes from observations record short periods of activities or interactions rather than a continuous overview of the process. Such observations may be regarded as micro-analytic glimpses that do not give a full view of the process

for developing theory (Morse, 2001).

Focus group data, one form of interview data, is also not amenable to grounded theory because conversations about certain topics or opinions only contain few stories. This type of data contains little replication in the sense that is required for saturation (Morse 2001). Focus group data is therefore similarly considered to be appropriate when a snap-shot of the process is required and poorly suited to grounded theory.

Another source of data is the unstructured retrospective interview, a collection of narrative accounts about a topic. The resulting list of characteristics and types of developing relationships can be linked to one another as a basis for grounded theory, though they may be exhibited initially as separate, even unrelated, incidents. This type of interview data, in which participants give their stories about some event from beginning to end, is a natural foundation on which researchers may identify processes. As participants voluntarily reflect on their stories, data are provided that incrementally build the process needed to derive grounded theory. These retrospective narratives, with events told as they unfold, are then best suit for grounded theory (Morse, 2001).

*Theoretical sampling*

Sampling in grounded theory is the process of data collection for generating theory whereby the researcher jointly collects, codes, and analyzes the data and decides what data to collect next and where, in order to develop the theory as it emerges. This process of data collection, termed as theoretical sampling, is controlled by the emerging theory (Glaser & Strauss, 1967). Indeed, only when some theoretical ideas have emerged is the researcher able to determine what further data should be collected in order to explore and elaborate the ideas. Sampling in grounded theory must be theoretically informed (Dey, 1999).

Unlike other sampling methods, theoretical sampling does not determine the size of the sample population before study begins. Informants are not chosen on the basis of their representativeness, but rather because of their expert knowledge of the phenomenon under study (Keri & Francis, 1997). The essence of such a sampling method is to collect data from informants who are best able to answer emerging analytic questions, rather than sampling a predetermined group of participants or settings (Glaser, 1978). This also allows sampling to be expanded to include greater variation in conditions and extends the applicability of the substantive theory to a wider population, up to the point when the phenomenon becomes so condensed as to be useful for practical guidance (Morse, 2001). Initially, informants who have experienced the phenomena or who have lived through the experience should be

invited to “tell the stories” so that an overview of the process may be obtained. From this sampling frame other informants are purposefully selected. Once the researcher has a broad overview of the process then sampling may also be directed to transitions, critical junctures, or significant points and events in the targeted process (Morse, 2001). Indeed, after the initial selection of informants for study, sampling decisions in grounded theory are based on the preceding analysis (Dey, 1999).

The use of theoretical sampling is to develop the emerging categories by identifying conceptual boundaries and specifying fit and relevance, and, in such a way, to make the categories more definitive and useful (Charmaz, 2000). A means of systematic and deductive conceptual elaboration is provided for the emerging categories, during which the theoretical possibilities and probabilities are further refined and delimited (Glaser, 1978). It is an approach to sampling which is theoretical rather than site or population driven, i.e. emphasis is put on making theories as richly complex as possible, rather than on proving hypotheses or testing previous theories (Star, 1998). Indeed, theoretical sampling is an active, purposeful way of collecting data to formulate categories that fit, work and are relevant (Glaser & Strauss, 1967; Charmaz, 2000). Thus, sampling in grounded theory cannot be planned before the study, but evolves during the research process itself (Strauss & Corbin, 1998). It continues until the researcher is satisfied that a conceptual framework has been

developed that is integrated and testable and explains the problem (Stern, 1994).

### *Theoretical saturation*

In grounded theory studies, the researcher continues collecting data until saturation is reached (Schreiber, 2001). Saturation occurs when no new information about the core processes is forthcoming from ongoing data collection (Strauss & Corbin, 1998). Saturation implies that the process of generating categories has been exhaustive rather than merely “good enough” (Dey, 1999). The state in which the categories and theory are saturated is often termed as “theoretical saturation” (Glaser & Strauss, 1967). Therefore, theoretical saturation, in grounded theory, is the identification of the point where continued data collection yields only repetitive theoretical material, and no further properties or relationships of the categories are generated by the data (Glaser, 1978). Theoretical saturation is the point where the generation of theory is deemed completed (Glaser & Strauss, 1967). Theoretical saturation may be reached after a small or large number of data collection episodes (Glaser, 1978). Nevertheless, theoretical saturation may not happen until late in the final write-up because it is in committing the theory to paper that the researcher may discover gaps in the data. When this happens, the researcher must identify the best sources of data to answer the questions that will fill these gaps (Schreiber, 2001).

However, many researchers undoubtedly misunderstood the term theoretical saturation to imply that data sources have been systematically exhausted. In fact, theoretical saturation in grounded theory refers to the state at which categories cope adequately with new data without requiring continual extensions and modifications. It implies that the capacity of the data to generate new ideas is exhausted, and not the accumulation of evidence to support those ideas (Dey, 1999). Indeed, theoretical saturation signifies the coding for categories can be brought to a conclusion. The process of theoretical generation is completed and the process of data collection is coming to an end.

### *Theoretical sensitivity*

In grounded theory, the processes of generating theory are based on the capacity of the researcher to identify the important features of the collected data, to perceived variables (concepts, categories, and properties) and their inter-relationships, and to give them meanings. This capacity is termed theoretical sensitivity (Glaser & Strauss, 1967; Glaser, 1978).

Theoretical sensitivity allows the researcher to move beyond pure description

to see theoretical possibilities in the data (Glaser, 1978; Wuest, 2000). It increases the researcher's ability to conceptualize and to formulate a theory as it emerges from the data, and in such a way that the theory faithfully reflects the true nature of the studied phenomenon (Glaser & Strauss, 1967).

The researcher's personal inclinations, assumptions, experience, and knowledge are helpful in developing alertness and sensitivity to what is going on in the research data (Glaser & Strauss, 1967; Glaser, 1992). Indeed, disciplinary or professional knowledge, as well as both research and professional experiences, which the researcher brings to the inquiry increase theoretical sensitivity (Strauss & Corbin, 1994). The researcher's theoretical sensitivity is further enhanced by being steeped in the relevant literature (Glaser, 1978). The reading of literature facilitates understanding of how variables are constructed in diverse fields (Glaser, 1978). It also provides accessibility to a wide range of theories for comparison and "bracketing" (Morse, 2001), which, in turn, inform and modify the emerging theory that fits both the data and the relevant concepts for the existing theories. It is an iterative process of 'emergent fit', which fosters the development of theoretical sensitivity (Wuest, 2000). Working without consulting the literature may render the researcher mired in the data without a theoretical context to draw on, which loses the unique insight into reality (Morse, 2001). Indeed, theoretical sensitivity is sharpened by the use of literature,

which, in turn, directs theoretical sampling and gives substance to the process of constant comparative method (Wuest, 2000).

While the ability to grasp the subtlety and pertinence of data is strengthened by reading the literature, it is not in itself without problem (Chicchi, 2000). Exploring the literature before commencing data collection may increase the chances of forcing or trying to fit the data with the established knowledge, and, thus, move the researcher too quickly toward completing data analysis (Glaser, 1998). Nevertheless, the possibility of forcing meaning is routinely corrected by the constant comparative method which aids the discovery of underlying patterns, and preconceived meaning, allowing the subjects' perspective to emerge (Glaser, 1992). In addition, the researcher should enter the research setting with as few predetermined ideas as possible so that the data is not filtered to fit pre-existing hypotheses and biases (Glaser, 1978).

### ***Constant comparative method***

The research process in grounded theory is an iterative methodological cycle, in which the collection, coding and analysis phases are interwoven continually from the beginning of an investigation to its end (Glaser & Strauss, 1967; Chicchi, 2000).

In this way, data are collected, coded, analyzed, and revised during the entire research process (Star, 1998). The central idea of this combined strategy is to allow the gradual development of a theory that is strictly grounded in the data in a progressive manner, and to raise the theory from the lowest level of abstraction to a level of generality higher in theoretical conception (Chicchi, 2000). This specific strategy used in grounded theory is called constant comparative method (Glaser & Strauss, 1967).

In constant comparative method, each piece of data is continually compared with every other piece of relevant data so as to generate theoretical concepts that encompass as much behavioural variation as possible (Glaser & Strauss, 1967; Munhall & Oiler, 1986). Concepts identified in the data are then compared with subsequent and prior data to generate their interrelationships and theoretical suppositions. This involves comparing various cases, events, phenomena, and kinds of behaviour in order to establish the common factors that unify them regardless of varying external conditions. Concepts are also compared in order to facilitate their integration to generate the theory for a given research problem or area (Glaser & Strauss, 1967). Through this constant interactive analytic process in the methodological cycle, concepts and ideas emerging from the data are compared and contrasted with each other, commonalities and differences are determined, interrelationships are delineated, and themes are drawn, refined and developed,

eventually, leading to the discovery of a grounded theory (Glaser, 1978).

Constant comparative method is an interplay between induction and deduction. Codes are induced or emerge after data collection starts. Deduction is then used to derive conceptual guides from induced codes as to where to go next for which comparative group or subgroup, in order to sample for more data to generate the theory. This deductive-inductive process continually checks for fit and produces modification of the generated theory, i.e. provides an ongoing check and balance (Wuest, 2000). Indeed, by alternating between inductive and deductive logic, the researcher is able to feed the emergent theory with new material and further verify the conclusions in subsequent data collection. When data analysis ceases to produce new information, core categories are established and saturation has been achieved. Saturation of categories signals the end of constant retroactive process, which also closes the link between data collection and analysis (Glaser, 1978).

There are two essential methodologic procedures in constant comparative method - coding and memoing.

### *Coding*

Coding is the fundamental analytic process in constant comparative method (Corbin & Strauss, 1990). Coding begins early. It begins as data is being collected. Coding begins with a tentative exploration of all the different facets that the researcher perceives as important or interesting in the text. All these phenomena are labeled according to the potential relevance that they have to the subject area. The aim of coding is to produce a relevant list of concepts that the informant has deemed necessary to reveal, i.e. a construction of an understanding of the informant's world (Corbin, 1986). It allows the researcher to transcend the empirical nature of the data while at the same time conceptually accounting for the processes within the data in a theoretically sensitive way. Indeed, coding gets the researcher off the empirical level by fracturing the data, then conceptually grouping it into codes that then become the theory which explains what is happening in the data (Glaser & Strauss, 1967). Unlike quantitative research that requires data to fit into preconceived standardized codes, coding, in constant comparative method, also helps the researcher to gain a new perspective on the data and to focus further data collection (Charmaz, 2000).

Coding is constructed through line-by-line or even word-by-word analysis, i.e. fracturing of data, to avoid missing out important aspects that might escape in the overview approach of reading the data quickly (Corbin, 1986; Glaser, 1978). While coding the data, the researcher poses questions, such as “what does this incident

indicate?”, in order to yield an impressionistic cluster of categories, and, at the same time, starts to define and categorize the incidents emerged from the data (Glaser, 1978). Coding is, in fact, an interaction with the data (Charmaz, 2000). It involves the discovery and naming of categories that are abstractions of phenomena observed in the data (Strauss, 1987).

In constant comparative method, coded data are constantly compared with other data and concepts at each level of theory development. At each stage of analysis, the researcher generates hypotheses or hunches about relationships among categories that are tested against the data. The researcher continues to compare emerging conceptualizations, which result from testing these hypotheses, against the data until core categories and a theory of behaviour are distilled and understanding of human experience from the perspective of the participants is advanced (Melia, 1978; Schreiber, 2001). Indeed, coding of data in constant comparative method begins at the descriptive level in which all aspects of a phenomenon as seen by the informants are labeled and categorized exhaustively. Coding then progresses to a more abstract, theoretical level in which social responses to the phenomenon under study are compared to other types of human responses and situations to reveal the unique nature of this particular problem and response (Kearney 1998). Details of the two levels of coding are given in the following paragraphs.

*Descriptive level coding.*

While reading through the transcript, the researcher carefully examining the data line-by-line in order to select phrases or words that contains a single category of meaning. Essentially, each line, sentence, or even paragraph is fractured to search for the answer to the repeated question “what is this about?”, and “what is being referenced here?” (Glaser & Strauss, 1967). The researcher then tries to use the words of the informant labeling the category, i.e. “in vivo” codes (Schreiber, 2001), and some of these codes should take the form of gerunds which indicate action or process and ending in “ing” (Stern, 1985). Such interpretive process of breaking down, examining, naming and categorizing is defined as open coding (Glaser & Strauss, 1967; Strauss & Corbin, 1990). Open coding is the initial steps of theoretical analysis in constant comparative method that pertains to the initial discovery of categories and their properties. It generates substantive codes that conceptualize the empirical substance of the area of research (Glaser & Strauss, 1967). It is through open coding that concepts and categories are developed. In addition, open coding enables the researcher to break through subjectivity and bias. Fracturing the data in open coding forces the researcher to examine the data with their preconceived notions and ideas. Systematic comparisons of incidents ensure that the data and concepts are arranged in appropriate classifications (Corbin & Strauss, 1990).

During open coding the researcher fractures the data into incidents. These incidents are closely examined and compared for similarities and differences, while constantly asking the question “What category or property of a category, of what part of the emergent theory, does this incident indicate?”. Different incidences are then conceptualized into as many categories as possible. This strategy maximizes the best fits, the most workable ones and the core relevancies to emerge on their own (Glaser, 1978). Indeed, such coding process enables the researcher to look for patterns so that a pattern of many similar incidents can be given a conceptual name as a category, and dissimilar incidents can be given a name as property of a category, and the compared incidents can be seen as interchangeable indices for the same concept (Glaser, 1992). When the researcher gets many interchangeable incidents the researcher gets saturation, i.e. it is not necessary to keep collecting more incidents which keep indicating the same pattern and no new properties of it (Glaser, 1992). Open coding then comes to an end.

Strauss and Corbin (1990) introduce a set of procedures to put data back together after open coding. They refer to it as axial coding (Strauss & Corbin, 1990). Axial coding is the process of delineating the special features of a category, i.e. subcategories, then relating the categories to their subcategories, and further testing

their relationships against data. The purpose of axial coding is to form more precise and complete explanations about categories, and to make the conceptual links more specific (Corbin & Strauss, 1990). Although axial coding differs in purpose from open coding, these are not necessarily sequential analytic steps, anymore than labeling is distinct from open coding. Axial coding does require the researcher to have some categories, but a sense of how categories relate begins to emerge during open coding (Strauss & Corbin, 1998).

In axial coding, the linking of subcategories to a category is done by utilizing a coding paradigm involving conditions, context, action/interactional strategies, and consequences (Corbin & Strauss, 1990). There are four analytic steps: (a) the hypothetical relating of subcategories to a category by means of statements denoting the nature of the relationships between them and the phenomenon; (b) the verification of those hypotheses against actual data; (c) the continued search for the properties of categories and subcategories, and the dimensional locations of data indicative of them; (d) the beginning exploration of variation in phenomena, by comparing each category and its subcategories for different patterns discovered by comparing dimensional locations of instances of data. The use of this paradigm model enables the researcher to think systematically about data and to relate data in very complex ways (Strauss & Corbin, 1990).

However, in grounded theory the researcher does not link properties and categories in a set of relationships denoting conditions, context, action, and consequences. This would force theoretical concepts on the data. The use of axial coding merely gives the appearance of making the researcher think systematically and relate data in complex ways. It actually pushes the researcher to force a full conceptual description on data with no questions about where the links are relevant to any emerging theory that really explains how the informants process their main concerns. The more the researcher practices axial coding the more the researcher will exclude the ability to respond to any theoretical code that may emerge and become relevant (Glaser, 1992). Indeed, the formulation of axial coding undermines and confuses the grounded theory. It turns grounded theory into a procedure-oriented method, which becomes rather programmatic (Melia, 1996). The end result of such “erosion of grounded theory” is indeed a kind of full conceptual description rather than a substantive theory that is grounded in the data (Stern, 1994).

*Theoretical level coding.*

Having saturated the categories by the substantive codes that have been generated from open coding, the researcher begins to delimit the coding process by selective coding of one of the categories that accounts for most of the variation of the

central phenomena of concern and around which all the other categories are integrated (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1990). The essential idea is to weave the fractured data back together again and move the coding process from a descriptive level to theoretical level so as to develop a theme around which the emerged substantive concepts are integrated for theory generation (Glaser, 1998; Strauss & Corbin, 1998; Schreiber, 2001). Such coding process is referred as selective or theoretical coding, which involves hypothesizing the core category, and systematically relating this category to all other conceptual categories for theoretical integration. It is from selective coding that the core category is evolved (Glaser, 1992; Strauss & Corbin, 1998; Kendall, 1999).

Selective coding conceptualizes how the substantive codes will relate to each other as interrelated, multivariate hypotheses in accounting for resolving the main concern of the study. It is therefore more directed and, typically, more conceptual than open coding. When selective coding is started, it is the time to cease open coding (Glaser, 1998). In selective coding, the researcher begins to analyze the open codes or categories in terms of their types, dimensions, properties, consequences, and relationships to others. This conceptual elaboration gives theoretical order to the categories, and thus leads to a theory (Glaser & Strauss, 1967; Chenitz & Swanson 1986). To facilitate selective coding, the use of typology or conditional matrix,

which is an analytic diagram that maps the range of conditions and consequences related to the phenomenon or category, helps to sensitize the researcher about the range of conditions conceivably affecting the phenomenon of interest and hypothetical consequences (Glaser, 1978; Struass & Corbin, 1998).

Selective coding helps the researcher to maintain the conceptual level in writing about concepts and their interrelations. It is a process of integrating and refining categories. It is indeed the second level of generalization that brings all the data, codes, categories and core category into a seamless, integrated grounded theory (Strauss & Corbing, 1998; Charmaz, 2000; Schreiber, 2001).

### *Memoing*

Memoing in constant comparative method is the process of writing theoretical memos, during which theoretical hunches, decisions, and modifications, including the data supporting each theoretical component and relationship, are carefully documented (Glaser, 1978). Theoretical memos are thus the theorizing write-up of ideas about codes, open or selective, and their properties and relationships as they emerge and strike the researcher during coding, collecting, and analyzing while memoing (Glaser, 1998). They continually capture the researcher's thinking while

going through the data, codes, or writings. Indeed, theoretical memos are not simply ideas but are written records of the researcher's stages of analytic development that relate to the formulation and revision of the emergent theory during the research process and lead to abstraction (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Charmaz, 2000). Thus, theoretical memos, together with coding, collecting, and analyzing provide an integrative platform and binding power to generate a substantive grounded theory (Glaser, 1998).

Memoing begins when first coding data, and continues to the very end of the study. Memoing further reflects the process of constant comparison across concepts and codes. It allows the researcher to think theoretically and helps to generate open questions leading to further coding and data collection, which saturate and develop the categories (Glaser & Strauss, 1967; Glaser, 1978; Corbin & Strauss, 1990). Moreover, memoing also provides the researcher with a system that keeps track of all the categories, properties, hypotheses, and generative questions that evolve from the coding process. If the researcher omits memoing and moves directly from coding to writing, a great deal of conceptual detail is lost or left undeveloped (Corbin & Strauss, 1990). Indeed, through memoing the researcher elaborates processes, assumptions, and actions that are subsumed under codes, which in turn facilitates the linking of analytic interpretation with empirical reality (Glaser, 1978). In short, memoing helps

the researcher: (a) to grapple with ideas about the data, (b) to set an analytic course, (c) to refine categories, (d) to define the relationship among various categories, and (e) to gain a sense of confidence and competence in analyzing data (Charmaz, 2000).

Theoretical memos may vary from a few words to several pages. Memoing should flow freely and should not be formalised. Anything that captures the meaning of conceptualized ideas is substance for memoing (Glaser,1978). However, the major concerns of memos may be summarized as follows: (1) the boundaries of the code; (2) the empirical criteria on which the code rests; (3) the conditions under which the code emerges; (4) the connection and significance to the data and the major themes (Glaser, 1998).

As memoing continues sorting becomes an essential step of memo management aimed at characterizing the ideas that have been revealed in the memos so that the preparation of a theoretical outline for writing of the theory is made possible (Glaser, 1978). In the process of sorting, ideas or theoretical concepts emerge and are compared, clarified, and delimited until an outline of the emerging theory surfaces (Glaser, 1998).

### *Identification of core category*

The end product of developing theory is the core category (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998). The core category encapsulates the substance of a pattern of behaviours seen in the data and summarizes what is happening (Schreiber, 2001). It integrates the theory according to the emergent perspective of investigation and thereby defines its cut-off-points (Keri & Francis, 1997). The core category describes a central and stable pattern that pulls the other categories together to form an explanatory whole (Glaser, 1978; Strauss & Corbin, 1998).

In grounded theory studies, the core category is also a basic social process. It is a central theme that brings together all the categories and explains most of the variation among the data that ties stages and phases of the theory together (Glaser, 1978; Strauss & Corbin, 1998). There are two types of basic social process: basic social psychological process and basic social structural process. Basic social psychological processes are model patterns of social behaviours occurring to individuals and/or groups while basic social structural processes describe aspects of evolving social structure or arrangements (Glaser & Strauss, 1967; Glaser, 1978; Mullen 1986; Schreiber, 2001). These processes are not only durable and stable over

time but they can account for change over time (Glaser 1978). They can therefore also explain variations in the problem being studied, predict behaviours and show how they may evolve over time (Morse and Field 1996). By convention, a basic social process is labeled with a gerund (an 'ing' word). The use of a gerund captures the notion of change over time, and embodies the action of the informants (Schreiber, 2001).

Identification and development of a core category requires theoretical sensitivity and constant comparative method. It is a process of coring out (Star, 1998). While theoretical sensitivity escalates the conceptualization of the emergent data, constant comparative method continually refines codes, integrates categories, and theorizes memos (Keri & Francis, 1997). As this analytico-synthetic approach in grounded theory goes along, theoretical ideas are absorbed and reassembled, reabsorbed and again reassembled, until a very fine point is reached when a pattern of behaviour occurs again and again and seems to link other categories all together (Glaser, 1978). This means that it moves from a phenomenal to seminal level with the result of eventual convergence, in which an ultimate generic category is arrived at - the core category (Star, 1998). In short, the establishment of core category is the essence of grounded theory studies.

### *Rigor, legitimation and trustworthiness*

As with other qualitative studies, the notion of rigor, legitimation, and trustworthiness are issues of concern for grounded theory studies. In grounded theory studies, the research setting is unstructured and variables are uncontrolled. The data gathering instrument is the researcher. Techniques for data collection and analysis are highly distinct. Hence, the usual scientific cannons of good science by which quantitative studies are judged are quite inappropriate for judging the merit of grounded theory studies (Strauss & Corbin, 1998). Therefore, criteria used to assess the quality of grounded theory studies need to be reconfigured to take into account the broader concepts of rigor, validity, reliability and generalizability (Patton, 1990; Annells, 1997; Mays & Pop, 2000).

In qualitative research, validity refers to the extent to which the research findings represent reality (Morse & Field, 1996). It is related to the question of whether or not the findings are interpreted in a correct way without being biased towards the researcher's preconceptions and assumptions (Kirk & Miller, 1986, Martin, 1998) The focus of qualitative validity is therefore on the degree of comprehension of the true nature, meaning and attributes of the phenomenon under study (Strauss 1987).

In grounded theory studies, the concurrent sampling, data collection, and analysis strategy, and the complex data-elaboration and coding procedures enable the research to generate a substantive theory without overlooking the necessary criteria for any correct science: relevance, compatibility between data and theory, generalizability, potential for repetition, precision, rigor, and testability (Strauss & Corbin, 1990; Chicchi, 2000). In addition, the active seeking of variations and the incorporation of this data into the analysis during constant comparative method also ensure validity (Morse, 2001). Moreover, sharing the emerging analysis and selected verbatim data with the informants has been commonly used as a way to assess validity (Lincoln & Guba, 1985; Fetterman, 1989).

Generalizability refers to the extent to which findings can be generalized beyond the setting in which they are generated (Mays & Pope 2000). In another words, it is related to the truth value of the results (Annells, 1997) and depends on using or testing the framework in other settings (Lincoln and Guba 1985). To establish the true value of results in grounded theory studies, verification of the generated theory should be considered. However, Corbin & Strauss (1990) point out that verification of the theory developed is carried out throughout the course of grounded theory study. It is built into the very processes of data collection and constant comparative method,

which provide a means of “testing” hypotheses against evidence. The rigorous research process of grounded theory study has already embraced verification as part of the process of generating theory (Corbin & Strauss, 1990; Strauss & Corbin, 1998). Glaser (1992) does not subscribe to this view. He argues that findings of grounded theory study are grounded hypotheses and become a theory only after further research and testing for verification. According to Glaser (1998), the relationship between discovery and verification is a sequential one. With hypotheses discovery comes first and then the most relevant hypotheses are tested with a different methodology. For Glaser (1992) verificational work usually involves replication of some crucial hypotheses using a form of quantitative method such as survey or a controlled experiment.

Reliability in qualitative research is defined as the degree to which the finding is independent of accidental circumstances of the research (Kirk & Miller, 1986). It is concerned with measuring the extent to which random variation may have influenced the stability and consistency of results (Morse and Field 1996). The theoretical foundation of grounded theory is based on symbolic interactionism, which assumes the world is continually changing and hence findings cannot necessarily be replicated. Reliability is therefore demonstrated by the researcher describing and accounting for the changing conditions that lead to an increased understanding of the setting or

context in which the phenomena was studied. As for assuring reliability, this focuses essentially on identifying and documenting the analytic procedure and findings as fully and truthfully as possible, so that any further studies carried out in a similar context could be used for comparison of results (Patton, 1990; Mays & Pop, 2000).

### *Critical challenges*

As with other forms of qualitative study, grounded theory is not without its critics. The nature of the method is generally criticized as unsystematic, impressionistic, exploratory, or armchair theorizing. Riessman (1990) comments that grounded theory methods were insufficient to respect her interviewees and to portray their stories. Cornrad (1990) notes that fracturing the data in grounded theory research might limit understanding because grounded theories aim for analysis rather than the portrayal of subjects' experience in depth. Clough (1992) points out that grounded theory studies compose their stories unconsciously and deconstruct the subject. Richardson (2000) states that grounded theory reports are not as straightforward as their authors represent them to be. This is because grounded theory authors are selective in presenting evidence, clean up subjects' statements, unconsciously adopt value-laden metaphors, assume omniscience, and bore readers. Star (1998) observes that the openness and centrality of complexity has made grounded theory subject to the

constant tension between faithfulness to empirical details and a desire to make the complexity usable via abstraction.

These criticisms challenge grounded theory authors' representations of their subjects, and their writers' voice. They also imply that grounded theory methods gloss over meanings within informants' stories, which lead to separating the experience from the subject, the meaning from the story and the viewer from the viewed. Seemingly, these criticisms assume that grounded theory: (a) limits entry into informants' worlds thus reduces understanding of their experience; (b) curtails representation of both the social world and subjective experience; (c) relies upon the viewer's authority as expert observer; (d) posits a set of objectivist procedures on which the analysis rests (Charmaz, 2000). However, grounded theory assumes that people create and maintain meaningful worlds through dialectical processes of conferring meaning on their realities and acting within them. Social reality does not exist independent of human action. Thus the researcher can move grounded theory further into the realm of interpretive social science consistent with a Blumerian (1969) emphasis on meaning, without assuming the existence of a unidimensional external reality (Charmaz, 2000). Moreover, the procedural strategies of grounded theory help the researcher avoid remaining immersed in anecdotes and stories, and subsequently unconsciously adopting subjects' perspectives, prevent the researcher's becoming

immobilized and overwhelmed by voluminous data, and create a way for the researcher to organize and interpret data (Glaser & Strauss, 1967). Thus, the grounded theorist's analysis tells a story about people, social processes, and situations; it does not simply unfold before the eyes of an objective viewer; it also reflects the story of the viewer as well as the viewed (Glaser, 1978). Indeed, grounded theory recognizes the interactive nature of both data collection and analysis. The strong component of constant comparison and analytic synthesis are keys to these challenges and tension (Star 1998). Nevertheless, these criticisms may be used to make grounded theory researches more reflexive and contextually situated and may foster the growth and maturity of the grounded theory methodology.

### *The Glaser-Strauss schism*

Strauss and Corbin (1990) sought to help beginners in the field of grounded theory to learn to construct in-depth and dense grounded theories in a consistent manner. However, in response, Glaser (1992) denounced Strauss and Corbin's approach for being more about conceptual description than emergent theory. Such divergences in grounded theory opened up the debate between the Glaserian and Straussian models on the theoretical differences and usefulness of the two perspectives.

Both Glaser (1978) and Strauss and Corbin (1990) describe coding as an essential aspect of transforming raw data into theoretical constructions of social processes. Glaser (1978) distinguishes two types of coding, open and selective, and Strauss and Corbin (1990) describe three: open, axial, and selective. Glaser (1978) describes open coding as a way to generate an emergent set of categories and their properties which fit, work, and are relevant for integrating into a theory. Strauss and Corbin (1990) define open coding as the process of breaking down, examining, comparing, conceptualizing, and categorizing data. It is apparent that the approaches to open coding are similar, although Glaser places more emphasis on the importance of allowing codes and theoretical understandings of the data to emerge (Kendall, 1999). Selective coding is the final coding process in constant comparative method. Although Glaser and Strauss and Corbin utilize this coding differently in their theoretical constructions, both Glaserian and Straussian models acknowledge that selective coding involves the systematic selection of a core category that accounts for most of the variation of the central phenomenon of concern, and around which all the other categories are integrated (Glaser, 1992; Strauss & Corbin, 1998).

The crux of the debate seems to be Glaser's insistence on the need for emergent conceptual analysis and Strauss & Corbin's utilization of axial coding via a paradigm

model (Kendall, 1999). Strauss and Corbin (1990) define axial coding as a set of procedures whereby data are put back together in new ways after open coding. It focuses on the conditions that give rise to a category, the context in which it is embedded, the action/interactional strategies by which the processes are carried out, and the consequences of the strategies. Each of these features is examined in terms of their links, and systematically examined in relation to a paradigm model. The model is an organizing scheme that helps the researcher to think systematically about the data and pose questions about how categories of data relate to each other (Strauss & Corbin, 1998). Grounded theory procedures could be stopped after doing axial coding if the researcher is only interested in thematic analysis or concept development, and this would be useful in some circumstances. To generate theory, however, it is necessary to move on to selective coding to gain a more complex and abstract level of analysis to integrate the categories and produce a theory (Strauss & Corbin, 1990).

Glaser (1992) maintains that the concept of emergence is an underlying guiding principle of grounded theory, and, therefore, the codes used and the actual labels placed on the codes should be driven by conceptual interests that have emerged from the data rather than being forced into any particular scheme, such as the paradigm model. He insists that data should not be viewed through a predetermined framework, but rather data interpretation and category development are driven by conceptual

concerns in the data. Although he identifies 18 coding families that may be used in guiding the researcher systematically to connect categories of data to each other, Glaser (1992) argues that those coding families are only possibilities and that what is most important is to let the conceptualization lead the analysis. In this way, analysis and interpretation are assured of being grounded in the data, and the researcher does not see only what will fit into a predetermined conceptual plan. Glaser (1992), therefore, remarks that generating codes, and theoretical relationships between codes and categories from a predetermined organizing schema does not help the researcher to construct complex and meaningful theory because it has strayed too far from the underlying principles of emergence. Thus, according to Glaser (1992), the use of axial coding via the paradigm model is inconsistent with the work necessary to generate useful and dense theory that is grounded in the data. It can only produce a conceptual description of the phenomena under study. Kendall (1999) also points out that though the Straussian approach is indeed a wonderful method of conceptual description and has given an in-depth portrayal of what life is, description, no matter how conceptual it appears, is still description. The hardest part of grounded theory is moving beyond description and into conceptualization and theorizing. Strauss & Corbin's paradigm model only provides an escape for those lost in data that allows for a finished descriptive product. Robercht (1995) further adds that the Straussian method itself is focused more on operational steps than on theory development which only encourages

the production of poorly integrated theoretical explanations (Robercht, 1995).

One grounded theory approach is not necessarily superior to another, and the decision to use a particular approach should depend on the goal of the research study and not on the politics of who or what is currently in vogue (Kendall, 1999). Indeed, one needs to be clear, before the start of the research study about what the goal of the research is and if the research question is congruent with the grounded theory approach to be used.

### **The Grounded Theory Applied**

In order to generate a substantive theory to provide comprehensive explanations of the following question: “*What exactly is going on when nurses diagnose patients’ clinical condition in acute clinical environments?*”, it is therefore fundamental that the canons and methods of grounded theory must be observed through out the entire research process.

#### ***Data collection***

### *Pilot study*

Underpinned by the grounded theory, a pilot study was conducted to assess the feasibility of the present study. Assuming that nurses with two to three years of post-registration clinical experience and working in the medical setting would be frequently engaged in diagnosing patient's clinical condition as a form of daily nursing practice, the first informants were selected. An in-depth informal interview of 45 minutes in length was conducted after informants' scheduled shift. Questions asked during the interview were primarily based on a tentative interview guide that was modified taking account of the objectives of this study. During the interview, the informant was encouraged to reflect and give stories about diagnostic practice in acute clinical environment. The interview was audio taped and transcribed verbatim. The transcript was then analyzed line-by-line in light of the researcher's knowledge of the literature and experience of nursing practice. Initial coding and memoing were also attempted.

Information and experience gained from the first interview helped to decide the direction of sampling the succeeding informants and, most importantly, provided a platform for constant comparison of subsequent interview data. A total of 6 in-depth informal interviews were conducted in the pilot and the data was transcribed, analyzed

and compared.

The experience of the pilot study not only provided assurance that grounded theory, as a research methodology, was productive in achieving the aim of this study, but also provided some implications for the main study:

(a) *Focus of the study.*

As discussed earlier, much of the research studying diagnostic process in nursing was guided by cognitive theories and suggested that nurses followed a hypothetical deductive rational reasoning process. However, in the pilot study informants did not give emphasis to a generic rational reasoning process, but talked about the strategies, behaviours, activities, patterns, and thoughts that were employed in the course of interacting with their patients when diagnosing clinical conditions. These initial findings suggested that diagnostic practice in nursing was essentially a social-psychological process of human experience that could be revealed by the use of grounded theory. In this regard, the findings served as an indicator to further reaffirm the focus of the main study.

(b) *Revision of interview guide.*

Knowing that the informants did not normally describe a generic reasoning process, the interview guide for the main study was refined accordingly:

- How do you interact with your patient, to start with? Why?
- What sort of information are you going to solicit? How? Why?
- In what ways do you analyze the collected information? Why?
- How do you bring about the conclusion?
- Are there any components that are perceived to be critical in the process of diagnosing your patient's condition? What are they? How critical are they? Why?

### *The setting*

The study setting should provide rich data relevant to the research question. Thus, certain criteria for site selection were established: (1) an acute clinical setting; (2) general wards which admitted new patients; (3) team or primary nursing as the care delivery model; (4) nurse as the patient care personnel.

The study was conducted in a regional hospital run by the Hospital Authority. It was a typical acute hospital located in the New Territories in Hong Kong. Medical, surgical, orthopedic and paediatric wards were included in the study, while specialties such as emergency department, operating theatre, intensive care unit, and cardiac care unit were excluded. The patient load of these wards was about ninety-five percent

throughout the study period. Nurses were the core patient care provision agents of these wards. Each nurse was primarily responsible for the overall assessment, planning, implementation and evaluation of eight to ten patients in each shift of duty.

### *The informants*

Informants in a grounded theory study should not be chosen randomly but should be selected according to theoretical sampling (Morse and Field, 1996). Initially after gaining access in one regional hospital, contacts were made with nurses with two or three years of post-registration clinical experience. These nurses were believed to engage themselves in diagnosing patients' clinical condition most frequently during daily nursing practice. Ideas gained from this group led to a decision that nurses with three to five years of post-registration experience, who had been working in a particular ward for more than two years should form the group of informants for this study. Analysis of the 26<sup>th</sup> informant's transcript indicated that the capacity for generating new ideas about diagnostic practice was exhausted, but to ensure theoretical saturation, a total of twenty-eight nurses were interviewed in the study.

### *Procedure and technique*

As discussed earlier, unstructured or in-depth informal interview is the most appropriated method for collecting data in grounded theory studies. Reviewing documents and observing nurses behaviours does not necessarily foster understanding of the psychosocial and cognitive activities that are involved in diagnosing patients' clinical condition. Moreover, the presence of a third person in the process of making diagnosis could possibly interrupt the interaction between the nurse and the patient, or even inhibit the nurse's diagnostic performance which as a result might put the patient at risk. It was therefore logical to adopt informal interview as the data collection method for the study.

The informal interview took the form of a conversation. To minimize the possibility of provoking a wide range of responses that were irrelevant and difficult to pull together for analysis, an interview guide was used as the frame of reference for the interview. The interview guide outlined a set of key issues that were to be explored with each informant. These issues were largely developed from the objectives of the study and were continuously refined following the experience gained from the pilot and from preceding interviews. During each interview, these key issues were introduced informally and in random order. They only served to encourage the informants to talk about their experience or views on issues that were related to their diagnostic practice. In addition, interview probes, such as 'What is it like for a nurse to

diagnose her/his patient's clinical condition?' 'Can you recall any particular experience or event that has happened to you during the process of diagnosing patient's clinical condition? What are the impacts of this experience on your practice?', were also used to elicit stories that best illustrated nurses' experience of diagnostic practice.

All of the interviews were conducted by the researcher. The fact that the researcher was also a nurse excluded the risk of using jargon as a problem. The researcher was in a better position to facilitate informal questioning, creation of an empathetic ambience in the interview setting, and, most importantly, cultural understanding of the nurses' perspective.

Each interview began by obtaining informed consent and thanking the informant for participating. Demographic data, such as years of experience, experience of working in that particular setting, and academic qualifications, were then obtained. Some informants remarked at the beginning of the interviews that they were not sure 'what to expect.' They were reminded that the discussion would focus on topics that were related to the course of diagnosing their patients' clinical condition. As the discussion about diagnostic practice began, the informants were by and large candid in their responses and appeared intent on giving the comprehensive data being

sought.

The interviews were tape-recorded, which allowed for the maintenance of a face-to-face contact with the informants so as to keep the discussion flowing and for the retrieval of the entire interview if needed. However, the researcher was conscious of the fact that some informants might find the use of a tape recorder inhibiting and the recorder was purposely placed in an unobtrusive location. Most informants quickly forgot the presence of machinery when they were engrossed in the discussion.

All of the interviews were transcribed verbatim by the researcher. Interview tapes were reviewed twice. The first review occurred immediately after the interview and the second as the transcribed copy was proofread for accuracy. Corrections were made as necessary and transcripts were stored in the form of hard copies.

### *Data analysis*

Running concurrently with data collection, the interviews transcripts were analyzed using the constant comparative method. Each transcript was first open coded. These codes were then compared and contrasted with one another to form categories until saturation occurred. The properties and relationships among categories were

theorized by memoing, and further conceptualized by selective coding. Having moved the coding to a theoretical level, a core category, to which all other categories related, was identified.

These data analysis procedures were, in fact, not discrete and separate activities, but overlapped in actual application. However, to facilitate their discussion, they are described separately in the following sections.

#### *Concept formation and development: descriptive level coding*

The aim of this level of coding was to discover, name and group the incidents in the interview scripts perceived as important or related to the process of diagnosing patient's clinical condition. Each interview script was examined line-by-line with a series of questions in mind: 'What is going on here?' ; 'What is this about?' ; 'What is being referenced here?' ; 'What are the important issues?' ; 'What are the processes at work?' ; 'For what purpose was this action taken?' . These questions assisted in revealing codes that accounted for the diagnostic practice of nurses. In addition, to ensure that the codes fitted exactly the incident described in the data, 'in vivo' codes in the form of gerunds were used. An excerpt from a line-by-line analysis with descriptive level coding illustrates this:

*Researcher:* What happened? What have you done?

*Nurse 18:* During the hand over, they tell me that she becomes rather 'unusual' .I guess. that should not be the case. [because] she looks quite O.K. last evening and I 'receive' no complaint from her at all before I get off. Anyway [for safety sake] I go to her cubicle during my ward round in order to check her up. I look at her bed-end chats & obs. results. When I look at her. she really looks rather lethargic and pale. I try to ask her some questions, such as 'How do you feel?' 'Is there anything wrong?' .but she looks so tired that she is not able to answer my questions. I really do not know what goes wrong..what is really happening to her..I begin to worry about her...

*hand over(context)*

*ward round(context)*  
*checking up(behaviour)*  
*data-specific*  
*questioning-specific*  
*(strategy)*  
*data-specific*

*Excerpt from line-by-line analysis of Nurse 18 with Open Coding, 8/6/97*

When a code was allocated, it was recorded subsequently on an index card along with a short description of the noted property, and a summary of the reasons why the incident had been included under this particular code. The card was then filed away. The process continued by checking the rest of the script for all possible incidents of new codes.

As coding of new interview scripts, collected by theoretical sampling, continued, the number of index cards on nursing diagnostic practice expanded rapidly. However, this level of coding in grounded theory study was not a counting exercise to find out how often an event occurred, but was aimed to collect a set of 'indicators' that existed in a potentially significant concept. Hence, in light of the researcher's

understanding and experience of diagnostic practice in nursing, all generated codes and emerged incidents on the index cards were continually compared and contrasted for differences and similarities. Consequently, having gained a deeper and more complex understanding of the nature of each code through this reflexive process, the property of the codes and the dimension of the incidents were sorted, teased, refined, condensed, and then developed into conceptual categories.

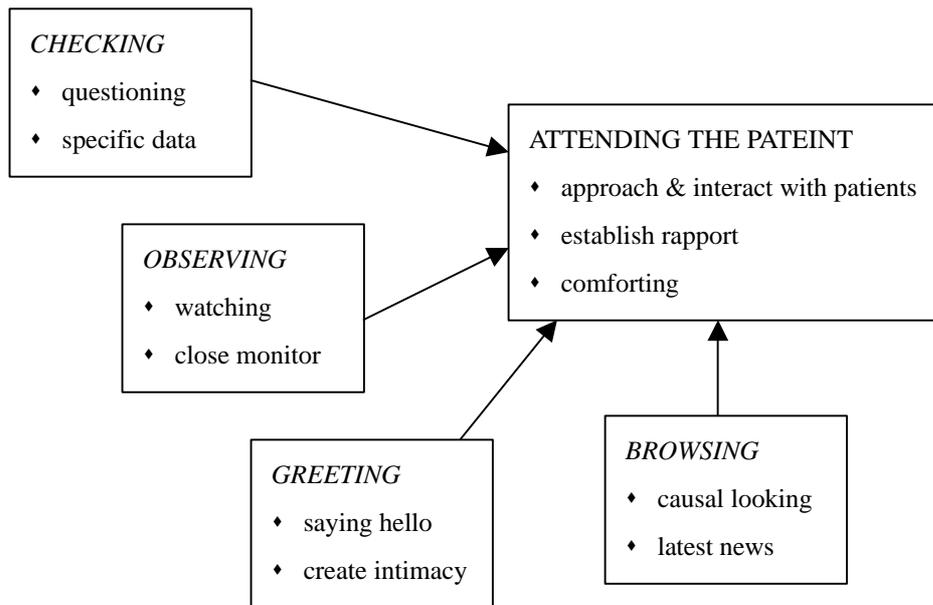
*Concept modification and integration: theoretical level coding*

Having developed and saturated the conceptual categories, specificity in these categories was pursued to look for connections between the categories. All categories were systematically compared, cross-referenced, and related to each other in terms of their types, properties, dimensions and consequences. Thoughts and insights revealed in the course of constant comparing of categories were also highlighted by memoing to conceptualize and hypothesize theoretical links between categories. As this level of coding proceeded, the interrelationships among different categories became more apparent, and the interconnections between the categories and the subcategories began to emerge. In a sense, the abstraction and inclusiveness of these categories was further enhanced, and certain links and patterns among categories also became evident. This coding process quickly led to the reorganization of conceptual categories. For

example, when comparing the new and previously collected data, “observing”, an identified category that concerned with watching patients in a careful manner, and “greeting”, another category that was used to express concerns, were found to be not sufficiently distinct from one another to remain separate. These two categories were therefore subsumed under a higher level of category, “attending the patient”, which described nurses interacting with patients in a particular context.

With the use of memoing and in light of the researcher’s theoretical sensitivity, the categories, patterns and links were then woven back to form a single theme. In the process integrating these back together again, the emerged interlocking patterns of these categories were further extrapolated, extended and unified so as to generate a final theoretical framework that represented the theoretical generalization of diagnostic practice in nursing in the acute clinical setting.

In order to optimize the conceptualization of links between categories and, the subsequent integration of categories, graphic depictions, such as conditional matrix, typology and analytic diagrams, were used.



**Figure 3.1. An Analytic Diagram of Attending the Patient.**

		<i>Patient Group</i>	
		( Old Case )	( New Admission )
<i>Client Type</i>	( Patient )	<i>Greeting</i>	<i>Observing</i>
	( Visitors )	<i>Browsing</i>	<i>Checking</i>

**Figure 3.2. Client Type-Patient Group-Attending Behaviour Matrix.**

*Identification of core category*

Having integrated the categories to a single theme, one of the categories that played a central role in explaining how different categories were linked began to become evident. This was the core category into which all other categories and

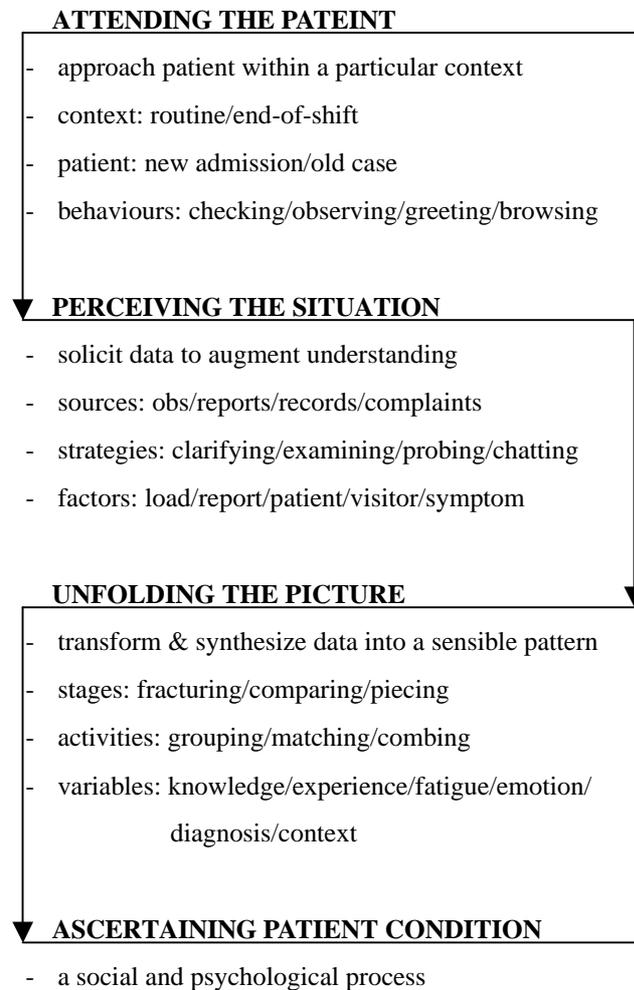
subcategories were being systematically integrated. This core category was the central phenomenon that outlined a suitable representation and an accurate summary of the diagnostic practice in nursing in acute clinical settings.

However, the selection of the exact descriptor for the core category involved some subjectivity. In this study, the core category was variously labeled “finding out the diagnosis” pitting against “looking for clinical status” and “discovering clinical condition”. In light of the insight generated from the memos and the researcher’s clinical experiences, the core category was later re-labeled as “ascertaining patient condition”. While being broadly equivalent, the later descriptor allowed a wider perspective that reflected the essence of nursing diagnostic practice.

Emerged as the core category, *ascertaining patient condition* surfaced as a basic social psychological process that brought together all the other categories, and accounted for most of their variations. It encapsulated the phenomena seen in the data, and summarized nurses’ own perspectives when diagnosing patient conditions in the acute clinical settings. Details of this core category, *ascertaining patient condition*, will be discussed in the subsequent chapters.

In the analytic process of identifying *ascertaining patient condition* as the core

category, a diagrammatic model was used to map out, delineate, and examine the characteristics, compatibility, and points of variation of the concepts involved and to illustrate the stages of *ascertaining patient condition*.



**Figure 3.3. A Diagrammatic Illustration of the Core Category.**

*Verification of the results*

*Level 1 - Informant checking*

The analyzed transcripts and their interpretation were presented to the informants for clarification and feedback. Most of the informants responded positively to analysis and developed concepts, and indicated that the behaviours and strategies identified accurately reflected different approaches they used in their area of practice. However, some informants found that some of the terms were rather awkward and provided suggestions for change.

#### *Level 2 - Expert substantiation*

Towards the end of this study, two nurse specialists involved in clinical patient care were invited to give comments to substantiate the theoretical model of ascertaining patient condition. The two experts were provided with the general framework of the model and the grounded hypotheses. They were requested to match these hypotheses with the framework. One of the experts matched 82% of the hypotheses with the corresponding stages of the framework as conceptualized in the analysis; while the other matched 93%. The combined interrater agreement level was 87.5%. These experts also provided some verbal feedback regarding the discrepancies between their matching and those expected. This feedback was used to refine the subsequent analysis.

### *Level 3 – Nurses’ survey*

To further establish the notion of true value of the results, a survey was conducted to perform verification of the generated theory. The grounded hypotheses of the theory were translated into relational propositional statements, and were compiled into a self-report questionnaire, which consisted of five sections (Appendix I). The first section attempted to delineate nurses’ personal profile, such as rank, work area, and years of experience. Using a four point Likert-type scale, the rest of the four sections aimed at soliciting nurses’ opinions on: (a) the process of finding out the clinical condition of their patient, (2) the behaviours that they adopted to approach and interact with their patients, (3) the strategies that they used to collect information, and (4) the cognitive activities that they used to analyze and articulate the collected data.

A panel of experts, which included two nursing academics and two nurse specialists, was invited to comment on the validity of the questionnaires. The content validity index (C.V.I.) was reported as 0.98. Using Cronbach’s alpha as an estimate, the internal consistency of the questionnaire was 0.9343; where as the second, third, fourth, and fifth sections were 0.8419, 0.8752, 0.8505 and 0.8360 respectively. Piloting of the questionnaire was carried out with 20 nurses to test for feasibility before launching of the survey study.

1000 self-report questionnaires were then distributed randomly to nurses working in various hospital settings through a nursing association with a membership of 12,500. Return of the completed questionnaire implied that the respondents had consented for the study. To assure confidentiality of the study data, anonymity for all the staff participating in the study was strictly observed.

### **Ethical Considerations**

Although the study did not involve any manipulation of human subjects as in experimental research, the researcher always ensured that the study was conducted within ethical parameters. In order to fulfill such principles, the researcher scrutinized his performance particularly in respect to two aspects of the research process. These included the way in which the researcher 'gets the facts' and 'what he does with them' (Sweeney & Olivier 1981).

With the submission of a detailed proposal, access to conduct the study in a regional hospital was granted (Appendix II). In the process of data collection, the researcher was highly aware that the use of undue pressure or coercive techniques to

probe for information was unethical to the point of being a violation of human rights. The general human rights of the informants under study had to be safeguarded. Participants were fully informed of the nature of the research and its design. Their consent was obtained and they were given the opportunity to withhold their involvement at any stage of the study. Anonymity and confidentiality were assured. All data, such as tapes of interviews and transcripts, were stored securely and were not divulged except in the form of the final report. Data analysis was honest and thorough, and no data that did not fit the picture was omitted.

Clearly, the main ethical consideration in any study is not so much about the information the data contains but what the researcher does with that information. For example, interviewing nurses concerning their viewpoints on diagnostic practice in the clinical area might open avenues of discussion in which the informants might verbalize highly personal problems and emotions. Hence, under all circumstances, any such privately yielded information, even if it was related to the study, was not disclosed without the agreement of the respondents.

## **Summary**

This chapter has justified the decision to adopt grounded theory to achieve understanding of the diagnostic practice in nursing. The theoretical and procedural perspectives of grounded theory have been discussed and the application of this methodology in the present study in term of sampling, data collection and analysis, and verification of results have been detailed. The following chapter will describe the findings and the core category which accounts for the processes involved when nurses diagnose patients' clinical condition in an acute clinical setting.

## CHAPTER 4: FINDINGS

---

This chapter provides a description of the results of the study. The first section presents the verbatim quotations from the transcripts that provide evidence for the substantive theory that has been generated by the grounded theory methodology. The second section details the results of the survey in an attempt to verify the generated theory.

### **Section One: Generating a theory for diagnostic practice in nursing**

This section describes the findings of a grounded theory study. The interviews of this study are conducted and transcribed by the researcher. In the interest of maintaining clarity of the findings, editing has been done on some of the quotes; however, the essence of the quotes has been unchanged.

#### ***Background of informants***

Twenty-eight in-depth informal interviews were carried out with nurses who

were working in either medical or surgical units of an acute hospital in the New Territories during a twenty-month period. The informants were registered nurses from two levels of the nursing education programme. 40% were studying towards Diploma in Nursing and 60% towards Bachelor in Nursing. All had at least two years of post-registration nursing experience with 43% having more than five years.

### *Ascertaining patient condition – the core category*

Diagnostic practice in nursing surfaced as a fundamental social and psychological process of *ascertaining patient condition*. It emerged as a dynamic integration of cognitive, psychosocial, and interpersonal behaviours, which nurses adopted in order to find out the clinical condition of patients in acute clinical environments. Conceptualised as diagnostic practice in nursing, the process of *ascertaining patient condition* involved a series of purposeful actions through which nurses, in interacting with patients and the environment, use their professional skills, knowledge, experiences, and perceptions to find out the clinical condition of patients. It was through the process of *ascertaining patient condition* that nurses established a therapeutic relationship, which provided the platform for their interventions to support recovery and to protect patients from vulnerability to harm. The assumption underlying *ascertaining patient condition* was that nurses had a positive

and committed attitude towards their patients, and were aware of the importance of identifying patients' clinical condition before implementing possible nursing interventions. Nurses expressed their views as follows:

*I have to make sure that things happen right at the beginning of my shift. It's a call day [admission day] ..it will be very busy. Though the hand-over reports say that patients are doing okay..I cannot say to myself that they're doing okay. You know ..I really don't know how they're going on..I have no idea because I don't have a feel for them. I have to find it out by myself. You know ..it is part of my duty ..I have to make sure they are really okay in my shift.*

(Nurse 3)

*We have already learned most of the typical patterns of responses, certain aspects of the situation stand out as salient, others recede in importance ..but we cannot simply compare the patterns to patients ..you know, different patients may respond differently. We also need to have some sense of them before trying to figure out their typical pictures ..in so doing, early warnings of patient changes are attended to, medical therapies are given with an understanding of a particular patient's responses, and most importantly particularized nursing care is made possible.*

(Nurse 7)

*As a nurse, I am obliged to reduce, or even eliminate, any potential harmful threat to my patients because I have to ensure their safety. It is my obligation! Sometimes, I also need to alert my colleague as well, so as to minimize any possible risk of my patients. So ..I have to know my patients well and, by all means, figure out their conditions ..understand their needs ..before I can offer any help to them...*

(Nurse 13)

Three critical sequential stages evolved from the process of *ascertaining patient condition* (Figure 4.1). Stage I, *attending the patient*, was when nurses started approaching and interacting with the patient. Stage II, *perceiving the situation*, began when nurses solicited information from all possible sources to augment their understanding of the patient. Stage III, *unfolding the picture*, was the stage in which nurses transformed data into facts and organized these facts into a sensible pattern that reflected the clinical condition of the patients. Nurses gave the following explanations of these stages:

*It is sometimes, I think, rather hard to describe but I find in most situations there are some steps that I used to follow ..it is not simply a matter of applying the learned knowledge ... it is a step-by-step procedure.*

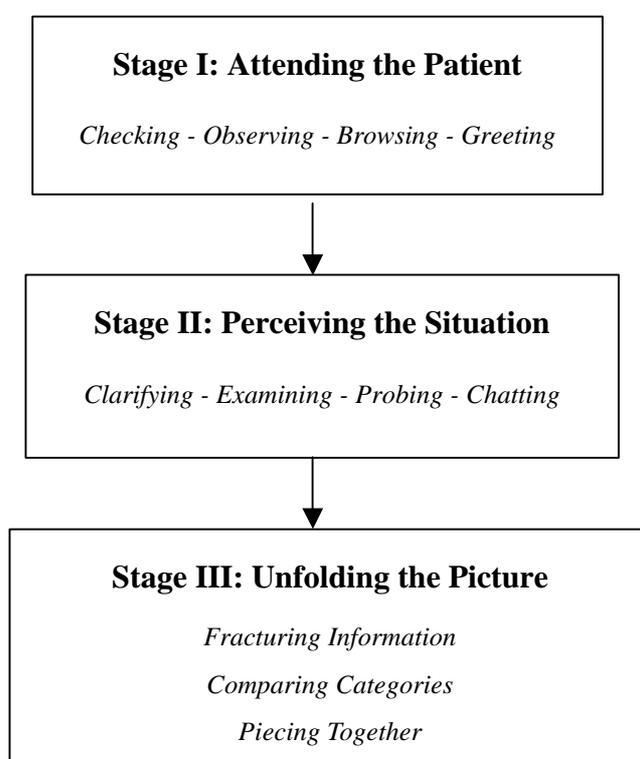
(Nurse 10)

*I read her charts and laboratory reports and get an idea of what is her baseline. I then look at her, get a feel of her, see what she looks like. Lastly I talk to her, know what she wants..it is sometimes not even medical. That's what I suppose to be 'getting to know my patient and understanding her situation'. I am her nurse ... how can I offer my help to her if I don't know what is happening?*

(Nurse 21)

Each of these stages was a theoretically complete unit comprising unique strategic behaviours. The stages were interdependent; each was equally necessary to ensure adequate and thorough “ascertaining”. If Stage I, *attending the patient*

was incomplete, Stage II, *perceiving the situation*, would be adversely affected, and if *perceiving the situation* was faulty, Stage III, *unfolding the picture* might be impaired. All these stages were found to be context dependent and closely associated with a number of psychological, social, and structural variables, which, in turn, either facilitated or hampered the process of *ascertaining patient condition*.



**Figure 4.1. The Process of Ascertaining Patient Condition.**

The stages of the core category, *ascertaining patient condition*, together with its' relationships with the associated psychological, social, and structural variables will now be described in detail.

### ***Stage I: Attending the patient***

The process of *ascertaining patient condition* began as nurses started to attend their patients. The definition of *attending the patient* emerged from the data as a means of approaching patients within a particular context. The stage of *attending the patient* provided a solid platform for the interaction between nurses and patients. The emphasis of this stage was on establishing rapport and putting the patient at ease. It was through *attending the patient* that subsequent stages of ascertaining patient condition were made possible. The stage began when nurses started approaching patients and ended when the nurse-patient interaction began.

In general, the stage of *attending the patient* arose out of two particular contexts and was either nurse-initiated or client-prompted. Nurses did their rounds when performing routine nursing procedures after the hand over and at the end of each shift. During these rounds nurse-initiated attending occurred. As for client-prompted attending, it happened when nurses were alerted by patients, who made complaints about changes of clinical conditions. It also occurred when visitors, such as relatives and friends, drew nurses' attention to perceived changes in the patients' general appearance. One nurse commented:

*You know nowadays the patient load is always very high. I only go to see my patients during my routine ward rounds. Or else, it is often the case that I am called by patients when they themselves are not feeling all right...*

(Nurse 22)

### *Behaviours of attending the patient*

Checking, observing, greeting, and browsing were consistently reported as the overt behaviours of nurses during this stage. These behaviors facilitated nurses' triggering off interaction with patients, and, as a result, enable nurses gaining access into patients' realm.

*Checking* referred to the act of questioning patients and seeking specific information about potentially problematic areas. It opened up the arena for nurses to interrogate their patients, as one nurse explained:

*We have to ask him a couple of questions in detail..like those questions that are related to his vital signs and medical diagnosis. Not until he tells us about that can we find out what is really happening to him...*

(Nurse 14)

*Observing* concerned watching patients in a careful and thorough manner for a period of time and often necessitated further examinations or changes in therapeutic procedure. It provided nurses with the opportunity to closely monitor their patients, as the following comment illustrates:

*She has been rather unstable now and then. I must take a close look at her carefully. I need to aware of all her vital signs, clinical reports and previous changes before I go to write my hand over report.*

(Nurse 24)

*Greeting* was the third type of behaviour that nurses adopted in attending the patient. Through the act of saying hello or expressing concern, a feeling of intimacy was created between nurses and patients. Common examples of greeting behaviour adopted by nurses were:

*When I meet my old cases all I need to say is something like 'Hello. How are you today?'*

*I used to say 'Hi. Are you feeling much better now? Did your son come to visit you yesterday?'*

*Browsing* involved looking at patients in a rather unhurried and casual manner when opportunities arose e.g. during ward rounds. It gave nurses chances

to spot the ‘latest news’ of their patients, as one of the nurses described her experience:

*She should be okay. However, having not seen her for quite sometime, to make sure she is still there and nothing new has happened, I just take a look at her when I am doing my medication round.*

(Nurse 19)

#### *Variability of the attending behaviours*

The type of behaviour nurses engaged in was found to be largely contingent upon the context in which the stage of attending the patient occurred. For example, the behaviour of nurses in nurse-initiated attending was reported to be different from that found when attending was client-prompted. In addition, psychological, social, and structural variables, such as patient group, ward round, hand over report, and client type, also influenced nurses’ behaviour when attending the patient.

#### *Patient group and ward round.*

The effects of the variables, patient group and ward round on nurses behavioural engagement when attending patients was nurse initiated are summarised in Figure 4.2.

		<u>Patient Group</u>	
		( New Admission )	( Old Case )
<u>Ward Round</u>	( Routine Procedure )	<i>Observing</i>	<i>Greeting</i>
	( End-of-shift )	<i>Checking</i>	<i>Browsing</i>

**Figure 4.2. The effects of Ward Round and Patient Group on Attending Behaviour.**

As shown in the above typology, during routine procedure rounds, such as administration of medications, nurses engaged themselves in *observing* newly admitted patients and in *greeting* patients who had been on the ward for sometime.

The following comments illustrate:

*Performing dressing is a good time for me to observe the new patients. I can have a closed look at their wounds, their appearances, their vital signs ..whatever ..so that I can watch for any potential changes in condition.*

(Nurse 21)

*I used to have sixteen patients to take care of in each shift ... to me the best time for looking at them is during my medication rounds. I used to keep an eye on those new cases closely while administering drugs to them ..for those old cases I just put the drugs on their table and say hello to them. I guess..they should be O.K. anyway.*

(Nurse 15)

When performing ward rounds at the end of each shift nurses engaged in *checking* the newly admitted patients for particular information and in *browsing* in respect of ‘old cases’ :

*Being the ward in-charge I always want to have a smooth hand over. By having a final check on the new cases, I can ask them how they feel, so that I can be pretty sure that they are okay at the end of my shift..or at least before I go off duty.*

(Nurse 25)

*They have been here for quite sometime. I only take a brief look at them before I go off duty. It's my routine ..just make sure that they are still there and nothing new has happened to them ..knowing that they are okay should be enough for me to do the hand over report.*

(Nurse 5)

*Hand over report and patient group.*

Nurses’ behavioural engagement in nurse-initiated attending was also found to be connected with the information from hand over reports and with the patient group, as indicated in the following typology (Figure 4.3).

		<u>Patient Group</u>	
		( Old Case )	( New Admission )
<u>Hand Over Report</u>	( Discussed )	<i>Checking</i>	<i>Observing</i>
	( Not Discussed )	<i>Greeting</i>	<i>Browsing</i>

**Figure 4.3. The connections between Hand Over Report and Patient Type with Attending Behaviour.**

In their hand over reports nurses adopted *checking* behaviour to look for particular information about the ‘old cases’ and in *observing* to watch newly admitted patients carefully during nurse-initiated attending. Nurses verbalised their experiences as follows:

*I was told that her condition was not too good and, above all, she did have the attack during my last shift. I definitely have to look for further attacks. I need to pay particular attention to her vital signs, cardiac enzymes and K<sup>+</sup> [potassium] level...etc ...when I do my ward round.*

(Nurse 17)

*I am just back from two days of day off. Some of the patients are new to me..I have no idea about them at all. However, from the hand over report, my colleague told me that there was a ‘bomb’ [an ill case] in bed 3. I must..for safety’s sake..watch this guy thoroughly and carefully during my rounds. I want to avoid any potential ‘explosion’ in my shift.*

(Nurse 22)

*Greeting* was reported to be the most common behaviour that nurses adopted to get a “feel” for the ‘old cases’ when this group of patients had not been discussed in the hand over report. On the other hand, *browsing* was found to be the behaviour that nurses engaged themselves in to look for information about newly admitted patients, who had not been discussed. Nurses expressed the following views:

*For those I know well from previous shifts and my colleagues do not mention anyone of them in the hand-over, I only say hello to them when I see them during my rounds. It should be okay.*

(Nurse 10)

*Though I did not meet him before ..probably he was admitted last night ..I did not receive any particular information about him from my colleagues either. I only take a quick look at him ..just trying to see if there is something new about him ..that’s quite enough, because nothing should happen..at least in my shift..I guess.*

(Nurse 20)

#### *Client type and patient group.*

When attending the patient was client-prompted, the type of client, i.e. patients or visitors, and the patient group were found to be associated with the behavioural engagement of nurses. These associations are shown in Figure 4.4.

		<u>Patient Group</u>	
		( Old Case )	( New Admission )
<u>Client Type</u>	( Patient )	<i>Greeting</i>	<i>Observing</i>
	( Visitors )	<i>Browsing</i>	<i>Checking</i>

**Figure 4.4. The Association of Client Type and Patient Group with Attending Behaviour.**

As illustrated in Figure 4.4, when patients prompted the attending, nurses adopted *greeting* to express concern to the ‘old cases’, but engaged themselves in *observing* the newly admitted patients when the new admission group prompted the “attending”. Comments from two nurses were:

*The patient told us that he was not feeling well. However, we did know that he should be in a satisfactory condition because he has been here for a few weeks. You know ..sometimes he just wanted to draw some attention from us. Most of the time what we need to do is just go to talk to him for a while..that usually work.*

(Nurse 13)

*For those new cases I don't have any idea about them ..when their call bells lightened up I need to know what they are doing. I have to get some information about them. I have to look at them thoroughly..keep an eye on them to look for changes.*

(Nurse21)

When the visitors of the 'old cases', be they relatives or friends, called upon nurses to attend the patients, *browsing* was the behaviour found to be adopted by nurses to look for new information. In situations where attending the patient was prompted by visitors of the newly admitted patients, *checking* was the behaviour that nurses engaged themselves in to look for specific aspects of the patients. Nurses stated their experiences as follows:

*Though he has been there for more than a week, his relatives suddenly call you to look at him. We cannot just go in and talk to the patient. We also need to look at him ..try to pick up anything new about his condition..sometimes relatives' complaints may help us to get some sort of new insight.*

(Nurse 16)

*During visiting hours when I am working in the nurse station relatives of the new cases always come to me telling me that Bed XYZ are not feeling well ..you know ..severe coughing, chest discomfort, dyspepsia, etc. Most of the time, these may not be my patients ..anyway all I can do is go look at these patients, ask them what's wrong and try to sort out what is really happening to them.*

(Nurse 25)

In summary, the first stage of ascertaining patient condition focused on initiating contact with patients. Checking, observing, browsing, and greeting were the behaviours that nurses engaged themselves in when attending patients. However, these behavioural engagements in the stage of attending the patient were found to be influenced by a number of variables, such as patient group, ward round,

hand over report, and client type. In addition, the behaviour that nurses adopted in the first stage of ascertaining patient condition also set the scene for the strategies used in the second stage of ascertaining patient condition.

### ***Stage II: Perceiving the situation***

Nurse-patient interaction having been initiated in Stage I, nurses now started to be conscious of the circumstantial information that was related to patients. This marked the beginning of the second stage of *ascertaining patient condition*: the stage of *perceiving the situation*. The purpose of this stage was to solicit patient information so as to augment nurses' understanding of their patients. It also provided necessary evidence and support for nurses to recognise a sensible pattern that reflected the clinical condition of patients. To achieve this, the second stage involved the use of effective perceiving strategies to gain access to every possible source of information. The stage of *perceiving the situation* came to an end when soliciting of patient information was considered to be complete.

#### *Information sources*

When perceiving patient situations, nurses took into account all aspects about the patients as sources of data. This included vital signs (blood pressure level, pulse and respiratory rate, and temperature reading), clinical reports, general appearance, emotional state, patient compliance, past history, nursing records, and medical notes.

Nurses described the following experiences:

*I used to look at his observation chart ..medical history, laboratory results, his general appearance and emotional state. For safety's sake ..I also need to know whether he has any particular complaint. I have to take note of everything about him before I can have some idea about him.*

(Nurse 7)

*Those are the basics ...blood pressure levels, respiration rates, pulse rates, appearances, general complaints, medical notes etc. This information gives me some idea of what is happening to my patients.*

(Nurse 13)

*We must observe her vital signs and general responses ..see whether she has been put on any aid or equipment. Then look at her medical notes and nursing records ..try to take note of the recent descriptions on her clinical condition or diagnosis ..just to let us have an overall idea about her situation.*

(Nurse 26)

However, nurses might modify the scope of perceiving patient situations.

Under certain circumstances, nurses only focused on collecting some particular

aspects of the patients when perceiving patient situations. Here are some of the nurses' explanations:

*I know I am supposed to read their case records thoroughly, and try to talk to them to discuss their condition but in this shift I have to take care of 2 cubicles ..you know ..a total of 18 patients. How can I have so much time to look at every detail about them? I can only concentrate on their vital signs, and have a quick look at their general appearance during my rounds. That will be O.K. ..at least ..I know what is happening ..you know ..not until they have any complaints, I cannot afford to look at everything.*

(Nurse 14)

*He is a known case of C.O.P.D. [chronic obstructive pulmonary disorder]. Just looking at his appearance, i.e. whether he is dyspnoeic or not, or may be sometimes also his SaO<sub>2</sub>, you know what is happening to him.*

(Nurse 17)

*I am told by my colleague in the hand over that she had been just having a heart attack and her general condition was no good. I must keep an eye on her vital signs, especially her E.C.G. [electrocardiogram], and her recent laboratory results on cardiac enzymes. I also need to take note of her clinical appearance ..see whether she has any complaint of chest or back pain ..this information is important.*

(Nurse 25)

As indicated in the above quotes, the scope of collecting information during the stage of *perceiving the patient* was largely influenced by variables such as patient load, medical diagnosis, and previous changes in clinical conditions. Nevertheless,

it was interesting to note that on some occasions, though rather reluctantly nurses still had to solicit patient information extensively. The background of patients affected the extent to which information was to be collected in different ways:

*He is the favourite of our C.O.S. [Chief of Service]. What else can I say? Though I am having a rather busy day..you know ..it's post-call [post admission day] ..I must perform all observations by myself again ..look at his kardex [nursing records] ..talk to him for a while to see if he has any complaint. Having done all this ..whether it is important or not really doesn't matter ..at least I have done my job. I can have something factual to write in my report in case the boss comes to ask me for information about his favourite.*

(Nurse 8)

*He is a drug addict. He has been 'living' here for quite some time. He knows us so well. You know nowadays with the 'magic' of Patient's Charter we become very vulnerable. I have to protect myself ..for god sake it's problematic to write 'statement' ..it's better for me to take note of everything about him in my shift ..at least I have some solid support in case he makes any complaint against us.*

(Nurse 24)

### *Strategies of perceiving the situation*

Four types of perceiving strategies were consistently used by nurses to solicit patient information in the second stage of ascertaining patient condition. They were, namely, *examining, probing, clarifying, and chatting.*

*Examining* emerged as a series of comprehensive assessment activities concerning all patient related aspects. The purpose of examining was to obtain thorough and complete information about the clinical condition of patients. When examining patients, nurses reviewed all the information sources including vital signs, general appearance, clinical reports, nursing records, and medical notes. Information generated from one source appeared to trigger off gathering of additional information in other related areas. Nurses even performed physical examinations on patients with or without the use of relevant equipment to solicit more detailed information whenever necessary. One of the nurses described such an experience:

*Of course we have to take their vital signs [blood pressure levels, pulse and respiratory rates, and temperature readings] ..sometimes listen to their chest sounds ..or even measure their SaO<sub>2</sub> [serum oxygen saturation levels] and blood sugar [levels]. But we cannot just simply rely on these readings. Readings are 'dead' ..you know... patients are 'living'. We also need to a look at their general appearances, talk to them, know something about their conscious levels, psychological states, reasons for hospitalisation etc. This helps us to 'view' things from different angles ..er ..also don't forget to review their medical notes and nursing records.*

(Nurse 21)

*Clarifying* emerged as the means of removing confusions that were considered to be casting doubt on some particular aspects of the patients. It involved the asking of focused questions, such as 'what about being able to drink?' or restatement of what the patient said, such as 'you are in great pain!' Through the

use of *clarifying*, nurses had the opportunity to have fuller descriptions of patient in the areas of inquiry. A nurse gave the following explanation of how *clarifying* was being used:

*Last time, He was admitted as a C.O.P.D. [chronic obstructive pulmonary disorder] case. I guess this time is just the same. As usual ..I only need to concentrate on looking at his respiration rate and pulse rate, signs of dyspnoea, his SaO<sub>2</sub> [serum oxygen saturation level], the chest X rays, and ask him about his breathing...*

(Nurse 18)

The third type of perceiving strategy was *probing*. It was concerned with the making of enquires about specific signs or symptoms about which there was no reported information. When probing patients, nurses explored some particular area and asked such questions as ‘are you breathing O.K.?’ ‘does it hurt here?’ in order to bring to the surface the ‘unseen’ aspects of patients’ clinical condition e.g. one nurse stated:

*She looks so pale..I wonder she may also be a case of gastrointestinal bleeding or even oesophageal varices. I guess there must be ‘something else’. For safety’s sake I better also check her blood pressure level and pulse rate, ask her about bowel opening, it’s colour, look for any sign of tarry stool ..you know ..those related signs and symptoms.*

(Nurse 10)

*Chatting* referred to the use of informal and friendly conversation to talk to patients about issues that did not seem to be contextually relevant. The purpose of talking to patients in such a casual manner was to get in touch with patients and, at the same time, obtain some general information about them. One of the nurses expressed her experience:

*He has been in my ward for a couple of days. He is one of those up and above cases. I know him well. He is awaiting transfer to the (X) hospital. Just talking to him during my medication round..to see how he is going on in my shift ..that's O.K. ..it's just sort of 'routine' ..knowing that he is still there.*

(Nurse 11)

#### *Variability of the perceiving strategies*

The uses of perceiving strategy were found to be influenced by a number of psychological, social, and structural variables, such as patient load, presence of visitors, and verbalization of symptoms. In addition, the variables that affected nurses' behavioural engagement in the stage of attending the patient were also found to be influencing the use of perceiving strategy.

#### *Patient load, hand over report and patient group.*

Even though the patient load was high, nurses adopted *examining* as the

perceiving strategy to solicit thorough and complete information about those newly admitted patients who had been discussed in the hand over report. *Clarifying* was reported to be the strategy that nurses used to check on some particular aspects of those ‘old cases’, who had also been discussed in the hand over report, when the patient load was high. Nurses gave the following explanations:

*This unconscious case came from the Accident and Emergency Department this morning. They told me that the case was rather ill and unstable. They had been trying to contact his relatives but news was yet to come. As the cubicle i./c. [charge nurse of 8-10 patient beds] ..I have to continue all these ..you know. Today is a call day [admission day]. Before I am overwhelmed by other new cases I better take some time to look at this case thoroughly to get some complete and up-to-date information about him ..you know ..It's really not my day.*

(Nurse 17)

*It's rather a surprise to know that he had a seizure last night. For the past few days, he was rather stable. This attack seems rather sudden. I need to talk to him to recheck those reasons that caused the attack. Just trying to know what is really happening to him ..for safety's sake..before I begin my pre-op preparation round for the listed cases.*

(Nurse 5)

Though the patient load was low, nurses took up *probing* as the strategy to explore the hidden signs and symptoms of the newly admitted patients who had been discussed in the hand over report. *Chatting* emerged as the strategy that nurses

employed to get in touch with the ‘old cases’, who had not been discussed in the hand over report, when the patient load was low. Some of the nurses remarked:

*When I am back for the p.m. shift after the call day [admission day] there are always some new cases that I don't know about. As the nurse-in-charge, I often go round these cases to see how they look. Sometimes ..for those elderly women ..I ask them a couple of questions to make sure there are no unanticipated problems ..you know ..although nothing special has been written down on their case notes, the aged patients usually have multiple pathologies.*

(Nurse 21)

*He's a known case of cirrhosis returned for P.T.A. [percutaneous transhepatic arteriogram]. He is one of those regular patients. We all know him well. As a routine we just say hello to him during our rounds ..when times allows talking to him is great fun.*

(Nurse 4 )

The following typology (Figure 4.5) summarizes these effects.

		<u>Patient Group</u>			
		( Old Case )	( New Admission )		
<u>Patient Load</u>	( High )	<i>Clarifying</i>	<i>Examining</i>	( Discussed )	<u>Hand Over Report</u>
	( Low )	<i>Chatting</i>	<i>Probing</i>	( Not Discussed )	

**Figure 4.5. The Effects of Patient Load, Hand Over Report and Patient Group on Perceiving Strategy.**

*Client type and patient group.*

Nurses used *chatting* as the perceiving strategy to obtain some general information about old cases when patients prompted the attending, whereas *examining* was the strategy adopted to solicit thorough and complete information about newly admitted patients. Some of the nurses described their experiences:

*He shows signs to call me to his bedside. I know what he really wants...in fact, everyone knows. All I need to do is just go to 'entertain' him for a while and that will be O.K.*

(Nurse 8)

*I was called by a new case who was just admitted from the accident and emergency department when I was admitting another pre-scheduled clinical case. He was complaining of shortness of breath. He really looked cyanotic. I rushed to him, listened to his chest, checked his blood pressure level, pulse rate and SaO<sub>2</sub> [serum oxygen saturation level]. I also reviewed his case notes, clinical records...etc. Just trying to find out what was happening to him.*

(Nurse 18)

When called by visitors to attend patients nurses used *probing* as the perceiving strategy to explore the hidden aspects of old cases and *clarifying* to check on some particular aspects of newly admitted patients. Nurses gave the following explanations:

*In the beginning of my shift, her friend comes to me saying that she looks very pale. Though I know that she is a renal case suffering from kidney disorder and has been on peritoneal dialysis for a while, I wonder would there be some other underlying causes...you know...kidney cases are always problematic. I go to check her blood pressure level and pulse rate. They are very low. When I ask her how she feels, she tells me that she is very cold. I begin to realize that she is in cold sweating. When I palpate her abdomen, it looks very hard. I know it must be sort of internal bleeding. Then I quickly call the houseman.*

(Nurse 15)

*You know ..when we are being called by the relatives of those cases just admitted from the accident and emergency department, we have to clarify exactly why those patients are not feeling well. There may be some signs that mask their symptoms. We do not want to be confused by that...we must be very specific. Otherwise we end up doing the wrong 'things' to them.*

(Nurse 20)

The following typology (Figure 4.6) illustrates these associations.

		<u>Patient Group</u>	
		( Old Case )	( New Admission )
<u>Client Type</u>	( Patient )	<i>Chatting</i>	<i>Examining</i>
	( Visitors )	<i>Probing</i>	<i>Clarifying</i>

**Figure 4.6. The Association of Client Type and Patient Group with Perceiving Strategy.**

*Verbalization of symptoms and presence of visitors.*

*Examining* was reported to be the perceiving strategy that nurses used to gather thorough and complete information when patients verbalised symptoms of their clinical condition and there were visitors with the patients. Even though the patients did not have any complaint about any changes in their clinical condition, nurses adopted *probing* as the strategy to explore the hidden signs and symptoms of these patients when visitors were present. The following experiences were reported:

*During visiting hour in my cubicle she keeps complaining of severe chest pain. Her relatives are by the bedside. Everybody looks nervous about this. I rush to her check her blood pressure level and pulse rate, look at her electrocardiogram monitoring results, ask about the character and location of pain, and review her notes.. trying to get a grasp of the situation.*

(Nurse 7)

*I used to ask patients and relatives, a couple of questions when doing my medication round during visiting hour. Especially for those who are admitted without having any company, even if they do not have any complaint ...always works..I often get some new information.*

(Nurse 19)

*Chatting* emerged as the strategy that nurses adopted to get in touch with their patients when the patients did not have any complaints about their clinical condition and there were no visitors present. When patients verbalised some symptoms of

their clinical condition, though no visitors were present, nurses took up *clarifying* as the perceiving strategy to check particular aspects. Nurses explained as follows:

*It doesn't matter whether there are visitors or not it is our responsibility to find out what's happening to the patient, especially when she does have some complaints about abdominal pain.*

(Nurse 22)

*For those who do not have anyone to come to visit them I talk to them for a while before I finish my shift. Though they look fine and do not have any complaint of discomfort. I just want to be 'in touch' with them, and, above all, I find this is of some therapeutic value ... a way of expressing caring, because we are nurses.*

(Nurse 10)

The following typology (Figure 4.7) summarizes these connections.

		<u>Verbalization of Symptom</u>	
		( + )	( - )
<u>Presence of Visitors</u>	( + )	<i>Examining</i>	<i>Probing</i>
	( - )	<i>Clarifying</i>	<i>Chatting</i>

**Figure 4.7. The Connections between Visitors' Presence and Symptom Verbalisation and Perceiving Strategy.**

From the above findings, it was apparent that the use of perceiving strategy in the second stage not only affected by patient load, verbalisation of symptom and presence of visitors, but was also by the attending behaviours, in which nurses engaged in the first stage of ascertaining patient condition, as indicated by the following nurses:

*..I begin have a couple of queries about his presented signs and symptoms. I am not sure how these 'things' are related to each other ..I really don't know ..I have to talk to him again and ask him some specific questions related to his past history in order to make things clear...*

(Nurse 14)

*As the i./c. you are responsible for your clients' safety so when you look at your client closely during the round, and recognize that he looks rather 'different' ..there must be something wrong ..to find out what is happening to him you must fully engage yourself in all sorts of examinations, techniques or procedures, even call the houseman for help, so as to be sure that we have done our job thoroughly.*

(Nurse 24)

*Before going off sometimes I walk toward them just wishing them a good night's sleep or even gossip with them about the latest news of celebrities that's on the T.V. that evening ..it's more than emotional support I come to know he is still looks 'alive' ..so that I can write it down on my hand over report that he is as 'usual'.*

(Nurse 5)

The following diagram (Figure 4.8) summarises the relationship between perceiving strategy and attending behaviour.

		<u>Perceiving Strategy</u>			
		( Clarifying )	( Examining )	( Chatting )	( Probing )
<u>Attending Behaviour</u>	( Checking )	ö			
	( Observing )		ö		
	( Greeting )			ö	
	( Browsing )				ö

**Figure 4.8. The Relationship between Attending Behaviour and Perceiving Strategy.**

In summary, the second stage of ascertaining patient condition began after nurses attended patients. In this stage, nurses aimed at augmenting their understanding of patients' condition by soliciting information that was considered to be relevant and appropriate. Four different types of perceiving strategies, *examining*, *clarifying*, *probing* and *chatting*, were found to be used by nurses in the second stage. The use of these perceiving strategies was influenced by the engaged attending behaviours, and a number of psychological, social, and structural variables, some of which have already been reported in the first stage of ascertaining patient condition.

### ***Stage III: Unfolding the picture***

When soliciting of patient information was completed, nurses entered into the final stage of ascertaining patient condition: the stage of *unfolding the picture*. In this final stage, nurses started to work with the solicited information by engaging themselves in a series of cognitive activities. During this stage information was transformed into facts, and subsequently organised into a sensible pattern, which reflected the clinical condition of patients. Having unfolded the picture of patients, nurses' understanding of their patients' clinical condition was then augmented. During this stage interaction between nurse and patient was minimal, as this stage was very dependant on nurses integrating their empirical knowledge, clinical experience, and cognitive skill, in order to move forward towards ascertaining patient condition. This final stage of ascertaining patient condition also evoked positive emotions, because nurses had now developed a solid platform for making decisions about future interventions, as the following comments illustrate:

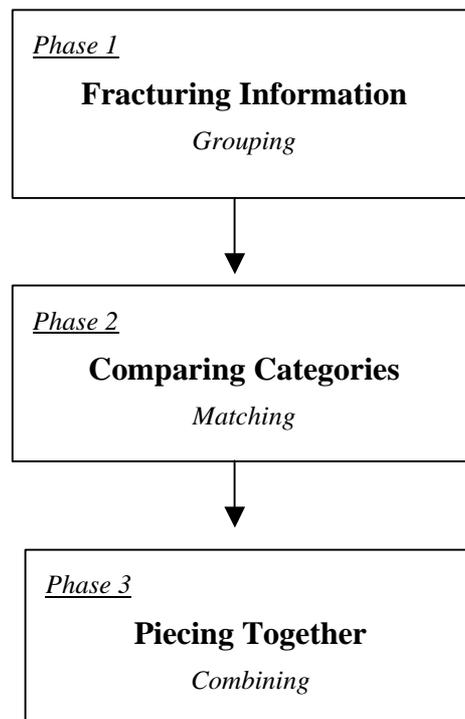
*Having talked to her for a while, I check on her observations, look at her laboratory results ..blood gases, complete blood picture, amylase, etc ..then I try to compare each of these groups with her previous findings one-by-one ... I should have a rough idea about her condition..is it the same or getting worse?*

(Nurse 24)

*It is important in the sense that, having gone through all these steps, I can eventually come up with something about his clinical condition ..it really feels good, and sometimes it is even a relief, because by then I know what to do next...*

(Nurse 19)

The stage of *unfolding the picture* was characterized by three sequential phases as shown in Figure 4.9.



**Figure 4.9. Three Phases in the Stage of Unfolding the Picture.**

It was found that whichever behaviours and strategies nurses adopted in the previous stages of ascertaining patient condition, were also used in these phases of the final stage of ascertaining patient condition.

### *Fracturing information*

In this phase, nurses attempted to break down and re-organize the collected information into categories in accordance with characteristics or common properties, such as observations, i.e. blood pressure, pulse, temperature, respiration or oxygen saturation index, and level of consciousness, signs and symptoms of the disease, and investigation or laboratory results. *Fracturing information* provided nurses with an objective and systematic base from which to work when dealing with this information in the subsequent phases. One nurse explained:

*When you have gathered all this information it is more useful to classify the information collected from the patient into different groups according to characteristics, such as sign & symptom, 'Obs' [observation findings], 'lab' [laboratory] results, etc ..in such a way it makes the subsequent comparing of data more easy and meaningful. It really helps me a lot to arrive at a conclusion late.*

(Nurse 7)

Grouping emerged as the cognitive activity in which nurses engaged to organize the gathered information logically into a comprehensive data bank. Grouping not only optimized the use of information, in terms of breadth and scope, it also speeded up nurses' understanding of the patient in the subsequent phases, as the following comments illustrate:

*Those blood results, such as white cell count, bilirubin and amylase, are in one group; temperature, pulse and respiration are in another. Besides, his imaging results such as magnetic resonance imaging, ultrasound ..etc ..these data also give me support. You can't go on with one parameter alone ... you have to collect all different sorts of data ..then organize and put things into pigeonholes, because different groups of data give different meaning..by grouping them together you will have some factual support ..this also provides you with a solid basis for subsequent comparison.*

(Nurse 22)

*Well ..having gone through the vital signs, subjective complaints, and our objective observations, I begin to group them together ..in so doing it provides me with a more objective and comprehensive picture and makes me more easy to do subsequent comparisons ..and I can also other possibilities.*

(Nurse 25)

### *Comparing categories*

Having organized the information into categories, nurses started to compare each of these categories with their reference framework one-by-one to look for differences or similarities. The reference framework that nurses used when making comparisons were; the normal range of readings, patients' baseline data, patients' previous readings or records, and signs and symptoms of the disease. It was through comparing that the normal was differentiated from abnormal, the unchanged clinical presentation from the changed, and the stable manifested characteristics from

the unstable. One nurse recounted her experience:

*Everybody has baseline line or previous readings. By comparing the findings with baselines or previous readings ..we can identify similarities and differences. If there is not baseline available, e.g. for new cases, then we will just compare their findings with the normal ranges ..then you still get some idea about a patient ..whether he is normal or deteriorating.*

(Nurse 17)

Matching emerged as the cognitive activity that nurses adopted to compare the categories with their reference frameworks. The purpose of matching was to identify the similarities and differences between the grouped information and nurses' reference framework. It was found that matching was carried out in either group-by-group or point-by-point manner. However, there was no obvious sequence in which matching was carried out. As the following quotes from nurses show:

*I already have a set of normal range about the condition. I learned this from books. What I have to do is just match what I get from the patient with those I already have in my mind ..one-by-one ..then I will get it...*

(Nurse 28)

*Yes it's just comparing her appearance when I met her before and now ..any difference? better or worse? does she look rather dull? how about her vital signs? any changes? are they still normal?*

(Nurse 21)

*I'm really worried about this man..I take care of him and he has been doing well for the past two shifts ..the difference between the way he looks now and the way he looked yesterday is very dramatic. I'm really concerned that he is starting to show signs & symptoms of myocardial infarction ..he reminds me of a guy we had three weeks ago ..they look more less the same..in fact, he is more lethargic ..we better do something to confirm his condition.*

(Nurse 7)

### *Piecing together*

In this phase, nurses consolidated their understanding of the clinical condition of patients by appraising the compared results, i.e. the manifested characteristics, in order to make sense out of them. Nurses mentally listed all the manifested characteristics, and then organized them into a sensible pattern that reflected the overall picture of patients' clinical condition. One nurse remarked:

*His lab. results ..such as  $Na^+$  [serum sodium level] .. $K^+$  [serum potassium level] are very low. He looks very lethargic probably because of low K.. His obs. [observation findings: blood pressure, pulse & respiration] are no good too. He complains of dizziness as well. When I get such kind of data ..I get an impression that nothing seems right with him ..he is probably in shock..I better inform the houseman immediately.*

(Nurse 8)

Combining emerged as the cognitive activity that facilitated nurses to

synthesize data from a variety of disparate sources to form a sensible pattern, i.e. to combine them to develop a single impression. It was through combining that nurses assembled and summed up the manifested characteristics into an overall picture that illustrated patients' clinical condition. Nurses explained as follows:

*Having taken all her data into consideration, I then have to do a bit of final work..add them up together, just like doing a puzzle ... then I will come up with the right answer..I mean her clinical condition..at least..I know she is 'good' or 'bad' .*

(Nurse 23)

*Even though you have looked at everything, listened to everything and compared the data with all possible sources, you only have, at hand, different sets of information..it is not done yet ... you still have to sum up all these data sets and put them back and see what you can get out of them.*

(Nurse 19)

### *Factors affecting stage III*

It was found that a number of factors influenced the third stage of ascertaining patient condition.

(a) Knowledge and experience were found to strengthen the breadth and depth of nurses' reference frameworks. This, in turn, increased nurses' sensitivity to identify the differences and similarities between the categories and the framework

during matching. Nurses recounted their experiences:

*Knowledge and experience are very important ..they enrich my databank [i.e. the reference framework] and make me more sensitive to those characteristics of my patients ..and this will in turn make my comparing more easy and faster. As a matter of fact, I think they are really complementary. If you don't have any experience, I mean prior exposure, you won't have that kind of down-to-earth evidence ..if you don't know the theory, you don't know what it should be..besides it gives you something really up-to-date.*

(Nurse 22)

*I know what a schizophrenic looks like ..even though this is the first time I've see him. Having talked to him for quite a while I do have a feeling that he is simply acting, but he really doesn't have that kind of quality to be an actor ..I'm not a 'newbie' at all..I've been working in this ward for 5 years ..for god sake ..I better find out what is really happing behind this scene..it may be something more than emotional ..anything wrong with his vital signs and lab. findings..better recheck them all.*

(Nurse 20)

(b) Physical fatigue and negative emotion emerged as the factors which impeded nurses' ability to recollect the reference framework. Consequently, the speed and comprehensiveness of matching were reduced, as the following nurses explained:

*It's been a bad day ... I am the in-charge today...the ward is so busy that it has already drained away all my energy...when I am so exhausted how can I still have the mood and patience to recall*

*everything and compare them one-by-one..who cares about the details..I ll just look at some main points to see how he goes.*

(Nurse 26)

*I am no good today ..I know ..not in the right mood just having had a 'crash' with my mother..I am really out of it..I cannot think of anything ..I can only give it a few seconds..just get it done roughly..somebody can pick it up anyway.*

(Nurse 15)

(c) Medical diagnosis and clinical context were also found to affect nurses' focus when matching the categories with their reference framework during comparing. Nurses made the following statements:

*This is a medical ward and most of them are heart cases ..nobody is going to worry about those surgical signs and symptoms, such as abdominal distensions and fever ..we usually focus on comparing the degree of chest pain, signs of radiation, the electrocardiogram and the heart enzymes results...why waste time?*

(Nurse 12)

*This guy is admitted into my ward because of chop wounds with ruptured tendons of right wrist. We are all busy finding out the number and depth of his chops, and the residual function of his right wrist, even the right upper limb ..not until I realize that he is unconscious ..god knows he also has a severe head injury..probably also been chopped ..in fact, that's really bad ..his G.C.S. [Glasgow Come Scale] drops below 5..if he was in a surgical ward things would not be the same.*

(Nurse 5)

In summary, the final stage of ascertaining patient condition focused on

appraising the compared results, i.e. the manifested characteristics, and forming a sensible picture which reflected the clinical condition of patients. This final stage composed of three sequential phases: *fracturing information*, *comparing categories*, and *piecing together*. Grouping, matching and combining were the cognitive activities that nurse used to organize the compared data into an overall picture. In addition, comparing categories, the second phase of unfolding the picture, was found to be influenced by a number of variables, such as experience, knowledge, physical status, emotion, medical diagnosis, and clinical context.

### *Summary of the findings*

This study has resulted in a substantive grounded theory that explains the diagnostic practice of nurses in acute clinical environment. The core category of this theory is a social and psychological process of *ascertaining patient condition*, whereby nurses engage themselves in a number of cognitive, psychosocial, and interpersonal behaviours in order to understand the clinical condition of patients.

Three critical sequential stages of *ascertaining patient condition* are delineated. The first, *attending the patient*, is the stage when the interaction between nurses and patients begins. Checking, observing, greeting, and browsing

are the attending behaviours nurses engage themselves in when interacting with patients. The type of attending behaviour engaged in is influenced by a number of psychological, social, and structural variables, such as patient group, ward round, hand over report, and client-type.

The second stage, *perceiving the situation*, is the stage of becoming aware of the circumstantial information that may be related to patients. Nurses attempt to exhaust source of data about the patients. Four perceiving strategies are used in this stage: examining, probing, clarifying, and chatting. The perceiving strategy used is depends on a number of variables similar to those found in the previous stage.

The final stage of ascertaining patient condition is *unfolding the picture*. During this stage nurses begin to organise the collected information into an overall picture of the patients' clinical condition. To complete this final stage, nurses go through three different phases: *fracturing information*, *comparing categories*, and *piecing together*. Variables, such as experience, knowledge, medical diagnosis, emotion, and clinical context, exert varying degrees of influence on comparing categories. Nevertheless, the unfolding of patients' picture evokes positive emotion in nurses and gives them confidence for deciding subsequent interventions.

In summary, the use of grounded theory indicates that diagnostic practice in nursing is a social and psychological process of *ascertaining patient condition*, in which nurses integrate their cognitive, psychosocial, and interpersonal behaviours to find out the clinical condition of their patients. It is through *ascertaining patient condition* that nurses establish therapeutic relationships and build a solid platform on which to ground subsequent nursing interventions to support patients' recovery and to protect them from harm.

## **Section Two: Results of theory verification**

This section describes the results of the survey in an attempt to verify the generated theory and examine its relevance to practice. One thousand questionnaires were sent out randomly to nurses working in various general care settings. A total of 366 nurses returned their questionnaires for analysis and the results of the data analysis are described below.

### ***Demographic profile of the sample***

As shown in Table 4.1, 84.7% (n = 366) of respondents were registered

nurses, of whom 96.7% had more than 6 years clinical experiences. 71.6% of respondents worked in acute hospitals (26.8% in general and 44.8% in special). 84.2% of respondents had worked in their existing clinical settings for more than 3 years. As regard to the academic qualifications of the respondents, 73.7% had been awarded a bachelor degree or above.

	(%) n = 366
<b><i>Rank</i></b>	
Enrolled Nurse	0.0
Registered Nurse	84.7
N.O./N.S./W.M.	15.3
<b><i>Year of Experience</i></b>	
0-5	3.3
6-10	33.9
Above 10	62.8
<b><i>Service Setting</i></b>	
Acute Hospital – General Wards	26.8
Acute Hospital – Specialties	44.8
Extended/Rehabilitative Hospitals	14.2
Others	14.2
<b><i>Experience in Existing Setting</i></b>	
0 – 3	15.8
3 – 6	34.5
Above 6	49.7
<b><i>Academic Qualifications</i></b>	
Certificate/Diploma/Higher Diploma	26.3
Bachelor Degree	55.7
Post-graduate Certificate/Diploma	9.8
Masters Degree	8.2

**Table 4.1. Demographic Profile.**

***The core category – Ascertaining patient condition***

As shown in Table 4.2, an average of 97.3% (n = 366) of the respondents considered diagnostic practice in nursing to be a process of ascertaining patient condition, whereby nurses engage themselves in three sequential stages of purposeful actions in order to find out patient’s clinical condition.

<b><i>Ascertaining Patient Condition</i></b>		(%) n = 366			
		Strongly Disagree	Disagree	Agree	Strongly Agree
♦	A series of purposeful action to find out the clinical condition of patients.	0.5	1.6	78.7	19.2
♦	A dynamic integration of cognitive, psychosocial and interpersonal skills.	0.0	1.6	54.6	43.8
♦	Provide solid platforms to ground nursing interventions to protect and support my patients.	0.0	3.3	56.3	40.4
♦	The first stage is to approach and interact with patients.	0.0	1.1	48.6	50.3
♦	The second stage is to collect information from all possible data sources.	0.0	2.2	72.2	25.6
♦	The third stage is to articulate the data into a sensible picture.	0.0	2.2	73.2	24.6
♦	These stages are sequential and interdependent.	0.0	6.6	72.9	20.5
(mean)		0.07	2.6	65.2	32.1

**Table 4.2. Ascertaining Patient Condition – the Core Category.**

### *Stage I: Attending the patient*

As shown in Table 4.3, an average of 82.9% (n = 366) of the respondents agree that checking, observing, greeting, and browsing are the behaviours that they adopt to approach and interact with their patients during the first stage of ascertaining patient condition and that these attending behaviours are influenced by a number of psychological, social and structural variables.

<i>Attending the Patient</i>	(%) n =366			
	Strongly Disagree	Disagree	Agree	Strongly Agree
♦ Attending the patient is either nurse-initiated or client-prompted.	3.3	21.3	63.4	12.0
<i><u>During routine ward rounds</u></i>				
♦ Observing - the newly admitted patients.	1.6	10.4	70.0	18.0
♦ Greeting - the 'old cases'.	1.1	6.0	65.6	27.3
<i><u>During end-of-shift rounds</u></i>				
♦ Checking - the newly admitted patients.	1.1	27.3	55.2	16.4
♦ Browsing - the 'old cases'.	1.6	25.1	64.6	8.7
<i><u>Discussed in hand over report</u></i>				
♦ Observing - the newly admitted patients.	1.6	7.7	71.6	19.1
♦ Check – the 'old cases'.	1.1	10.4	71.6	16.9
<i><u>Not discussed in hand over report</u></i>				
♦ Browsing - the newly admitted patients.	1.1	19.2	69.8	9.9
♦ Greeting - the 'old cases'.	1.6	14.8	69.9	13.7
<i><u>Client prompted: Patient</u></i>				

♦ Observing - the newly admitted patients.	0.5	13.1	70.6	15.8
♦ Greeting - the 'old cases'.	1.1	10.4	74.3	14.2
<i>Client prompted: Visitors</i>				
♦ Checking - the newly admitted patients.	1.1	15.8	67.8	15.3
♦ Browsing - the 'old' cases'.	1.6	22.4	68.3	7.7
(mean)	1.4	15.7	67.9	15.0

**Table 4.3. Stage I: Attending the Patient.**

### *Stage II: Perceiving the situation*

Table 4.4 illustrated that an average of 83.3% (n = 366) of the respondents regarded examining, probing, clarifying, and chatting as the strategies that they used to collect information about their patients in the stage of perceiving the patient, and that a number of variables, such as patient load, client type, hand over report, patient type, and verbalization of symptoms, also influenced their use of these strategies.

<i>Perceiving the Situation</i>	(%) n = 366			
	Strongly Disagree	Disagree	Agree	Strongly Agree
♦ Every aspect about the patient is the source of data for perceiving the situation.	0.0	0.0	50.8	49.2
<i>High patient load</i>				
♦ Examining - the newly admitted patients whose condition had been discussed in the hand over report.	2.7	25.7	59.6	12.0
♦ Clarifying - the 'old cases' whose condition had been discussed in the hand over report.	0.0	5.5	79.2	15.3

Low patient load

♦ Probing - the newly admitted patients whose conditions had not been discussed in the hand over report.	1.6	8.2	68.3	1.9
♦ Chatting - the 'old cases' whose conditions had not been discussed in the hand over report.	0.5	10.9	72.1	16.5

Client prompted: Patient

♦ Examining - the newly admitted patients.	2.2	27.3	57.9	12.6
♦ Chatting - the 'old cases'.	1.0	12.6	73.8	12.6

Client prompted: Visitors

♦ Clarifying - the newly admitted patients.	1.1	11.5	73.2	14.2
♦ Probing - the 'old cases'.	1.1	18.0	68.3	12.6

Verbalization of symptom

♦ Examining - when there are visitors.	1.6	24.6	56.9	16.9
♦ Clarifying - when there are no visitors.	0.0	3.8	66.7	29.5

No verbalization of symptom

♦ Probing - when there are visitors.	2.7	26.8	59.0	11.5
♦ Chatting - when there are no visitors.	1.1	19.3	69.8	9.8

---

(mean)	1.2	15.0	65.8	18.0
--------	-----	------	------	------

---

**Table 4.4. Stage II: Perceiving the Situation.**

***Stage III: Unfolding the picture***

Table 4.5 demonstrated that an average of 93.2% (n = 366) of the respondents agreed that the final stage of ascertaining patient condition consists of three different phases, namely fracturing information, comparing categories, and piecing together, in which grouping, matching, and combining are the respective cognitive activities

used to analyze the collected data.

<i>Unfolding the Picture</i>	(%) n = 366			
	Strongly Disagree	Disagree	Agree	Strongly Agree
♦ Fracturing the data by grouping it into different categories.	0.0	7.1	75.4	17.5
♦ Grouping provides a systematic and comprehensive data bank.	1.1	8.2	75.4	15.3
♦ Comparing the categories by matching them with the reference frameworks.	0.0	4.4	77.0	18.6
♦ Matching in a either point-to-point or group-by-group manner.	0.0	21.9	72.1	6.0
♦ Matching identifies the similarities and differences between the categories and the reference frameworks.	0.0	7.1	84.2	8.7
♦ The manifested characteristics provide a solid ground to actualize the understanding of patient's clinical condition.	0.0	4.9	83.6	11.5
♦ Knowledge and experience strengthen the reference frameworks, which increase the sensitivity to identify the manifested characteristics.	0.0	1.1	65.6	33.3
♦ Familiarities of medical diagnosis, the clinical context and prior experience determine the focus and emphasis of matching.	0.0	3.8	67.8	28.4
♦ Negative emotion and physical fatigue impede the comprehensiveness and speed of comparing.	0.5	8.7	59.0	31.8
♦ Combining puts the manifested characteristics together to a sensible pattern.	0.0	5.6	83.6	10.8

♦ Combining the manifested characteristics sum up and articulate these results into an overall picture.	0.0	6.6	82.5	10.9
♦ Knowledge and prior exposures of the manifested characteristics give shape and meaning to the overall picture.	0.0	1.6	73.2	25.1
(mean)	0.1	6.7	75.0	18.2

**Table 4.5. Stage III: Unfolding the Picture.**

### *Summary of verification*

In summary, descriptive analysis of 366 theory verification questionnaires goes some way to confirming that diagnostic practice in nursing is a social and psychological process of *ascertaining patient condition*, in which nurses integrate their cognitive, psychosocial, and interpersonal skills to find out the clinical condition of patients. The implication of this confirmation further contributes to the substantive theory generated by the analysis used in grounded theory, as it provides some evidence that the theory described here is ‘fit’ and relevant to nursing practice.

## CHAPTER 5: DISCUSSION

---

This chapter discusses the identified substantive theory in the context of scholarly literature. The chapter begins with an analysis of the congruence of the identified theory with normative models that have been used in studying clinical decision making, diagnostic reasoning, and clinical judgment. This is followed by deliberations on the important features of the sequential stages of the identified theory in relation to arguments from relevant theoretical literature and findings from related research. The chapter ends with discussion about the implications for nursing research, education, and practice.

### **The Juxtaposition of the Identified Theory and Normative Models**

In this section the theory of diagnostic practice in nursing will be compared with findings of studies that are derived from normative models of diagnostic reasoning and clinical decision making or judgment. It will be argued that the findings of this study that generated a substantive theory of diagnostic practice differ from previous models that have predominantly guided research on diagnostic practice.

### *Comparing with the normative models*

The following section discusses the differences and similarities between the identified theory from this study and normative models identified in the literature.

#### *Critical Features*

It is clear that the majority of studies based on the normative models concentrate on the cognition processes within the diagnostic process. Review of the literature yields no study concerned with the transactions that precede the mental activity. However, the real world of clinical practice is characterized by the dynamic interaction of intrapersonal and interpersonal influences, and the social context within which nurse and patient encounters take place (Orme & Maggs, 1993; Dela Cruz, 1994; Greenwood, 1998). Obviously diagnostic practice in clinical reality is much more than mental effort.

This study, by adopting the grounded theory method, has resulted in a substantive theory, *ascertaining patient condition*, which clearly indicates that diagnostic practice in acute clinical care is a dynamic process, which involves the

integration of interpersonal, psychosocial and cognitive skills and activities. The process of *ascertaining patient condition*, results in understanding the clinical condition of patients in three sequential stages, namely *attending the patient*, *perceiving the situation* and *unfolding the picture*. Each stage involves the use of a range of interpersonal behaviours, psychosocial strategies and cognitive activities, which are contingent upon a number of psychological and sociological contextual variables. The first stage, *attending the patient*, is characterized by nurse-patient interaction, in which, by engaging in a particular interpersonal behavior, nurses establish a therapeutic cornerstone for the subsequent stages of the process. Based on the rapport developed, the next stage, *perceiving the situation*, involves the use of psychological and social strategies to solicit all possible sources of information about the patient. Having gathered the information, nurses, in the final stage, *unfolding the picture*, go through a series of cognitive activities to organise the information into a pattern that reflects the clinical condition of patient.

A number of authors have adopted statistical theories, such as Bayesian theorem and decision analysis to examine how clinicians acquire and manipulate probability information. They argue that people hold degrees of belief in relation to scientific theories or outcomes. These degrees of belief are adjusted in response to the presentation of new probability evidence. The studies therefore attest that clinical

decision making requires a mathematical formula or a decision tree with numerical values to be identified, computed, and stored before decisions can be made. Consequently, such structured decision is the quantitatively correct and optimal outcome in terms of clinical effectiveness (Warner et al, 1964; Hammond et al., 1967; Schwartz et al., 1973; Grier, 1976; Aspinall, 1979; Gordon, 1980; Arkes & Hammond, 1986; Corcoran, 1986a; Doubilet & McNeil, 1988; Jones, 1988). The statistical conceptualization of diagnostic decision outlines a process of prescriptive modeling by which choices are made based on the value assigned to the outcome.

However, findings of this study indicate that nurses, in going through the process of *ascertaining patient condition*, demonstrate no evidence of using a decision tree and assigning probabilities and values to alternatives. Perhaps, this difference compared to the statistical model may in part be explained by the fact that the central focus of *ascertaining patient condition* is to describe the clinical status of patients; accuracy of the diagnostic outcome is not the major concern. Moreover, given that the computational resources of human decision-makers are limited in real life situations, the use of complex mathematical modeling, such as a decision trees, is not easily applied to clinical settings (Thomas, Wearing, & Bennett, 1991; Greenwood, 1998).

Research underpinning by the hypothetico-deductive model characterizes

diagnostic reasoning as a stepwise linear process, which includes data acquisition, hypothesis generation, cue interpretation and hypothesis evaluation. (Elstein et al., 1978; Kassier & Gorry, 1978; Matthew & Gaul, 1979; Carnevali, 1984; Mitchell, 1984; Tanner, et al., 1987; Westfall et al., 1986; Itano, 1989; Haffer, 1990; Kassirer & Kopelman, 1991; McFadden & Gunneett, 1992; Carnevali & Thomas, 1993). In this model hypotheses are activated early in the stage of the process; data acquisition is hypothesis driven and involves systematic information searches; and the pros and cons of hypotheses are evaluated (Jenkins, 1985; Radwin, 1990; Cholowski & Chan, 1992; Tanner et al., 1993; Greenwood & King, 1995; Greenwood, 1998; Thompson, 1999).

As in the hypothetico-deductive model, nurses in this study also take into account multiple aspects of patients as sources of information in the course of ascertaining the clinical condition of their patients. However, unlike the hypothetico-deductive models, where nurses, driven by the generated hypothesis, search multiple sources of patient information, in this study nurses collect data about the patients according to a range of specific perceiving strategies. The use of a particular perceiving strategy is largely contingent upon the attending behaviours and a number of psychological and social structural variables such as patient load, presence of visitors, familiarity of patient, hand-over report, and patient behaviours. One possible explanation is that in ascertaining clinical condition of patients in real

clinical situations the use of a particular perceiving strategy allows nurses to focus on collecting appropriate and substantial patient information for subsequent mental processing.

Contrary to the hypothetico-deductive model, it is noted that when nurses are going through a series of cognitive activities, such as *fracturing information*, *comparing categories*, and *piecing together*, in the final stage of *ascertaining patient condition*, there is no evidence of hypotheses generation and testing by the nurses. Nurses are using a different mode of reasoning in attaining understanding of patients' clinical condition.

In this study, the identified theory, *ascertaining patient condition*, suggests that nurses proceed through stages in the course of their diagnostic practice. The sequential structure has similarities with the hypothetico-deductive model and decision analysis. However, by attesting the nature and function of interpersonal, psychosocial, and cognitive behaviours and activities in the process, *ascertaining patient condition* represents a process of diagnostic practice in acute clinical reality. On this basis, it is evident that the identified theory is fundamentally different from the hypothetico-deductive model and decision analysis.

Research in the phenomenological tradition has investigated nurses' use of intuition as part of the process of their diagnostic practice. Six key aspects of intuitive judgment are evident in the process of making diagnostic decisions, namely pattern recognition, similarity recognition, common sense understanding, skilled know how, a sense of salience, and deliberate rationality. The use of whichever aspect is dependent upon level of competence, ranging from novice to expert (Benner & Tanner, 1987; Rew 1988; Jenny & Logan, 1992; Fisher & Fonteyn, 1995; Offredy 1998; McCutcheon & Picombe, 2001). These studies also suggest that nurses appear to have an ability to grasp a situation as a whole without having to view each clinical element separately in the diagnostic process (Pyles & Stern, 1983; Benner, 1984; Benner & Tanner, 1987; Alexander, 1991; Jacavene & Dostal, 1992; Orme & Maggs, 1993; Macleod, 1994). This ability is described as 'nursing gestalt' or 'intuition', springing from knowledge embedded in practical experience. However, the use of 'intuition' to explain the cognitive skills involve in clinical judgment puts forward no accurate description of how intuition accounts for the diagnostic process (English, 1993).

On the contrary, findings of this study demonstrate that diagnostic practice in acute clinical context is a three-stage social psychological process. These stages explain in detail how nurses arrive at conclusions about patients' clinical condition. The identified theory indicates that the apparent ability to make diagnostic conclusions

almost unconsciously using ‘intuition’ is, in fact, the result of a dynamic integration of interpersonal interaction and socio-psychological cognitive strategies in clinical practice. The difference between the intuitive process and the identified theory in this study may be accounted for by the study methods. The identified theory here is generated by using a grounded theory method. This method is intended to identify gaps in knowledge; to uncover, discover and generate new concepts and relationships; and ultimately, to surface substantive theory (Glaser & Strauss, 1967). It is suggested that the findings of this study offer new knowledge that goes beyond the intuitive model.

Another interesting point concerns the different diagnostic labels used by the normative models and the identified theory. Most of the studies based on normative models assume that the outcome of diagnostic process is a diagnosis, be it medical or nursing. (Carnevali & Thomas, 1993; Papineau, 1996; Corcorna-Perry, Narayan & Cochrane, 1999). In contrast, rather than representing problems with a medical or nursing diagnosis, in this study, nurses describe the clinical condition of patient using expressions such as ‘good’, ‘stable’, ‘poor’, or ‘critical’. These expressions describe attributes, which reflect nurses’ perceptions of the physiological and functional aspects of the patient. One possible explanation is, as suggested by Crow and Spicer (1995), that nurses may be using critical elements of the patient’s state to predict the

future, i.e. what is likely to happen. The prediction implicit in the diagnostic label indicates what may be done subsequently. Following this line of argument, it would seem that diagnostic practice in acute clinical care reality is more than just ascertaining the current clinical condition of patient. The prognostic nature of diagnostic conclusion also serves to direct subsequent decisions for nursing interventions. Further studies are needed to explain the prognostic nature of diagnostic practice in nursing.

#### *Influential variables*

Review of the literature indicates that diagnostic process is potentially influenced by intrapersonal, interpersonal, and socio-structural variables, such as experience, knowledge, familiarity, diagnostic task, attitude, patient behaviour, others' expectations and clinical context (Benner, 1982; Carnevali et al., 1984; Woolley, 1990; Jenks, 1993; Watson, 1994; Hamers et al., 1994; Bryans & McIntosh, 1996; Radwin, 1998).

#### *Intrapersonal and interpersonal variables.*

The results of this study indicate that nurses' experience and knowledge are important in the final stage of ascertaining patient condition. These results contrast

with literature that states that experience and knowledge are separate entities in exerting influence on the diagnostic process (Cholowski & Chan, 1992; Long & Gomberg, 1995). In this study experience and knowledge are found to be mutually dependent and to have mutual and reciprocal effects on nurses' reference frameworks. The effects of these two variables sharpen nurses' sensitivity to patients' condition. In contrast to normative models that offer non-specific descriptions as to how experience or knowledge influence the diagnostic process, findings of this study detail how these two intrapersonal variables facilitate the stages of ascertaining patient condition in acute clinical care reality.

In some studies, nurses' experience and knowledge are measured objectively in terms of length of time in nursing and educational qualification attained (Tanner et al., 1987; Joseph & Patel 1990; Brooks & Thomas, 1997). In this study nurses describe their experience as exposure to previous incidences, or the application of what was learned from previous practice situations, while knowledge is considered as the input from both 'schooling' and practice. Nurses also indicate that as experience accrues, their knowledge of some particular situations develops. With the growth of such a knowledge base, nurses are likely to concentrate on the salient areas in their course of diagnostic practice. This supports previous findings that experience is acquired from prior works and clinical exposures, while sources of knowledge are

either theoretical or experiential (Schraeder and Fischer, 1987; MacLeod, 1994; Radwin, 1998). These authors argue that experience affords knowledge and this knowledge is utilized during subsequent exposures. Nurses in this study also state that as they practice over time, they have increased opportunities for repeatedly dealing with many patient situations and they gain experience of what happened before, during, and after these situations. According to these nurses, by comparing and contrasting their experience with 'books', they build up their 'knowledge' of particular patient instances. Nurses in this study also reported that as their experience and knowledge developed, they became more confident in assessing a range of patient conditions. With increased confidence, nurses are more likely to consider a broader range of patient characteristics. Perhaps, this explains why in this study experience and knowledge are equally important in nurses' reference frameworks as far as matching groups of data is concerned.

The importance of familiarity with patient in relation to diagnostic practice is supported by findings from this study. It is evident that the choices of attending behaviours and perceiving strategies are closely associated with nurses' familiarity with patients. The more the nurses get acquainted with the patient, the more specific their attending behaviour and perceiving strategy are in Stages 1 and 2. Nurses who have cared for the same patient or patients with similar problems get to know common

issues and important characteristics of a particular patient group and are more likely to use similar strategies to interact with subsequent patients. Previous studies that examined the effect of familiarity on the diagnostic process similarly found that the more the nurse knows the patient, the better the nurse is in performing diagnostic skills (Tanner, 1984; Woolley, 1990; Jenks, 1993; Radwin, 1995; Lange et al., 1997).

Studies based on information processing theory claim that social background and personal values of nurses influence all stages of the diagnostic process (Elstein & Vordage, 1988; Hamers et al., 1994; Brooks & Thomas, 1997; O' Kelly, 1998). Some studies even suggest that patients' social characteristics, such as age, gender, and class, exert influences on the diagnostic process (Field, 1987; Clark et al., 1991; Webb, 1992; Webb & Lloyd, 1994). These studies argue that nurses are not value free and may have biases in relation to any number of social factors which developed from some past experience with a particular kind of patient. Such prejudice, if not taken into consideration, may dramatically influence the reasoning process, even to the extent that standards of care may suffer. However, data from this study reveals no evidence indicating that social background of nurses and patients impede the diagnostic practice in the acute clinical context. Perhaps, one of the reasons for this is that, as the culture of nursing is about caring and client-focus, it demands nurses to count out any possible prejudice and bias in their daily clinical practice. Another related argument to note is,

as Mack (1996) points out, that the professional socialization of nurses enforces value-free behaviour in nursing.

Nevertheless, some of the nurses in this study repeatedly emphasised the effect of physical fatigue and negative emotion. Nurses stated that when they are not in the 'mood' and, by whatever means, get exhausted, their ability to recollect their reference framework to do the matching in the second phase of the final stage of ascertaining patient condition is possibly impaired. According to the nurses, speed and comprehension may at such times be adversely affected. No previous studies have identified similar findings. Further investigations are needed to explore the effects of physical fatigue and negative emotion on diagnostic practice.

The potential influence of variables, such as patient behaviour and others' expectations, on the diagnostic process suggest that complaints from patients and the presence of relatives during the diagnostic process exert a certain degree of pressure on doctors and nurses. As a result, nurses probably behave in accordance with patients' or relatives' expectations (Nazareth & King, 1993; Carnevali & Thomas, 1993). Findings of this study support this view and show that nurses adopt a specific attending behaviour or perceiving strategy in response to a patient's complaint or the presence of visitor. Some of the nurses in this study point out that patients know

something is going to happen and know themselves better than anybody does. In addition, nurses consider the presence of family members to be beneficial, in one way or another, to the diagnostic process e.g. by providing further important information. Two nurses state they use the relatives' or visitors' capacity to note changes in the patient's condition. Findings of this study confirm that these two variables do have a positive impact on diagnostic practice.

#### *Socio-structural variables.*

Socio-structural variables such as the medical diagnosis of the patient and the clinical setting in which nurses are currently working do influence the focus of nurses when going through the comparing phase of the final stage of ascertaining patient condition. The diagnostic label of the patient and the clinical context serve to direct nurses' attention and focus on matching the collected data with certain domain-specific information of their reference framework. It seems that the effect of these two variables could be to speed up the cognitive process in the final stage. However, it could be argued that information about medical diagnosis and clinical settings may shift the diagnostic outcome away from the patient problem. Nevertheless, results of this study support the findings of previous studies that specific settings and predominant client group are important in determining the outcome of the diagnostic process (Mitchell, 1984; Carnevali & Thomas, 1993; Crow & Spicer, 1995;

Thompson, 1999). Such influences over time may draw nurses' attention to only certain types of cues or data and lead them to ignore others others. Thus, particular diagnostic labels commonly made within the specific clinical context are more likely to be accepted. Hence, thorough explanation regarding this effect should be given to nurses in order to minimize any possibility of making inappropriate diagnosis, which impedes the implementation of subsequent care and interventions.

Studies that investigate factors inhibiting the diagnostic process suggest that high patient load impedes the diagnostic process because nurses have insufficient time to get to know their patients thoroughly (Henderson, 1997). However, this study finds that patient load alone does not have any direct effect on the diagnostic process. Findings of this study indicate that together with other factors, such as familiarity with the patient, the difference in level of patient load does influence nurses' choice of perceiving strategies in the second stage of ascertaining patient condition. However, there is no evidence of any negative effect inhibiting the diagnostic practice of nurses. On the contrary nurses are encouraged to adopt the most appropriate strategy to collect patient information. The difference in level of patient load certainly creates stress for nurses, but this motivates nurses to remain alert and to be aware of important clinical data in the course of perceiving the situation. Indeed, as Baumann and Bourbonnais (1993) point out, stress has a positive effect on clinical decision making, in that it

causes nurses to focus only on relevant issues and to disregard the ‘ nonessential’ .

Some studies argue that the diagnostic task influences the diagnostic process. They state that the more complex the task, the more difficult the decision making and the higher the likelihood that an incorrect decision will be made (Tanner, 1984; Corcoran, 1986b; Gordon, 1987; Carnevali & Thomas, 1993; Hamers et al., 1994). However, unlike some of these studies that use simulation and laboratory method and are underpinned by either hypothetico-deductive model or decision analysis, this study uses the grounded theory method, and, most importantly, focuses on nurses themselves rather than on the diagnostic task. Obviously, such difference is indeed methodological.

### ***Concluding remarks***

The identified theory, *ascertaining patient condition*, offers an alternative conceptualization of diagnostic practice in nursing. Unlike the normative models, the identified theory uncovers the importance of social and psychological elements that precede the cognitive activities in the diagnostic process in real clinical settings. It confirms that nurses are operating on a mode of reasoning that goes beyond the normative models. The identified theory also details the influences of a number of

stage-specific intrapersonal, interpersonal and socio-structural variables on the process of *ascertaining patient condition*.

The differences may be explained, in part, as methodological. As discussed earlier, most studies based upon normative models used simulations to isolate and measure specific concepts and variables in their study designs. However, the use of simulation may not be true to actual practice in real life situations (Funder, 1987; Radwin, 1995). Other studies, following the phenomenological tradition, are mostly putting their emphasis on describing the situations rather on explaining the diagnostic practice. Underpinned by the grounded theory method, this study aims at generating a substantive theory to provide a comprehensive explanation of the following question: ‘*what exactly is going on when nurses diagnose a patient’s clinical condition in an acute clinical environment?*’ Hence, the identified theory, *ascertaining patient condition*, offers alternative explanations to the normative models.

The fact that the identified theory is different from the normative models is not problematic. It poses a challenge to the normative models. Indeed, the unfolding of a three-stage basic social and psychological process of *ascertaining patient condition* advances nurses’ understanding of their own diagnostic practice in acute clinical reality. Most importantly, the identified theory sheds light on nursing diagnostic

practice. Moreover, by detailing how the stage-specific variables are responsible for influencing the diagnostic process, the value of these variables in effective and efficient clinical practice in nursing may subsequently be evaluated.

It is not possible to generalize the findings of this study to all other clinical settings. However, *ascertaining patient condition* puts forward a comprehensive theoretical representation that mirrors diagnostic practice in acute clinical care environment.

### **The Stages in Relation to Relevant Literature**

The sequential stages of the identified theory will now be discussed in relation to arguments from relevant literature and findings from related research. The important characteristics of these stages will be highlighted.

#### ***Stage I: Attending the patient***

The process of *ascertaining patient condition* begins with the stage of *attending the patient*. In this stage, nurses start approaching and interacting with their

patients. This initial contact is important in the process of *ascertaining patient condition* as it allows nurses to create openings to identify patient needs and for patients to express their concerns or to ask questions to obtain information. These openings also pave the way for specific observations of individual patients in the next stage of the process.

Moreira, Fodrigues and Coler (1997) state that the first point of contact between nurses and patients offers opportunities to observe patient behaviours and stimulate patients to express themselves and make their needs known. Sandelowski (1994) maintains that such interaction differs markedly from the investigation of signs and symptoms that represent the traditional medical way of 'knowing' a patient. Gardner (1996) adds that this approach provides a level of intersubjectivity that further enriches the nurse-patient relationship. According to Gardner, this intersubjectivity is manifest through a shared meaning, a mutual and tacit understanding of phenomena, which brings a new dimension to the understanding of a patient's condition. Others also argue that the interaction of talking with patients creates an environment which permits the nurse to deal with a patient's vulnerability (Lawler, 1991; Parker & Gardner 1991). Moreover, as Jenks (1993) points out, a good relationship between nurse and patient is of particular importance in the clinical decision making process, in that nurses feel secure and certain about their ability to make appropriate decisions

where good relationships exist.

Studies that have examined interactions between nurses and patients in different clinical situations suggest that although nurses understand that patients are not just ‘bodies’ and should be regarded as ‘persons’, they often move their attention momentarily from relationship with the patient to the routine task in hand (Athlin, Norberg, Asplund & Jansson, 1989; Lawler, 1991). However, the findings of this study indicate that nurses in the stage of *attending the patient* place the patients at the centre of attention. This is particularly important given that nurses are moving towards a person-centred humanistic approach. This approach, as Rogers (1986) argues, also adds further value to the nurse-patient interaction. It enables nurse and patient to reach a positive level of interpersonal relationship, which in turn contributes to the establishment of a rapport between them. Indeed, as Paterson and Zderad (1988) point out, the initial interaction between nurses and patients is a special kind of human meeting, in which both parties come with profound feeling aroused by the anticipated event. There is a bond between nurse and patient which results in a sense of shared affinity through relating to each other’s humanness (Taylor, 1994). More importantly, parallel to the building up of a positive foundation with the patient in the early stage of contact, as Nichols (1993) argues, is the fostering of therapeutic engagement throughout the process of *ascertaining patient condition*. It is through therapeutic

engagement, according to Nichols (1993), that the patient feels that the nurse has a realistic and non-judgmental appreciation of his or her needs and can be trusted. Moreover, by knowing that nurses are working on his or her problem, the patient's readiness and motivation to go through the diagnostic process is enhanced (Joe & Simpson, 1998). Indeed, the cultivation of therapeutic engagement in the stage of *attending the patient* facilitates the progression of the subsequent stages of ascertaining patient condition.

In this study the initial contact between nurses and patients was initiated either by nurses during their ward rounds, or by clients, be they patients themselves or their visitors, when they bring complaints to the nurses' attention. However, the results reveal that whichever context the interaction takes place, the nature and function of the first stage, *attending the patient*, is not changed. Nurses in this study direct the flow of the interaction and set limits for its boundaries, while patients and visitors play a rather passive role giving information and responding to nurses' concerns. Obviously, patients are not included as active participants in the course of interaction. However, Roberts and Krouse (1995), in comparing two different nurse-patient interactions of 98 pair nurses and patients, remark that although patients receive a non-negotiated interaction, they do not feel that they are being coerced into any specific behavioural outcome.

One interesting finding of this study is that the context of interaction also serves to enhance nurses' opportunity to help patients to comprehend what is happening. Nurses stated that sometimes they are too busy to go through everyone during the ward rounds so it's good to be alerted by the patients or their relatives. Indeed, although infrequently, nurses do sometimes miss or overlook patient cues in real clinical settings. Therefore client-prompted interaction can be a 'safety valve' to draw attention to changes in patient condition. Besides, complaints raised by clients also serve to direct nurses to focus more intently on patients' concerns.

However, the findings in this study from the theory verification suggest that about one fifth of the respondents consider *attending the patient* neither nurse nor client initiated. Possibly, some nurses, who have already tuned into the 'work as you are told' kind of organizational culture, still have the mindset that *attending the patient* is just one part of ward routines.

Studies exploring factors influencing nurse-patient interaction suggest that stereotyping and labeling, prejudices, lack of friendliness, withdrawal or over involvement with patient, and lack of empathy and care are some of the factors that impede the interaction between nurses and patients (Yuen, 1986; Holden, 1990;

Richmond & Roberson, 1995; Muller & Poggenpoel, 1996; O' Kelly, 1998; Cleary & Edwards, 1999). It is also argued that nurses display these attitudes to patients unconsciously in what is termed 'countertransference' (Heimann, 1950; Winnicott, 1960; Schroder, 1985; O' Kelly, 1998). In such circumstances, as Hartman (1995) points out, nurses deny patients' legitimate right to be cared for, which, as a result, further decreases the quality of interaction. Bonniver (1992) also adds that such attitudes and feelings develop towards patients are generally considered to be 'normal' and 'inevitable'. There is no evidence in this study of 'countertransference' towards patients in the nurse-patient interaction during the stage of *attending the patient*. Perhaps, one possible explanation is that, as Mack (1996) argues, since the culture of nursing emphasizes caring, empathy, and sharing, and hospitals are culturally oriented to facilitate patients' recovery, nurses are constantly being socialized to observe these cultural expectations. Hence, they have to dismiss any emotionally biased feeling and reaction towards their patient, and behave professionally in a non-judgmental, impartial, and empathetic manner.

The findings of this study confirm that nurses use a number of attending behaviours in order to spark off the interaction. *Checking* is one of the attending behaviours that involves asking patients for specific information. *Observing* entails watching patients carefully and thoroughly for a period of time. *Greeting* is the act of

nodding the head and saying hello to patients. *Browsing* involves looking at patients in a casual manner. Each of these behaviours is distinct in terms of nature, focus, and function. These attending behaviours are, in fact, structural units of the nurse-patient interaction. Moreover, these attending behaviors are contingent upon psycho-socio-structural variables, such as patient group, hand over report, client type, and ward round. These findings suggest that when nurses engage themselves in an appropriate type of attending behaviour to structure the interaction, they are not dependent on personal characteristics or nature of the tasks, but rather on the needs and concerns of patients. Indeed, as Lowenberg (1994) states, unlike the traditional medical interaction in which the boundary between personal and professional concerns is relatively impermeable and the focus of the encounter remains confined to the presenting medical problem, the structure of nurse-patient interaction in diagnostic settings expands in the holistic model to become more expressive and less specific. Hence, it is important to note that one type of attending behaviour should not be seen as more important than another – all play their part in the orientation of the interaction. Nevertheless, the results of theory verification indicate that a small percentage of nurses do not consider the use of these attending behaviors is appropriate. Probably, these nurses are still working under the medical model of care delivery.

Studies that investigate nurse-patient interactions support the claim that nurses

adopt different strategies to communicate with patients during their interactions. Using qualitative etiology to examine thirty-two nurses' during their interactions with cancer patients, Bottorff and Morse (1994) identify four types of attending behaviours used by nurses. These include *doing more* in which nurses try to 'reach out' to patients; *doing for* where nurses, following patients' requests, do some personal little things for patients; *doing with* in which nurses actively engage patients by seeking their opinions; *doing task* where nurses' focus is to 'get the job done'. Bottorff and Morse (1994) also find that the perceived needs of the patient, the nature of the task, time constraints and the sensitivity of the nurse are factors that exert influence on the types of attending behaviour. In a study to explore nurses' behaviour and patients' interaction, Osso (1995) finds that nurses use various approaches to initiate contact with their patients. These approaches include talking about the patients' families and the events that led to hospitalization, or simply asking 'how are you?'. According to Osso, the use of these strategies gives nurses access to realm of their patient. In proposing a model as a means for the nurse and the patient to negotiate and establish a desired therapeutic relationship, Morse, Havens and Wilson (1997) argue that any contact or interaction constitutes a nurse-patient relationship and involves some type of nursing action to establish a desired relationship. They state that *comforting strategies*, such as talking, touching, and listening, and *a nursing pattern of relating*, i.e. professional code of conduct and distinctive nursing mannerisms, are the nursing actions to secure a

positive relationship. They add that the use of these nursing actions is essentially selected by the nurse or directly in response to patients' particular signal. Jarrett and Payne (2000) conducted a qualitative study to examine the interaction between eight nurses and nine of their patients in the cancer care context. They found that nurses are active in constructing and sustaining an optimistic and cheerful nurse-patient interaction. According to them, the skills used by nurses are *working-up*, that is elaborate on positive statements and optimistic knowledge to create optimistic feelings; *self-comparison*, which involves comparing oneself with other worse neighboring patients and expressing sympathy for others; and *reframing* which refers to the blocking of negative comments after a full discussion of patients' negative concerns.

Obviously, the nature, focus, and function of the above mentioned communication strategies are different from findings of this study. However, despite of the differences, it is apparent that these behaviours and strategies share some commonalities. They form the essential 'bridge' for nurses to gain access into the patients' realm and establish rapport with patients. Also these strategies involve the use of a variety of verbal and non-verbal behaviours.

Nurses have been criticized for engaging in relatively brief and superficial communication strategies when interacting with patients - recently viewed as

antithesis of caring (Watson, 1988; Benner & Wrubel, 1989; Clark, Potter & McKinlay, 1991; Bottorff & Varcoe 1995). However, nurses in this study when engaging themselves in attending behaviours often use a variety of verbal and non-verbal strategies to communicate with patient. Indeed, the findings illustrate that verbal attending behaviours, ranging from social conversations to friendly interrogations, and nonverbal attending behaviours including making eye contact, smiling, and head nodding, are commonly used during nurse-patient interaction in the stage of *attending the patient*. As Caris-Verhallen, Kerkstra and Bensing (1999) point out, effective use of communication strategies is important in face-to-face interpersonal interaction, not only do these strategies convey attitudes, emotion, and support, but often they give substance to the establishment of rapport between nurses and patients. Perhaps this is the reason why the stage of *attending the patient* is both therapeutic and diagnostic.

To sum up, by capturing the interaction dynamics between nurses and patients, this study characterizes the important features of the stage of *attending the patient*. The findings of this study also illuminate the fluidity of attending behaviors, and their contributions on the progression into the subsequent stages of diagnostic practice. Indeed, the study uncovers a critical juncture of the process of *ascertaining patient condition*.

## ***Stage II: Perceiving the situation***

The next stage of the identified theory is the stage of *perceiving the situation*. Building on the platform and rapport developed in the stage of *attending the patient*, nurses actively involve themselves in soliciting information concerning their patients. All possible sources of patient related information are used to enable nurses to gather all the necessary details to support and sustain the final stage of *ascertaining patient condition*. The stage of *perceiving the situation* concerns information seeking and data collection and is an integral part of the identified theory. Barrows (1990) argues that searching for information is a skill central to clinical problem solving. According to Barrows, nurses need information about their clients, not just initially, but during the entire period of care delivery. Carnevali and Thomas (1993) put forward a diagnostic reasoning model for nursing decision making. They point out that collection of data is a key strategy diagnosticians use to bring together relevant information so as to complete the diagnostic task. In a study to explore the pattern recognition process of nurses, Osso (1995) states that gathering information is one of the subprocesses of the core process of pattern recognition. Kozier, Erb and Blais (1997), discussing the data collection phase of the nursing process, maintain that information gathering is important in that it prevents the omission of significant data and reflects the changes in the client's health status. They add that the seeking of information in the process also

helps to form a comprehensive database that helps substantiate subsequent data analysis.

Clearly one essential function of information gathering is to collect data for subsequent analysis, but this function does not involve any intent to effect changes of patients' condition. Finn and Tonsager (1997), in reviewing the literature related to the use of psychological assessment in planning treatment, point out that data collection that will only aid in providing information to enhance decision making about clients and does not intend to produce positive changes in clients' condition, falls into the diagnostic model of assessment paradigm rather than the therapeutic model.

As discussed earlier, nurses in this study often take into account multiple aspects of the patient as sources of information in the stage of *perceiving the situation*. These sources include objective data, such as vital signs, general appearance, laboratory reports, medical and nursing records, and subjective data, such as patients' complaints and emotion state. The literature supports the practice of collecting multiple sources of patient information and points out that it is common in information seeking. Corcoran-Perry and Graves (1990), examining the information seeking behavior of 46 cardiovascular nurses, report that nurses need a surprisingly large

amount of information, such as patient-specific data, institution-specific data, and domain knowledge to track their patients' clinical status. In a study to investigate clinical decision making of 27 nurse practitioners, White, Nativio, Kobert and Engberg (Date) find that though there is variation in the specificity of information, nurse practitioners seek both objective and subjective data in reaching a diagnosis of their patients. O'Toole, O'Toole, Webster and Lucal (1996), exploring the diagnostic work of 1036 nurses in the field of possible physical child abuse, point out that nurses' diagnostic work involves an extensive search for information compared to that of physicians, involving primary physical data, information on psychological behaviour and data concerning mother-child relationships as well. In a study about the thinking strategies of 15 registered nurses in various acute clinical settings, Fonteyn (1998) observes that when using the thinking strategy 'searching for information' nurses look for numerous types of data or information, such as vital signs, logistical information, medication information, care plans, and test data. Perhaps, one of the reasons for nurses' needing multiple sources of information is, as Muha and Smith (1998) state, to avoid the risk of uncovering information that could threaten patients. Another possible explanation concerns 'stress and coping'. Davison, Degner and Morgan (1995) argue that information seeking is a stressful event in decision making and to overcome the stress, people collect as much information as possible.

Studies investigating factors influencing information seeking suggest that experienced nurses focus on gathering specific data and junior nurses tend to collect general information (Kassirer & Gorry, 1978; Benner, 1984; Gordon, 1987; Tanner et al., 1987; Kirschenbaum, 1992; Roberts, While & Fitzpatrick, 1995). Other related studies find that gathering information is driven by the hypotheses generated in the process of data acquisition (Marshall, 1977; Carnevali & Thomas, 1993; Wojciszke, 1994). However, the findings of this study indicate that nurses' data collection in the stage of *perceiving the situation* is largely driven by socio-psychological structural factors, such as patient load, medical diagnosis, and familiarity with patient. Nurses in this study appear to vary their focus for information collecting according to these factors. Perhaps, in this way they are able to limit the collection of unnecessary information and so lessen their cognitive strain. This finding is supported by Crow, Chase and Dawn (1995) and O'Toole et al. (1996), who point out that context and domain-specific structures play a major role in guiding the choice of information during the phase of data gathering.

The findings of this study indicate that nurses use a range of perceiving strategies to collect patient information in the second stage of ascertaining patient condition, namely *examining, probing, clarifying, and chatting*. *Examining* refers to vigilant assessment activity to obtain thorough information about every aspect of the

patient. *Clarifying* concerns the asking of focused questions to clear up confusions about patients' clinical state. *Probing* is used to explore possible hidden or unreported patient information. *Chatting* refers to casual and friendly talk that aims at getting patients' general information. The use of different strategies to collect patient information is, in fact, supported by literatures that investigate data acquisition methods in seeking information. Using think aloud to investigate nurses' diagnostic reasoning strategies, Tanner et al. (1987) report that there are four methods nurses commonly use to gather information. These include *cue-characterization*, in which each piece of data is examined separately, *systematic*, a thorough review of all relevant information, *question directed*, asking specific questions to look for definite answers and *hit or miss*, a shotgun approach seeking information that is not obvious. In a study to examine how nurses gather and use data, Navin (1991) finds that nurses use two different approaches to complete the information gathering task, namely scanning and focusing. According to Navin, nurses use scanning to explore routine information and the seeking of additional information about the patient is not necessary. Navin adds that, as a routine functional inquiry method, the use of scanning requires little effort. Focusing, on the contrary, Navin argues is an information gathering activity aimed at clarifying and validating information recognized as relevant. It requires skilled performance using complex questioning and examination techniques. White et al. (1992), studying the clinical decision making process of nurse practitioners, identify

three methods of information acquisition, namely *symptom driven*, *expanded physical* and *comprehensive care*. According to White et al., *symptom driven* is the asking of specific questions that are directly related to patient symptoms, *expanded physical* is a comprehensive examination that focuses on gathering information about the physical aspects of patients and *comprehensive care* concerns with gathering subjective and objective information not required to diagnose the cause for the patient's complaints. Osso (1995) explores how nurses recognize patterns of nurse-patient interaction and finds that nurses involve themselves in three activities in seeking information - questioning, listening, and observing.

From the above discussions, it is obvious that though each study uses its own terminology to describe the information gathering strategies, the nature and function of these strategies do share some similarities. It is also noted that these strategies are not mutually exclusive and each strategy serves to collect particular aspects of patient information. Hence, nurses use these strategies differently in accordance with their information needs. Interestingly, the use of perceiving strategies identified in this study is consistent with findings in previous studies. The findings of this study also reveal that, as in the previous stage, the use of these perceiving strategies is contingent upon a number of social and psychological structural variables, such as patient load, handover report, patient behaviours, and familiarity with patient. Most importantly,

the study confirms that nurses' engagement of a particular type of attending behaviour in the first stage points to the use of perceiving strategy in the next stage. Other studies agree with this finding. In analyzing the assessment phase of the nursing process, Leddy and Pepper (1993) argue that the initial contact between nurses and patients influences the data collection process and determines the direction and appropriateness of data collection method. McCutcheon and Pincombe (2000), studying 29 nurses' perceptions and their use of intuition in nursing practice, find that nurses consider establishing a relationship with patients is important before they are able to seek information to know their patients.

Despite of the fact that most nurses in this study are in favour of using perceiving strategies to seek patient information, the results of theory verification indicate about one fifth of respondents do not agree about the use of these strategies during the second stage. One possible reason for this is, as Brown (1994) and Tichenor, Davidson and Jensen (1995) point out, the use of information gathering activities inevitably involves competence in questioning skills and physical examination techniques and some nurses may not be well equipped with the necessary skills and techniques, and therefore lack confidence. Indeed, over the past decades, the apprenticeship type of nurse training has provided little opportunity for nurses' competence in these areas of clinical practice to grow.

Nurses in this study always collect patient information one piece at a time irrespective of the strategy used. This approach of perceiving is consistent with Pepper's suggestion (in Roberts et al., 1995) of the corroborative approach to information seeking, which involves establishing one fact before moving on to the next. Possibly, one of the reasons, as Marshall (1997) points out, is that nursing education emphasizes such an approach towards information seeking.

In short, by confirming the nature, scope, and approach of information seeking, this study justifies the importance of the stage of *perceiving the situation*. The findings of this study also illustrate the specificity of perceiving strategies and their interplay with attending behaviors. Obvious, the study surfaces the nature and essential functions of the stage of *perceiving the situation* in the process of *ascertaining patient condition*.

### ***Stage III: Unfolding the picture***

Having identified the relevant patient information, nurses involve themselves in a series of cognitive activities to organise the collected information into a whole picture that reflects patients' clinical condition. This marks the final stage of the

process of *ascertaining patient condition*. In this stage, nurses have every intention to make conclusions about their patients' status. In so doing, they can then plan subsequent interventions. This is supported by Gilbert (1989), who describes deliberative thinking, when a person takes time, makes a conscious mental effort and thinks things through more deeply before coming to a judgment.

In order to *unfold the picture*, nurses in this study go through three sequential phases of cognitive activity, namely *fracturing information*, *comparing categories*, and *piecing together*. These cognitive activities and their relevance with existing literature will be discussed in the following sections.

In the phase of *fracturing information* nurses use grouping to break down or reorganize the gathered patient information into different categories in accordance with common properties, such as observation findings, sign and symptoms of the disease, and laboratory results. In that way, the information is organised into a comprehensive data bank, which helps to optimize and speed up the integration of patient information in the next phase of the stage of *unfolding the picture*. The mental functioning of *fracturing information* is described in a number of studies. Using multiple sorting task and modified Q-sort to examine 24 nurses' organization of patient knowledge, Crow and Spicer (1995) report that nurses structure patient

information in terms of three categories, namely features, dimensions and holistic properties. They further state that each category is a summary representation of particular instances, which function as a template for point-to-point association with the memory's indexing schemes in a matching process. Using repertory grids to investigate clinicians' differences in knowledge representation, Murphy and Friedman (1996) refer to such a category-specific data organization approach as prototype categorization. Kozier et al. (1997) argue that once information is collected in the assessment phase of the nursing process, this information is then systematically organized into a usable framework to facilitate access to information in the successive steps of assessment phase. Kushniruk, Patel and Marley (1998), conducting a meta-analysis of medical cognition and knowledge engineering of physicians point out that physicians organize diagnostic knowledge on the basis of similarities and distinguishing features. They add that such characterization helps to limit the scope of comparison involved in the diagnostic process.

It is noted that the labels nurses use for the categories reflect only the normality and severity dimensions of the patient. Neither medical nor nursing diagnostic classifications are used. As discussed earlier, the possible reason for adopting such a characterization may be that the use of these dimensions helps to predict patients' future state.

Analysis of the results clearly indicates that, having grouped the information into categories, nurses in the second phase of the final stage conduct point-to-point or group-by-group matching between the categories and their own mental reference frameworks so as to identify differences and similarities. The attributes of nurses' mental reference frameworks are by and large similar to the categories. In this way the relative similarities between contrast categories are mapped out by direct comparison, and, most importantly, distinctive features of the patient are identified. These features then form the basis for nurses to figure out the representation of patients' condition in the next phase. This cognitive activity of comparing categories has been mentioned in several previous studies. Moustakas (1990), examining the process of heuristic inquiry, points out that researchers relate the information, attained through whatever sources, back to their internal frame of reference through the use of focusing. Focusing, according to Moustakas, is an essential step in the inquiry process that enables researchers to connect thoughts with information, and in turn achieve a refined meaning and the essence of the problem in question. In arguing for an alternative representation of clinical reasoning, Narayan and Corcoran-Perry (1997) state that one of the structural components of representation is the use of domain concepts, when nurses link sets of data about the patient situation to their chunks of domain-specific knowledge stored in memory. In so doing, nurses draw on the stored knowledge to

work out the mismatches between the two. Kozier et al. (1997) examined the data processing steps of the nursing process. They point out that one of the important steps is that nurses compare the client's data against a wide range of standards, such as normal health patterns, normal vital signs, laboratory values, and development patterns, to identify significant differences. In a study to examine 15 nurses' thinking strategies, Fonteyn (1998) reports that nurses use a thinking strategy, termed as forming relationships, to connect assessment findings with a variety of other information, such as client history, test data, and treatment information. Fonteyn further argues that by clarifying and defining the connection between this information, forming relationships assists nurses to change the ill-structured problems to become well-structured problems.

From the above, it is evident that nurses, in the phase of comparing categories, are involved in a type of category-based thinking strategy. Nevertheless, Eli (1996) remarks that in this type of strategy once comparing between data begins there is a tendency to look for features to fit one's own schema, i.e. nurses' reference framework, and to pay less attention to features that do not. According to Eli, this leads to confirmation bias. However, the results of this study indicate no evidence of such stereotyping phenomena. One possible reason is that nurses are engaged in self-verification, in which, as Pennigton (2000) suggests, people actively attempt to

refute the label that is being applied to the schema in the first place, to reduce the risk of bias. Another reason may be that being health professionals, nurses are always conscious of striking a balance in the phase of comparing categories. Perhaps, subsequent researches are necessary to further explore these reasons.

The findings of this study confirm that nurses, in the final phase of *unfolding the picture*, go through a series of cognitive activities in order to gain an overall impression of patients' clinical condition. By drawing on the identified patient 'characteristics' from the second phase, nurses combine data together again in order to reach a conclusion about patients' condition. The mental process of the final phase is also found in studies that examine cognition and heuristics. In deliberating the concepts in heuristic discovery, Polanyi (1983) argues that tacit knowing is the process of inquiry that forms the base of all heuristics. According to Polanyi, it allows someone to sense the unity or wholeness of something from an understanding of the individual qualities or parts. Polanyi adds that the process of tacit knowing involves the integration of two elements - subsidiary, the invariant constituents, and focal, implicit features. Radwin (1995), conducting a qualitative study to investigate the decision making strategies of 18 nurses, finds that nurses in the process of getting to know their patients seek to understand patients' experiences, behaviours, feelings, and perceptions. Radwin conceptualizes the strategy as developing a bigger picture.

Studies that examine the heuristic and thinking strategies of nurses find that pattern or feature recognition, is one of the core strategies nurses use to evaluate patient data (Osso, 1995; Fisher & Fonteyn, 1995; Miller & Babcock, 1996; Fonteyn, 1998). According to these studies, in pattern recognition, nurses draw identified pieces of information together to form a whole in order to understand the condition of their patients. In discussing the process of impression formation in social perception, Pennington (2000) states that impression formation is largely a dynamic configuration of the interplay between the actual information about a person and someone's expectation of that person.

Nurses' cognitive activities in the phase of *unfolding the picture* are following neither the hypothetico-deductive model nor the decision analysis model. Obviously, these activities also go beyond intuition. Indeed, as indicated in the results of theory verification, majority of nurses agree that the cognitive activities, in which they are involved, are different from the normative models. Interestingly, such a mental process is similar to the notion of 'representativeness heuristics' (Tversky & Kahneman, 1974). Tversky and Kahneman (1974) refer to the tendency to judge a group of cues by relevance to a particular class on the basis of how typical the cues appear to be as 'representativeness heuristics'. According to them, this heuristic strategy implies that one will base one's decision on how similar the cues appear to be

to the information that one knows already. Tversky and Kahneman add that knowledge and experience also have some influence on ‘representativeness heuristics’. Perhaps, this is the reason why the findings of this study indicate that nurses in the final stage of *unfolding the picture* are influenced particularly by a number of psychosocial variables, such as knowledge, experience, medical diagnosis, and familiarity with patients.

However, the use of ‘representativeness heuristics’ is not without problems. One of the problems is related to information overload. Eiser and van der Pligt (1988) point out that it is probable that in the course of combining all the relevant cues to reach for an overall evaluation, the amount of information that has to be considered simultaneously is very large. Hence, it causes mental overload, which impedes the thinking process. However, this does not seem to be an issue of concern among nurses in this study. One possible explanation is that as discussed earlier, the use of different types of perceiving strategy to collect particular types of patient information in the stage of *perceiving the situation* and the function of grouping strategy in the phase of *fracturing information* have already optimized the consumption of information and limited the number of irrelevant cues. The chances of having information overload is therefore minimized.

Another problem when using this heuristic approach is, according to Triplet (1992) and Pennington (2000), that people tend to ignore or under-use base-rate information. They refer such phenomena as base-rate fallacy. Interestingly, nurses in this study gave no indication of having much trouble in this respect. Perhaps, the category-based thinking strategy in the phase of *comparing categories* provides a prototype model for nurses to maximize the matching of all the relevant information, which, in turn, reduces the possibility of falling into the fallacy.

To sum up, by delineating the features of cognitive phases and activities, this study confirms that the mental process of nurses in the stage of *unfolding the picture* is similar the process described in ‘representative heuristics’. In this regard, the findings of this study surface an alternative mode of reasoning in the process of *ascertaining patient condition*.

### ***Epilogue***

The above discussion not only highlights the unique features of the sequential stages of the identified theory, *ascertaining patient condition*, but also demonstrates that the stages are inextricably interwoven with each other. By surfacing the nature and functions of nurse-patient interactions in the clinical environment, and the effect

of engaging in different types of attending behavior, the identified theory confirms that these interactional components are indeed critical junctures in the process of *ascertaining patient condition*. With the discovery of the scope and approach of information seeking, the efficacy of using a range of perceiving strategies, and the interconnectedness with attending behaviors in the stage of *perceiving the situation*, this study illuminates the essentials of data gathering for the identified theory. By characterizing the mental process and cognitive activities of the stage of *unfolding the picture*, the identified theory presents strong evidence indicating that nurses' mode of reasoning in the final stage of *ascertaining patient condition* is parallel to the notion of representative heuristic. The influences of socio-psychological and structural variables in ascertaining patients' clinical condition are also discussed. In addition, the implications of the results of theory verification are addressed.

Indeed, this study clearly displays the details and justifies the function of the sequential stages of the identified theory, *ascertaining patient condition*. In so doing, a substantive theory that explains the diagnostic practice of nurses in acute clinical environment becomes discernible.

### **Implications for Nursing**

Drawing on the characteristics of the identified theory, *ascertaining patient condition*, the implications for nursing practice, research, and education will now be discussed.

### ***Implications for nursing practice***

This study generates a theory, which provides understanding of the process of how nurses diagnose patients' condition in the acute clinical environment. This increased understanding is of great value in identifying appropriate diagnostic behaviours and skills in day-to-day clinical nursing practice.

The findings of this study confirm that one of the critical components of the process of ascertaining patient condition is a good nurse-patient relationship. This implies that nurses, in the course of diagnosing patient's clinical condition, must interact with patients and establish rapport with patients before proceeding to diagnostic activities. The identified theory also suggests that nurses sometimes adopt a non-negotiated approach in the process of ascertaining patient condition, which may, as discussed earlier, impede patients' participation. It is very important for nurses to be very conscious of not exhibiting over-dominating behaviour in performing their

diagnostic practice. As revealed in the findings of this study, nurses should involve themselves in a range of perceiving strategies in order to collect appropriate patient information to augment their understanding of patients' condition. Such practice is inevitably concerned with the application of essential assessment skills, such as physical examination technique and questioning method. Nurses must therefore improve their competence in performing these clinical skills so as to optimize the outcome of information gathering. The importance of nurses' framework for reference as one of the cognitive activities in the phase of comparing categories has been highlighted in the identified theory. It is vital for nurses to keep up-to-date with domain-specific knowledge and adequate clinical exposures. The findings of this study also suggest that socio-psychological structural variables, such as patient load, familiarity of patient, hand over report, knowledge and experience, physical and emotional state, and clinical context, exert various degrees of influences on the process of ascertaining patient condition. Nurses need to be well aware of effect of these variables that may negate the focus, scope and function of their diagnostic practice.

The identified theory, *ascertaining patient condition*, offers insights for the development of effective and skilled diagnostic practice in acute clinical nursing environment. However, it should be noted that to apply the identified theory in clinical nursing practice requires a fundamental shift of paradigm that goes beyond the

traditional models of diagnostic reasoning or clinical decision making, and, most importantly, the acknowledgement of the role and functions of socio-psychological components in the process of nursing diagnostic practice.

### ***Implications for nursing research***

This study attempts to describe the complex process of diagnostic practice in nursing. Much research on this subject remains to be done. Future researchers, who adopt the identified theory as a theoretical framework, could pursue several lines of evidence-based inquiry.

The findings of this study indicate that the seeking of multiple information sources appears to be a coping strategy for nurses to reduce stress. Further research may be necessary to evaluate the connection and extent of these two variables. As discussed earlier, there is also a need for further research to examine the issue of confirmation bias (Eli, 1996) in the phase of comparing categories.

The identified theory indicates that the prototype which nurses use to categorize patient information is largely based on the normality and severity dimensions. Neither medical nor nursing diagnostic classifications are being used.

Further research may therefore be necessary to explore the importance of this approach to the acute clinical environment.

As attending behaviors, perceiving strategies and unfolding activities are found to be part of the repertoire of socio-psychological cognitive strategies in the acute clinical environment, similar studies should be conducted in community and extended care settings.

Another topic that may be important to future research is related to instrument development. It would certainly be premature to suggest that verification of the identified theory could immediately result in an instrument to measure diagnostic practice in nursing. However, there is the basis for development of instruments which could measure specific concepts in diagnostic practice that are important to nursing. For example, instruments could be developed to measure the degree of patient load and its relation to the use of perceiving strategies or to determine how attending behaviours moderate perceiving strategies. In addition, a measure to assess the effects of physical fatigue on cognitive activities would be useful.

A final area of research concern is on patient outcome. Since the focus of this study is on the process of diagnosing patient condition, this study does not address

aspects that relate to patient outcomes. Future researchers may be interested to investigate the effects of the identified theory on patient outcomes.

### ***Implications for nursing education***

The use of grounded theory method to generate a theory for diagnostic practice in nursing has important implications for nursing education. The identified theory, *ascertaining patient condition*, is essentially grounded on the data. It is a substantive practice theory that reflects the day-to-day clinical practice of nurses. Thus, the use of the identified theory as a source and framework of learning allows nurse educators to link teaching directly with practice and so reduce the theory-practice gap in the process of teaching and learning. Students have the opportunity to be exposed to a practice-based learning experience, which will enhance their clinical knowledge and practice skills in the area of diagnostic practice.

Another important implication is that once the features of diagnostic practice are better understood, appropriate educational programmes and pedagogical strategies may be developed to furnish nursing students with the necessary ‘theoretical’ knowledge of diagnostic practice, as well as to advance their diagnostic skills. For instance, the identified theory reveals that a patient-centred approach is important to

the process of diagnosing patient condition. Nurse educators should inspire students with this fact in designing the pedagogical method to teach diagnostic practice. Also, emphasis needs to be placed upon the use of verbal and non-verbal communication skills, physical assessment technique, and questioning method, so as to strengthen nursing students' competence in engaging themselves in various types of attending behaviours and perceiving strategies. In addition, there is a need for nurse educators to select appropriate instructional strategies to shape nursing students' information categorization and comparison skills in order to enhance their mental performance in the process of ascertaining patient condition. Nurse educators also need to acknowledge the impact of those socio-psychological structural variables that are found to be exerting influences on diagnostic practice. Teaching methods should be employed to highlight the impact of these variables, so that any possible negative effects on the diagnostic process can be minimized.

Incorporating research findings into educational and pedagogical practices is not without difficulties. However, the identified theory offers insights and guidelines for nurse educators to present a practice-focused nursing curriculum.

### **Summary of Discussion**

The particular features of the sequential stages of the identified theory have been examined in the light of relevant literature and research studies and important implications for nursing practice, research and education have been identified. The analysis of the findings of this study has confirmed that the identified theory, *ascertaining patient condition*, offers an alternative conceptualization of diagnostic practice in nursing and goes beyond the normative models of diagnostic reasoning and clinical decision making.

## **CHAPTER 6: CONCLUSION**

---

This chapter describes the researcher's reflection of the research process.

The limitations of the study will also be addressed.

### **Reflection of the Research Process**

Having generated a substantive theory to explain diagnostic practice in nursing, it may well as be good, at this point of time, to reflect upon the entire research process. In so doing, evaluation of whether the canons and methods of ground theory have been observed through out the study becomes possible, and, above all, the strengths and weaknesses of the study can also be highlighted. Hence, the researcher's experience can be consolidated. For simplicity of discussion, the reflection is divided into three sections: planning the study, collecting and analyzing data and verifying the results.

### *Planning the study*

The desire to integrate an appropriate theoretical framework to inform the pedagogical and clinical practice of nurses' diagnostic practice resulted in the conduction of a grounded theory study in acute clinical settings. Bearing in mind that the intention of the study was to understand nurses' experience in diagnostic practice in real-world clinical environment and to generate a substantive theory to explain nurses' practice, the researcher consulted the literature for relevant methodology of the study. The review of literature strongly suggested that grounded theory was the method of choice for an inquiry of such nature. The researcher was well aware that his experience of conducting grounded theory study was limited. To overcome this weakness, efforts had been made to attend workshops on grounded theory. Regular meetings and discussions were also held with supervisors to seek for their expert advice and support.

The researcher's own experience in nursing and the review of literatures about diagnostic practice in nursing not only helped to put the study into perspective but also shaped the focus of the study. More importantly, the review of literatures also sharpened the researchers' theoretical sensitivity in conceptualizing nurses' diagnostic practice in acute clinical environments. Yet, the researcher was also well

aware that these preconceived ideas from the literatures might increase the chances of forcing the research data to fit with the meaning of these ideas. To remain faithful to the data, the researcher was always conscious of making effort to keep running the data open and use 'in vivo' codes when coding the transcripts.

The process of gaining access to the acute clinical care settings was smooth. In general, the General Manager (Nursing) and the Department Operations Managers of various clinical units were receptive of this study. They even suggested ways to facilitate the conduction of interviews with their staff. For example, some of the managers reminded the researcher of the 'worst time', such as 'admission' and 'post-operation' days, for interviewing their staff. Indeed, this suggestion, by and large, helped the researcher to 'fit in' the optimal timing for better interview performance.

### *Collecting and analysing data*

In-depth informal interview data was the major data source of this study. Conducting in-depth informal interviews with nurses was not without problems. Though agreed to participate in the interviews, some nurses were too exhausted after their span of duty. They were not very keen on describing their experience of

diagnostic practice. Other nurses might make use of the interview as a chance to ‘ventilate’ or ‘air out’ their discontents. For example, in an interview with nurse X, she used more than one third of the time to express her dissatisfaction with the administration. To optimize the participants’ performance in the subsequent interviews, the researcher examined the transcripts to establish ways of improving his questioning techniques so as to guide the participants to resume discussing their experience on diagnosing patient’s clinical condition. Besides, though the use of audio recording during the interviews helped to minimize data lost or selection bias in transcript editing, it was sometimes found to be problematic. Some nurses were rather cautious or embarrassed when they discussed their experience of diagnostic practice in the presence of the tape recorder. To free the participants from this unnecessary disturbance, the researcher ‘hid’ the recorder from their views during the interviews.

The researcher’s limited experience in conducting grounded theory study rendered the initial experience of using theoretical sampling a bewildering one. In the early stage of data collection, the strong feeling of ‘not knowing where to go about’ added more confusions than providing direction to look for nurses to be included in the interviews. Nevertheless, in order to be faithful with the grounded theory method, the researcher decided to follow the golden rule of theoretical

sampling, i.e. let the data guided the sampling direction. Fortunately, after simultaneously collected, coded and analyzed the first few interviews, the researcher began to uncover that nurses with about five years of clinical experience were the most appropriate sample to be invited as participants of the study.

In order to generate a substantive theory that ‘fit, work, relevant and modifiable’ in explaining diagnostic practice in nursing in acute clinical environments, the researcher did recognize the importance of abiding by the rules’ of the constant comparative method when collecting and analyzing data. However, the insistence of following the iterative and cyclical process, to start with, turned out to be a ‘never ending battle’. To ground the fractured data on a solid platform for comparison with subsequent interviews, the verbatim quotes from the transcripts were transferred onto indexed cards after open coding. In so doing, it not only created a systematic data bank that facilitated the retrieval of data for subsequent comparison, but also allowed the researcher to use ‘in-vivo’ codes effectively to preserve the meaning of the data in the process of data analysis. However, such procedure was found to be extremely time consuming. As a result, the continuity of the planned interview schedule was disturbed. The researcher therefore had to re-establish links in the research setting so that further sampling of participants was possible. This indeed caused unnecessary delay of the study in the first few months.

Nevertheless, as the research process went on, the researcher found that the use of such indexed card system provided an effective and efficient means of grouping and comparing of categories. It, in fact, had speeded up the process of constant comparative method in the long run.

The constant checking and rechecking of data ended up with tons of striking ideas on how nurses diagnose patient's clinical condition. To contain these ideas and to find a 'way out', the researcher began to reflect upon pieces of idea and made memos about the reflections. This marked the beginning of an important analytic process in grounded theory study: the theorizing write-up of ideas about codes and categories, their commonalties, differences, and interrelationships. The initial memos were, by and large, wordings or phrases about the methods and conditions of diagnostic practice. The researcher, in the course of theorizing these ideas, was cautious about not being influenced by the preconceived ideas from the initial review of literature. However, the researcher found that it was sometimes rather difficult or even conflicting to be 'distant' from the preconceptions, and this, in some way, had instigated cognitive dissonance. Bearing in mind of the fact that one had to be faithful with the data in grounded theory study, the researcher resolved these situations by resorting to the use of 'in-vivo' codes for the 'precise' and 'specific' meanings. As memoing continued, coupled with the researcher's theoretical

sensitivity and a wider reading of literature, diagrams or matrix, instead of sentences, were used to order and re-order categories, and to integrate ideas as well. Eventually, the ideas and memos were brought to 'alive' and the researcher was able to see a structure underlying the studying phenomena: an initial analytic framework explaining diagnostic practice in nursing. Nevertheless, this initial framework did not, in the first place, provide conclusive and full-fledged explanation on how nurses' diagnose patient's clinical condition. Rather, it helped further to crystallize the researcher's understanding of the research problem, and, most importantly, gave shape and direction for the researcher to complete the study.

The cessation of data collection in grounded theory study was very much contingent upon the emergence of theoretical saturation. However, taking note of theoretical saturation during the study was not as straightforward as it was mentioned in the literatures. Even though the researcher was well informed by the literatures that theoretical saturation would arrive when the capacity of the data to generate new ideas was found to be exhausted, and the researcher was always maintaining the stringent procedural steps of constant comparative analysis to exhaust the meaning of the categories, the uncertain feeling of not knowing when the data would be saturated put the researcher in a rather uncomfortable and stressful situation. Eventually, at around the 18<sup>th</sup> month of data collection, analysis of the 26<sup>th</sup> interview suggested that

data saturation was near. Having saturated the emergent theory with two more interviews, the researcher was confident to confirm the point of theoretical saturation of this study. Hence, the process of data collection and analysis came to an end.

### *Verifying the results*

Though the rigorous procedural steps of constant comparative method had already embraced a verification component (Corbin & Strauss, 1990), it was argued that further verification of the generated theory was necessary in order to establish the true value of results (Glaser, 1992; 1998). Subscribing to this view, the researcher therefore conducted three levels of verification work to map the findings with nurses' views so as to look for general agreement between the identified theory and nurses' daily clinical practices. Nevertheless, the researcher was well aware of the fact that verifying the results of this study did not imply that the identified theory had been empirically tested, and, as a matter of fact, theory testing was never one of the agenda of this study. Yet, the decision of incorporating theory verification subsequent to the discovery of ascertaining patient condition suggested the need for extra time and resources. Funding from a small grant eased the resources constraint but the duration of the study was inevitably lengthened. Having conducted the verification the researcher was pleased to see that the results of verification were so

promising that the legitimacy of the identified theory was reaffirmed.

### **Limitations**

As mentioned earlier, theoretical foundation of grounded theory comes from symbolic interactionism, and a schism has emerged between the originators of grounded theory. It is these milieux that root the theoretical limitation of this study. Over the past years, symbolic interactionism is being accused of having an astructural bias, that is, it fails to deal with macro-structural issues (Reynolds, 1993). Critics have also argued that it ignores how the interpreted meanings of individuals are channeled by society's dominant institutions (Meltzer & Herman, 1990). These criticisms have also been translated into challenges directed against grounded theory methodology. Grounded theory is therefore being charged as having the potential for conservative bias and may serve to support the status quo (Layder, 1989). Nevertheless, it is argued that such interactionist perspective is indeed the strength of grounded theory. It crystallizes grounded theory with an enduring respect for the perspectives of the people being studies. It guides grounded theory further its emphasis on the importance of process of interactions and the way in which individuals and collectives play part in constructing their social environment

(MacDonald, 2001). Hence, grounded theory is particularly good at micro level analysis and discovering the essence of complex interactional processes (Hutchinson, 1986). It is on this basis that this study is conducted. The Glaserian and Straussian controversy over grounded theory has evoked doubt and confusion, which, as a result, further erodes and dilutes the contribution of this methodological framework. What is worst is that, in many cases, those middle-of-the-road mediocre researchers reported that they have used a ‘modified’ methodology in order to guard against accusations of inaccuracy or taking side. These studies in fact bear very little resemblance to grounded theory although this is what they claim to be. In so doing, they further muddle and smudge grounded theory and transmute it into a problematic research methodology. However, it is generally agreed that in following the procedural steps of whatever schools of the grounded theory in an exact manner, a genuine grounded theory is allowed to evolve. In this study, the cannons and methods of the Glaserian School are strictly observed. Hence, this study excludes itself from the muddling method, and the result of this study: ascertaining patient condition is a genuine grounded theory.

In this study, while the use of informal interview as the means to solicit nurses’ experience on diagnostic practices allows the researcher to enter into the world of the nurses and, in turn, permits the researcher to understand how nurses

perceive the way they diagnose patients' clinical conditions, it may also become the ground for landing a procedural limitation of the study. The knowledge of being included in the study may be sufficient to cause some of the nurses to describe what they think the researcher wants to hear rather than what they really experienced thereby diluting the data quality. Besides, it may also run the risk of allowing nurses to over-focus on recollecting their exemplary experiences which may turn out to be, as far as their daily practices are concerned, some "atypical" incidents. Obviously, one can never know if nurses will refuse to speak or say what they would have the researcher believed they interpret it. Nevertheless, this does not mean that the data is inconclusive and should be abandoned. The fact that the researcher himself does not has any "connection" with the nurses, and that the nurses are invited to interview on a voluntary basis will ensure that the nurses have, by and large, revealed their genuine experiences. More importantly, with 'cross checking' by the method of constant comparative analysis, the underlying structures of the codes and categories have been preserved.

Finally, a practical issue, while diagnostic practice in acute clinical environment can be theorized as a three-stage process of attending the patient, perceiving the situation and unfolding the picture, there are two main limitations in such a stage theory. First, the stages should not be taken as real points in time

through which all nurses must pass. They are neither ideal nor real and should not be taken as invariant in sequence. These stages are merely a 'technical' way to illustrate certain psychosocial, interpersonal and cognitive behavioural patterns that are momentarily ascendant in the process of ascertaining patient condition. Second, diagnostic practice should not be seen as a simple, rigid and linear process. While diagnosing patient's clinical condition in the real-world is a process that occurs over time, patients can and do present new information during the encounter. Nurses may then have to return to previously completed stages several times although more briefly than previously. This means that their passage through the process may not be strictly linear and may involve cycling back and forth between stages, or even remaining in one stage for some period of time. It is a process that may involve regression as well as progression. What is clear is that nurses are only able to move on to a progressive stage when the tasks of the previous stage have been successfully completed. Therefore, in a practical sense, diagnostic practice in the real-world is best understood as a multi-staged, ongoing cycle of interwoven diagnostic behaviours, strategies and activities directed to the goal of ascertaining patient condition.

## Epilogue

Following the canons and methods of the grounded theory approach, the researcher is confident that this study has generated a substantive theory of *ascertaining patient condition* that clearly explicates a unique three-stage process of how nurses diagnose patients' clinical conditions in real-world clinical environment. Indeed, the study demonstrates that nurses, when going through the stages of *attending the patient, perceiving the situation* and *unfolding the picture*, are able to distinguish patients' clinical conditions and to establish therapeutic relationship. It is on this basis that nurses can land on a solid platform to ground their interventions to protect patients from vulnerability to harm and to support recovery. For this reason, the discovery of *ascertaining patient condition* has two important contributions to nursing practice. First, it confirms that diagnostic practice in real-world clinical environment goes beyond the normative models of diagnostic reasoning, clinical judgment and clinical decision making. It is a fundamental social and psychological process that integrates cognitive, psychosocial and interpersonal behaviours. Second, it provides a theoretical framework for researchers to further advance their understanding of diagnostic practice of nurses in different clinical settings.

## APPENDICES

---



PRINCE OF WALES HOSPITAL  
威爾斯親王醫院

30-32 Ngan Shing Street, Sha Tin, N.T., Hong Kong Tel: (852) 2632 2211 Fax: (852) 2637 8244  
香港新界沙田銀城街三十至三十二號 電話: 2632 2211 傳真: 2637 8244

Miss Hermia HO  
General Manager (Nursing)  
Prince of Wales Hospital  
Tel: 2632 2427  
Fax: 2648 4085

5 February 1997

To: Mr. Joseph K.L. LEE  
Lecturer, Nursing  
School of Science and Technology  
30 Good Shephard Street,  
Ho Man Tin,  
Kowloon

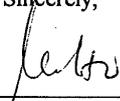
Dear Mr LEE,

Re: Application for approval of conducting a research project on  
"A Study to Explore Nurses' Perspective of  
Diagnosing Patient's Health Problems in the Clinical Context"

In response to your letter dated 29/1/97, your request to conduct your research has been granted.

We would like to inform you that you'll need to approach the DOMs informing them of the wards that you'll interview. Please submit a copy of the report to us upon completion of the study. You may also be required to seek approval again if you wish to publish the results.

Yours Sincerely,

  
Miss Hermia HO  
General Manager (Nursing)  
Prince of Wales Hospital

c.c. COS / DOM Department of Medicine  
COS / DOM Department of Surgery  
COS / DOM Department of Orthopaedics  
COS / DOM Department of Paediatrics

## *Diagnostic Practice Questionnaire*

**Part I**      The following questions relate to *details about you and yourself*.  
Please tick the appropriate box.

1. Rank:
 

<input type="checkbox"/> 1 E.N.	<input type="checkbox"/> 2 R.N.	<input type="checkbox"/> 3 N.O./N.S./W.M.
<input type="checkbox"/> 4 Others, _____		
  
2. Year of Experience:
 

<input type="checkbox"/> 1 0 – 5	<input type="checkbox"/> 2 5 – 10	<input type="checkbox"/> 3 above 10
----------------------------------	-----------------------------------	-------------------------------------
  
3. Service Setting:
 

<input type="checkbox"/> 1 Acute Hospital – General Wards	<input type="checkbox"/> 2 Acute Hospital – Specialties
<input type="checkbox"/> 3 Extended/Rehabilitative Hospitals	<input type="checkbox"/> 4 Others, _____
  
4. Year of Experience Working in the Existing Service Setting:
 

<input type="checkbox"/> 1 0 – 3	<input type="checkbox"/> 2 3 – 6	<input type="checkbox"/> 3 above 6
----------------------------------	----------------------------------	------------------------------------
  
5. Academic Qualifications:
 

<input type="checkbox"/> 1 Certificate/Diploma/Higher Diploma	<input type="checkbox"/> 2 Bachelor Degree
<input type="checkbox"/> 3 Post-graduate Certificate/Diploma	<input type="checkbox"/> 4 Masters Degree
<input type="checkbox"/> 5 Others, _____	

**Part II**      The following statements relate to *the process of finding out the clinical condition of your patients*. For each statement, please give a tick against the appropriate box to indicate your agreement.

- |  | Strongly<br>Disagree       | Disagree                   | Agree                      | Strongly<br>Agree          |
|--|----------------------------|----------------------------|----------------------------|----------------------------|
| 6. Diagnostic practice in nursing is a series of purposeful action that aims at finding out the clinical condition of my patients. | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 7. To find out my patients' clinical condition, I have to integrate my cognitive, psychosocial and interpersonal skills.           | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 8. Having found out their clinical condition, I can have grounds to deliver appropriate care to protect and support my patients.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 9. In order to find out my patients' clinical condition, first of all, I have to approach and interact with them.                  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

10. Having approached and interacted with my patients, I start collecting information from all possible data sources so as to augment my understanding of the situation.  0  1  2  3
11. After the stage of information collection, I analyse and articulate the data into a sensible picture that reflects the clinical condition of my patients.  0  1  2  3
12. The above mentioned stages (Q.9-11) of finding out the clinical condition of my patients are sequential and interdependent.  0  1  2  3

**Part III** The following statements relate to *the behaviours that you adopted to approach & interact with your patients*. For each statement, please give a tick against the appropriate box to indicate your agreement.

- |   | Strongly<br>Disagree       | Disagree                   | Agree                      | Strongly<br>Agree          |
|---|----------------------------|----------------------------|----------------------------|----------------------------|
| 13. I approach and interact with my patients either during my ward rounds or when they and their relatives are calling me.                      | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 14. I watch and observe the newly admitted patients carefully and thoroughly during the routine procedure ward rounds.                          | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 15. I say hello to my 'old cases' to express concern to them during the routine procedure rounds.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 16. I ask specific questions to check for potential problems of the newly admitted patients in my end-of-shift rounds.                          | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 17. I browse around my 'old cases' to spot for 'news' in my end-of-shift rounds.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 18. I watch and observe the newly admitted patients carefully and thoroughly when their conditions had been discussed in the hand over report.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 19. I ask specific question to check for potential problems of my 'old cases' when their conditions had been discussed in the hand over report. | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 20. I browse around the newly admitted patients to spot for 'news' when their condition had not been discussed in the hand over report.         | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 21. I say hello to my 'old cases' to express concern to them when their conditions had not been discussed in the hand over report.              | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 22. I watch and observe the newly admitted patients carefully and thoroughly when they are calling me.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 23. I say hello to my 'old cases' to express concern to them when they are calling me.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

24. I ask specific question to check for potential problems of the newly admitted patients when their relatives or friends are calling me.  0  1  2  3
25. I browse around my 'old' cases' to spot for 'news' when their relatives or friends are calling me.  0  1  2  3

**Part IV** The following statements relate to *the strategies that you used to collect information of your patients*. For each statement, please give a tick against the appropriate box to indicate your agreement.

- |   | Strongly<br>Disagree       | Disagree                   | Agree                      | Strongly<br>Agree          |
|---|----------------------------|----------------------------|----------------------------|----------------------------|
| 26. I collect information of my patients from every possible source, such as vital signs observations, nursing kardex, medical notes and laboratory reports, etc.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 27. Even though the patient load is high, I review all the information sources, and, if necessary, perform physical examination on the newly admitted patients when their condition had been discussed in the hand over report. | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 28. Though the patient load is high, I ask focused questions to clarify doubts on my 'old cases' when their condition had been discussed in the hand over report.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 29. I make enquiry to explore for any unreported or 'hidden' signs or symptoms of the newly admitted patients when their conditions had not been discussed in the hand over report and the patient load is low.                 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 30. I talk to my 'old cases' in a casual manner to get in-touch with them when their conditions had not been discussed in the hand over report and the patient load is low.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 31. I review all the information sources, and, if necessary, perform physical examination on the newly admitted patients when they are calling me.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 32. I talk to my 'old cases' in a casual manner to get in-touch with them when they are calling me.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 33. I ask focused questions to clarify doubts on the newly admitted patients when their relatives or friends are calling me.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 34. I make enquiry to explore for any unreported or 'hidden' signs or symptoms of my 'old cases' when their relatives or friends are calling me.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 35. I review all the information sources, and, if necessary, perform physical examination on my patients when they verbalised some symptoms and there is presence of visitors.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 36. I make enquiry to explore for any unreported or 'hidden' signs or symptoms of my patients when they verbalised some symptoms and there is presence of visitors.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

37. Though there is no presence of visitors and my patients do not verbalise any symptom, I ask focused questions to clarify doubts on them.  0  1  2  3
38. Even though my patients do not verbalise any symptom and there is no presence of visitors, I talk to them in a casual manner to get in-touch with them.  0  1  2  3

Part V The following statements relate to *the cognitive activities that you used to analyze and articulate the collected data*. For each statement, please give a tick against the appropriate box to indicate your agreement.

- |   | Strongly<br>Disagree       | Disagree                   | Agree                      | Strongly<br>Agree          |
|---|----------------------------|----------------------------|----------------------------|----------------------------|
| 39. Before analysing the collected information, I re-organise this data by grouping them into different categories in accordance with their common properties, such as observations, signs and symptoms of the disease, and laboratory results.               | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 40. It is through grouping of the collected information that I could have a systematic and comprehensive data bank to work on in the subsequent phases of analysis.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 41. Having grouped the information into categories, I start to compare these categories by matching them with my reference frameworks, i.e. normal range, patient's baseline readings or previous observation records, and signs and symptoms of the disease. | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 42. When matching the categories with my reference frameworks, I do not have an obvious sequence to follow; however, I used to match them in a one-to-one and group-by-group manner.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 43. It is through matching of the categories with my reference frameworks that I could identify the similarities and differences between them.  | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 44. These identified similarities and differences represent the manifested characteristics of my patient, which, in turn, provide a solid ground to actualise my understanding of patient's clinical condition.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 45. Knowledge and experience strengthen the breath and depth of my reference frameworks, which, in turn, increase my sensitivity to identify the differences and similarities between the categories and the frameworks during matching.                      | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| 46. Familiarities of medical diagnosis, the clinical context and prior experience with my patients determine the focus and emphasis of matching the categories with my reference frameworks during comparing.   | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |

47. Negative emotion and physical fatigue impede my ability to recollect the reference frameworks, which, in turn, reduce the comprehensiveness of matching as well as slow down the speed of comparing categories.  0  1  2  3
48. Having identified the differences and similarities of the categories, i.e. the manifested characteristics, I put them together by combining the characteristics into a sensible pattern, which reflect the clinical condition of my patient.  0  1  2  3
49. It is through combining of the manifested characteristics that I could sum up and articulate these results into an overall picture.  0  1  2  3
50. Knowledge on and prior exposures to these manifested characteristics give shape and meaning to the overall picture of my patient's clinical condition.  0  1  2  3

- End of Questionnaire -

Please return to Joseph Lee via the attached stamped envelope  
or Fax: 2789 1170

*Before May 25<sup>th</sup> 2001*

Thank You!

## REFERENCES

---

- Abdellah, F.G., & Levine, E. (1979). *Better patient care through nursing research* (2<sup>nd</sup> ed.). New York: MacMillan.
- Alexander, L. (1991). Explication of the meaning of clinical judgment in nursing practice using Ricoeurian hermeneutics. *Dissertation Abstracts International*, *B52/02*, 744.
- Annells, M. (1996). Grounded theory method: Philosophical perspectives, paradigm of inquiry, and Postmodernism. *Qualitative Health Research*, *6*(3), 379-393.
- Annells, M. (1997). Grounded theory method, part I: Within the five moments of qualitative research. *Nursing Inquiry*, *4*, 120-129.
- Arkes, H.R., & Hammond, K. (1986). *Judgment and decision making: An interdisciplinary reader*, Cambridge: Cambridge University Press.
- Aspinall, M.J. (1976). Nursing diagnosis - the weak link. *Nursing Outlook*, *24*, 443-447.
- Aspinall, M. (1979). Use of a decision tree to improve accuracy of diagnosis. *Nursing Research*, *28*, 182-185.
- Athlin, E., Norberg, A., Asplund, K. & Jasson, L. (1989). Feeding problems in severely demented patients seen from task and relationship aspects. *Scandinavian Journal of Caring Science*, *3*, 113-121.
- Backman, K., & Kyngas, H.A. (1999). Challenges, of the grounded theory approach to a novice researcher. *Nursing and Health Sciences*, *1*, 147-153.
- Bailey, P.H. (1997). Finding your way around qualitative methods in nursing research. *Journal of Advanced Nursing*, *25*, 18-22.
- Balla, J.I. (1982). The use of critical cues and prior probability in decision making. *Methods of Information in Medicine*, *21*, 9-14.
- Barrows, H. (1990). Inquiry: The pedagogical importance of a skill central to clinical practice. *Medical Education*, *24*, 3-5.
- Barrows, H.S., & Bennett, K. (1972). The diagnostic skills of neurologists. *Archives of Neurology*, *26*, 272-277.
- Bartlett, D., & Payne, S. (1997). Grounded theory – Its basis, rationale and procedures,

- In G. McKenzie, J. Powell, & R. Usher (Eds.), *Understanding social research: Perspective on methodology and practice* (pp. 173-195). London: Falmer.
- Baumann, A., & Deber, R. (1989). The limits of decision analysis for rapid decision making in ICU nursing. *Image: Journal of Nursing Scholarship*, 21(2), 69-71.
- Baumann, A., & Bourbonnais, F. (1993). When the chips are down: Decision making in a crisis situation. *Canadian Nursing*, 79(5), 23-25.
- Beaton, J.T. (1990). Dimensions of nurse and patient roles in labor. *Health Care for Women International*, 11, 393-408.
- Becker, H.S., & Geer, B. (1982). Participant observation and interviewing: a comparison. *Human Organization*, 16(3), 28-32.
- Benner, P. (1982). From novice to expert. *American Journal of Nursing*, 82(1), 402-407.
- Benner, P. (1983). Uncovering the knowledge embedded in clinical practice. *Journal of Nursing Scholarship*, 15(2), 36-41.
- Benner, P. (1984). *From novice to expert*, London: Addison-Wesley.
- Benner, P., & Tanner, C. (1987). Clinical judgment: How expert nurses use intuition. *American Journal of Nursing*, 87, 23-31.
- Benner, P., Tanner, C., & Chesla, C. (1992). From beginner to expert: Gaining a differentiated clinical world in critical care nursing. *Advances in Nursing Science*, 14(3), 13-28.
- Benner, P., Tanner, C. & Chesla, C. (1996). *Expertise in Nursing Practice: Caring, clinical judgment and ethics*, New York: Springer.
- Benner, P., & Wrubel, J. (1982). Skilled clinical knowledge: the value of perceptual awareness. *Nursing Educator*, 7, 11- 17.
- Benner, P., & Wrubel, J. (1989). *The primacy of caring: Stress and coping in health and illness*, Menlo Park, C.A.: Wesley.
- Benoliel, J.Q. (1996). Grounded theory and nursing knowledge. *Qualitative Health Research*, 6(3), 406-428.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs, NJ: Prentice Hall.
- Bogdan, R., & Taylor, S.J. (1975). *Introduction to qualitative research methods*, New York: John Wiley & Sons.
- Bonniver, J.F. (1992). A peer supervision group: put countertransference to work.

*Journal of Psychosocial Nursing, 30(5), 5-8.*

- Bottorff, J.L., & Morse, J.M. (1994). Identifying types of attending: patterns of nurses' work. *IMAGE: Journal of Nursing Scholarship, 26(1), 53-61.*
- Bottorff, J.L., & Varcoe, C. (1995). Transitions in nurse-patient interactions: a qualitative ethology. *Qualitative Health Research, 5, 315-331.*
- Bowers, B. (1998). Grounded theory. In B. Sarter (Ed.), *Paths to knowledge: Innovative research methods for nursing* (pp.33-60). New York: National League for Nursing.
- Brooks, E.M. & Thomas, S. (1997). The perception and judgment of senior baccalaureate student nurses in clinical decision making. *Advances in Nursing Science, 19(3), 50-69.*
- Brown, S.J.O. (1994). Communication strategies used by an expert nurse. *Clinical Nursing Research, 3(1), 43-56.*
- Bryans, A., & McIntosh, J. (1996). Decision making in community nursing: An analysis of stages of decision making as they relate to community nursing assessment practice. *Journal of Advanced Nursing, 24, 24-30.*
- Buckingham, C.D., & Adams, A. (2000). Classifying clinical decision making: a unifying approach. *Journal of Advanced Nursing, 32(4), 981-989.*
- Burgess, R.G. (1984). *In the field*, London: George Allen & Unwin.
- Burnard, P. (1989). Developing critical ability in nurse education. *Nurse Education Today, 9(4), 271-275.*
- Caris-Verhallen, W.M.C.M., Kerkstra, A., & Bensing, J.M. (1999). Non-verbal behavior in nurse-elderly patient communication. *Journal of Advanced Nursing, 29(4), 808-818.*
- Carnevali, D.L. (1984). The diagnostic reasoning process. In D.L. Carnevali, P.H. Mitchell, N.F. Woods, & C.A. Tanner (Eds.), *Diagnostic reasoning in nursing* (pp. 25-56). Philadelphia: J.B. Lippincott.
- Carnevali, D.L. Mitchell, P.H., Woods, N.F., & Tanner, C.A. (1984). *Diagnostic Reasoning in Nursing*, Philadelphia: Lippincott.
- Carnevali, D.L., & Thomas, M.D. (1993). *Diagnostic reasoning and treatment decision making in nursing*, Philadelphia: J.B. Lippincott.
- Castledine, G. (1995). Nurses' role in the decision making process. *British Journal of Nursing, 4(6), 355.*
- Catolico, O., Navas, M., Sommer, C., & Collins, M.A. (1996). Quality of decision

- making by registered nurses. *Journal of Nursing Staff Development*, 12(3). 149-154.
- Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (pp.509-535). Thousand Oaks, CA: Sage.
- Chenitz, W.C., & Swanson, J.M. (1986). *From practice to grounded theory: Qualitative research in nursing*, Melon Park: Addison-Wesley.
- Chicchi, F. (2000). Grounded theory and the biographical approach: An attempt at integrated heuristic strategy. *International Review of Sociology*, 10(1), 5-23.
- Chinn, P. L. (1997) Response to “The Comforting Interaction: developing a Model of Nurse-Patient Relationship”. *Scholarly Inquiry for Nursing Practice: An International Journal*, 11(4), 345-347.
- Cholowski, K.M., & Chan , K.K.S. (1992). Diagnostic reasoning among second-year nursing students. *Journal of Advanced Nursing*, 17, 1171-1181.
- Cianfrani, K.L. (1984). The influence of amounts and relevance of data on identifying health problems. In M.J. Kim, G.K. McFarland, & A.M. McLane (Eds.), *Classification of nursing diagnosis: Proceedings of the fifth national conference* (pp. 150-161). St. Louis: Mosby.
- Cioffi, J. (1997). Heuristics, servants to intuition in clinical decision-making. *Journal of Advanced Nursing*, 26, 203-208.
- Clark, J.A., Potter, D.A., & McKinlay, J.B. (1991). Bringing social structure back into clinical decision making. *Social Science and Medicine*, 32(8), 853-866.
- Cleary, M., & Edwards, C. (1999). ‘Something always comes up’: nurse-patient interaction in an acute psychiatric setting. *Journal of Psychiatric and Mental Health Nursing*, 6, 469-477.
- Clough, P.T. (1992). *The end(s) of ethnography: From realism to social criticism*. Newbury Park, CA: Sage.
- Cockerham, W.C. (1978). *Medical sociology*, Englewood Cliffs, NJ: Wadsworth.
- Conrad, P. (1990). Qualitative research on chronic illness: A commentary on method and conceptual development. *Social Science and Medicine*, 30, 1257-1263.
- Corbin, J. (1986). Qualitative data analysis for grounded theory. In W.C. Chenitz, & J.M. Swanson (Eds.), *From practice to grounded theory: Qualitative research in nursing* (pp.99-101). California: Addison-Wesley.
- Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3-21.

- Corcoran, S.A. (1986a). Decision analysis: A step by step guide for making clinical decisions. *Nursing and Health Care*, 7, 149-154.
- Corcoran, S.A. (1986b). Task complexity and nursing expertise as factors in decision-making. *Nursing Research*, 35, 107-112.
- Corcoran, S., Narayan, S., & Moreland, H. (1988). "Thinking aloud" as a strategy to improve clinical decision making. *Heart and Lung*, 17(5), 463-468.
- Corcoran-Perry, S., & Graves, J. (1990). Supplemental-information-seeking behavior of cardiovascular nurses. *Research in Nursing and Health*, 13(2), 119-127.
- Corcoran-Perry, S.A., Narayan, S.M., & Cochrane, S. (1999). Coronary care nurses' clinical decision making. *Nursing and Health Sciences*, 1, 49-61.
- Crow, R.A., Chase, J., & Dawn, L. (1995). The cognitive component of nursing assessment: An analysis. *Journal of Advanced Nursing*, 22(2), 206-212.
- Crow, R., & Spicer, J. (1995). Categorization of the patient's medical condition – an analysis of nursing judgement. *International Journal of Nursing Studies*, 32(5), 413-422.
- Davison, B.J., Degner, L.F., & Morgan, T.R. (1995). Information and decision-making preferences of men with prostate cancer. *Oncology Nursing Forum*, 22, 1401-1408.
- DeBondt, W.F.M., & Fhaler, R. (1985). Does the stock market overreact? *Journal of Finance*, 19, 793-805.
- Dela Cruz, F.A. (1994). Clinical decision-making styles of home care nurses. *IMAGE: Journal of Nursing Scholarship*, 26(3), 222-226.
- Denzin, N.K. (1970). *Sociological Methods*, Chicago: Aldine.
- Denzin, N.K. (1989). *The research act: A theoretical introduction to sociological methods*, Englewood Cliffs, NJ: Prentice Hall.
- Dey, I. (1999). *Grounding grounded theory: Guidelines for qualitative inquiry*, London: Academic Press.
- Diers, D. (1979). *Research in nursing practice*, Philadelphia: JB Lippincott.
- Dodge, J., & Oakley, D. (1989). Analyzing nurse-client interactions in family planning clinics. *Journal of Community Health Nursing*, 6, 37-44.
- Donahue, A., & Martin, S.G. (1995). Individual decision making. In R.A. P. Jones, & S.E. Beck (Eds.), *Decision making in nursing* (pp.59-75). London: Delmar Publishers.

- Doubilet, P., & McNeil, B. (1988). Clinical decision making. In J. Dowie, & A. Elstein (Eds.), *Professional judgment: A reader in clinical decision* (pp. 225-276). Cambridge: Cambridge University Press.
- Dreyfus, H., & Dreyfus, S. (1986). *Mind Over Machine: the power of human intuition and expertise in the era of the computer*. New York: Free Press.
- Easen, P., & Wilcockson, J. (1996). Intuition and rational decision-making in professional thinking: A false dichotomy? *Journal of Advanced Nursing*, 24, 667-673.
- Ehrenreich, J. (1978). *The cultural crisis of modern medicine*, New York: Monthly Review Press.
- Eisenberg, J.M. (1979). Sociological influence on decision making by clinicians. *Annals of Internal Medicine*, 90, 957-964.
- Eiser, J.R., & van der Pligt, J. (1988). *Attitudes and decisions*, London: Routledge.
- Eli, I. (1996). Reducing confirmation bias in clinical decision-making. *Journal of Dental Education*, 60(10), 831-835.
- Elstein, A., & Bordage, G. (1988). Psychology of clinical reasoning. In J. Dowie, & A. Elstein (Eds.), *Professional judgment: A reader in clinical decision making* (pp. 109-129). Cambridge: Cambridge University Press.
- Elstein, A., Schulman, L.S., & Sprafka, S.A. (1978). *Medical problem solving: An analysis of clinical reasoning*. Cambridge: Harvard University Press.
- English, I. (1993). Intuition as a function of the expert nurse: a critique of Benner's novice to expert model. *Journal of Advance Nursing*, 18, 387-393.
- Field, P.A. (1987). The impact of nursing theory on the clinical decision making process. *Journal of Advanced Nursing*, 12, 563-571.
- Field, P., & Morse, J. (1985). *Nursing research: The application of qualitative approach*, London: Chapman & Hall.
- Fetterman, D.M. (1989). *Ethnography: Step by step*, London: Sage Publications.
- Finn, S.E., & Tonsager, M.E. (1997). Information-gathering and therapeutic models of assessment: Complementary paradigms. *Psychological Assessment*, 9, 374-385.
- Fisher, A., & Fonteyn, M. (1995). An exploration of an innovative methodological approach for examining nurses' heuristic use in clinical practice. *Scholarly Inquiry for Nursing Practice: An International Journal*, 9(3). 263-279.

- Fischhoff, B., & Beyth-Marom, R. (1983). Hypothesis evaluation from a Bayesian perspective. *Psychological Review*, *90*, 239-260.
- Flett, G.L., Pliner, P., & Blankstein, K.R. (1989). Depression and components of attributional complexity. *Journal of Personality and Social Psychology*, *56*, 757-764.
- Fonteyn, M.E. (1998). *Thinking strategies for nursing practice*, Philadelphia: Lippincott.
- Frauman, A.C., & Skelly, A.H. (1999). Evolution of the nursing process. *Clinical excellence for nurse practitioners*, *3*(4), 238-244.
- Fuller, J., & Schaller-Ayers, J. (2000). *Health assessment: A nursing approach*. Philadelphia: Lippincott.
- Funder, D. (1987). Errors and mistakes: Evaluating the accuracy of social judgement. *Psychological Bulletin*, *101*(1), 75-90.
- Gale, J. (1982). Some cognitive components of the diagnostic thinking process. *British Journal of Educational Psychology*, *52*, 64-76.
- Gallop, R. (1985). The patient is splitting: Everyone knows and nothing changes. *Journal of Psychosocial Nursing*, *23*(4), 6-10.
- Gardner, G. (1996). The nurse researcher: An added dimension to qualitative research methodology. *Nursing Inquiry*, *3*, 153-158.
- Gardner, H. (1985). *The mind's new science: A history of the cognitive revolution*, New York: Basic Books.
- Gilbert, D.T. (1989). Thinking lightly about others: Automatic components of social inference process. In J.S. Uleman, & J.A. Bargh (Eds.), *Unintended thought: Causes and consequences for judgment, emotion and behavior*, New York: Guilford.
- Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory*, Chicago: Aldine.
- Glaser, B.G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. (1992). *Emergence vs. forcing: Basics of grounded theory analysis*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. (1998). *Doing grounded theory: Issues and discussions*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. (1999). The future of grounded theory. *Qualitative Health Research*,

9(6), 836-845.

- Gordon, M. (1980). Predictive strategies in diagnostic tasks. *Nursing Research*, 29(1), 39-45.
- Gordon, M. (1987). *Nursing diagnosis: Process and application*, New York: McGraw-Hill.
- Greene, J. (1990). Three views on the nature and role of knowledge in social science. In E.G. Guba, (ed.) *The paradigm dialogue* (pp.227-245). Thousand Oaks, CA: Sage.
- Greenwood, J. (1998). Establishing an international network on nurses' clinical reasoning. *Journal of Advanced Nursing*, 27(4), 843-847.
- Greenwood, J., & King, M. (1995). Some surprising similarities in the clinical reasoning of 'expert' and 'novice' orthopaedic nurses. *Journal of Advanced Nursing*, 22(5), 907-913.
- Grether, D.M. (1980). Bayes rule as a descriptive model: the representative heuristic. *The Quarterly Journal of Economics*, 95, 537-557.
- Grier, M.R. (1976). Decision making about patient care. *Nursing Research*, 25(2), 105-110.
- Groen, G.J. & Patel, V.L. (1985). Medical problem-solving: Some questionable assumptions. *Medical Education*, 19,95-100.
- Guba, E.G. (1990). The alternative paradigm dialogue. In E.G. Cuba (Ed.). *The paradigm dialogue* (pp.17-27). London: Sage.
- Haffer, A.G. (1990). Beginning nurses' diagnostic reasoning behaviours derived from observation and verbal protocol analysis. *EdD Thesis*, Ann Arbor: UMI.
- Hallett, C.E., Austin, L., Caress, A., & Luker, K.A. (2000). Wound care in the community setting: Clinical decision making in context. *Journal of Advanced Nursing*, 31(4), 783-793.
- Hamers, J.P.H., Huijjer Abu-Saad, H., & Halfens, R.J.G. (1994). Diagnostic process and decision making in nursing: A literature review. *Journal of Professional Nursing*, 10(3), 154-163.
- Hamers, J.P.H., Huijjer Abu-Saad, H., Halfens, R.J.G., & Schumacher, J.N.M. (1994). Factors influencing nurses' pain assessment and interventions in children. *Journal of Advanced Nursing*, 20, 853-860.
- Hammersley, M., & Atkinson, P. (1983). *Ethnography: Principles in practice*, London: Tavistock Publications.

- Hammond, K.R. (1966). Clinical inference in nursing: A psychologist's viewpoint. *Nursing Research, 15*(1), 27-38.
- Hammond, K., Kelly, K., Scheider, R., & Vancini, M. (1967). Clinical inference in nursing: Revising judgements. *Nursing Research, 16*, 38-45.
- Haralambos, M., & Holborn, M. (1990) *Sociology: Themes and perspectives*, (3<sup>rd</sup> ed.). London: Unwin Hyman.
- Harbison, J. (1991). Clinical decision making in nursing. *Journal of Advanced Nursing, 16*, 404-407.
- Harbison, J. (2001). Clinical decision making in nursing: theoretical perspectives and their relevance to practice. *Journal of Advanced Nursing, 35*(1) 126-133.
- Hartman, C.R. (1995). The nurse-patient relationship and victims of violence. *Scholarly Inquiry for Nursing Practice, 9*(2). 175-192.
- Heimann, P. (1950). On counter-transference. *International Journal of psycho-Analysis, 31*, 81-84.
- Heintzman, M., Leather, D.G., Parrott, R.K., & Cairns, I.I.I.A.B. (1993). Nonverbal rapport-building behaviors' effect on perceptions of a supervisor. *Management Communication Quarterly, 7*(2), 181-208.
- Henderson, S. (1997). Knowing the patient and the impact on patient participation: A grounded theory study. *International Journal of Nursing Practice, 3*, 111-118.
- Hogarth, R. (1981). Beyond discrete biases: functional and dysfunctional aspects of judgmental heuristics. *Psychological Bulletin, 90*, 197-217.
- Holden, R.J. (1990). Models, muddles and medicine. *International Journal of Nursing Studies, 27*(3), 223-234.
- Hommod, K.R. (1971). Computer graphics as an aid to learning, *Science, 172*, 903-908.
- Hommod, K.R., Kelly, K.J., Schneider, R.J., & Vancini, M. (1967). Clinical inference in nursing: revising judgment. *Nursing Research, 16*(1), 38-45.
- Hughes, K., & Young, W. (1990). The relationship between task complexity and decision making consistency. *Research in Nursing and Health, 13*, 189-197.
- Hutchinson, S. (1986). Grounded theory: The method. In P. Munhall & C. Oiler (Eds.), *Nursing research: A qualitative perspective* (pp. 111-129). Connecticut: Appleton-Century Crofts.
- Itano, J. (1989). A comparison of the clinical judgment process in experienced registered nurses and student nurses. *Journal of Nursing Education, 28*(3).

120-126.

- Jacavene, J., & Dostal, M. (1992). A descriptive study of nursing judgement in the assessment and management of cardiac pain. *Advances in Nursing Science*, *15*(1), 54-63.
- Jarrett, N.J., & Payne, S.A. (2000). Creating and maintaining 'optimism' in cancer care communication. *International Journal of Nursing Studies*, *37*(1), 81-90.
- Jenks, J.M. (1993). The pattern of personal knowing in nurse clinical decision making. *Journal of Nurse Education*, *32*(9), 399-405.
- Jenkins, H.M. (1985). A research tool for measuring perception of clinical decision making. *Journal of Professional Nursing*, *1*(4), 221-229.
- Jenny, J., & Logan, J. (1992). Knowing the patient: One aspect of clinical knowledge. *Image: Journal of Nursing Scholarship*, *24*(4), 254-258.
- Joe, G.W., & Simpson, D.D. (1998). Effects of readiness for drug abuse treatment on client retention and assessment of process. *Addiction*, *93*(8), 1177-1191.
- Johnson, R. (1993). Nurse practitioner-patient discourse: uncovering the voice of nursing in primary care practice. *Scholarly Inquiry for Nursing Practice: An International Journal*, *7*, 143-157.
- Jones, J.A. (1988). Clinical reasoning in nursing. *Journal of Advanced Nursing*, *13*, 185-192.
- Jones, M.A. (1992). Clinical reasoning in manual therapy. *Physical Therapy*, *72*, 875-884.
- Jones, R.A.P. (1995) Process and models. In R.A.P. Jones, & S.E. Beck (Eds.), *Decision making in nursing* (pp. 3-24). London: Delmar Publisher.
- Joseph, G.M. & Patel, V.L. (1990). Domain knowledge and hypothesis generation in diagnostic reasoning. *Medical Decision Making*, *10*(1), 31-44.
- Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representative. *Cognitive Psychology*, *3*, 430-454.
- Kasch, C.R. (1986). Interpersonal competence and communication in the delivery of nursing care. *Advances in Nursing Science*, *6*(2), 71-88.
- Kassirer, J.P. (1989). Diagnostic reasoning. *Annals of Internal Medicine*, *10*(11), 893-900.
- Kassirer, J.P., & Gorry, A. (1978). Clinical problem solving. *Annals of Internal Medicine*, *89*(2), 245-255.

- Kassirer, J.P., & Kopelman, R.L. (1991). *Learning clinical reasoning*, Baltimore: Williams & Williams.
- Kearney, M.H. (1998). Ready-to-wear: Discovering grounded formal theory. *Research in Nursing & Health*, 21, 179-186.
- Kelly, G.A. (1963). *The theory of personality: The psychology of personal constructs*, New York: Norton.
- Kendall, J. (1999). Axial coding and grounded theory controversy. *Western Journal of Nursing Research*, 21(6), 743-757.
- Keri, S., & Francis, B. (1997). Understanding grounded theory: Principles and evaluation. *Nurse Researcher*, 4(3), 17-30.
- King, L., & Macleod Clark, J. (2001) Intuition and the development of expertise in surgical ward and intensive care nurses. *Journal of Advanced Nursing*, 37(4), 322-329.
- Kirk, J., & Miller, M.L. (1986). *Reliability and validity in qualitative research*, Beverley Hills: Sage Publications.
- Kirschenbaum, S.S. (1992). Influence of experience on information-gathering strategies. *Journal of Applied Psychology*, 77(3), 343-352.
- Kloes, K.B., & Weinberg, A. (1968). Countertransference: a bilateral phenomenon in the learning model. *Perspectives in Psychiatric Care*, 6(4), 153-163.
- Kozier, B., Erb, G. & Blais, K. (1997). *Professional Nursing Practice: Concepts and perspectives*, New York: Addison-Wesley.
- Kushniruk, A.W., Patel, V.L., & Marley, A.A. (1998). Small worlds and medical expertise: Implications for medical cognition and knowledge engineering. *International Journal of Medical Informatics*, 49(3), 255-271.
- Lange, L.L., Haak, S.W., Lincoln, M.J., Thompson, C.B., Turner, C.W., Weir, C., Foerster, V., Nilasena, D., & Reeves, R. (1997). Use of Iliad to improve diagnostic performance of nurse practitioner students. *Journal of Nursing Education*, 36(1), 36-45.
- Lauri, S., & Salanterä, S. (1995). Decision making models of Finnish nurses and public health nurses. *Journal of Advanced Nursing*, 21, 520-527.
- Lawler, J. (1991). *Behind the screens: Nursing, sociology and the problem of the body*, London: Churchill Livingstone.
- Layder, D. (1989). The macro-micro distinction, social relations, and methodological bracketing. *Current Perspectives in Social Theory*, 9, 123-141.

- Leddy, S., & Pepper, J.M. (1993). *Conceptual bases of professional nursing*, Philadelphia: J.B. Lippincott.
- Leininger, M.M. (1985). *Qualitative research methods in nursing*, Orlando: Grune & Stratton.
- Lilford, R.J., Pauker, S.G., Braunholtz, D.A., & Chard, J. (1998). Decision analysis and the implementation of research findings. *British Medical Journal*, 317, 405-409.
- Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage.
- Lincoln, Y.S., & Guba, E.G. (2000). Paradigmatic controversies, contradictions, and emerging confluences. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (pp.163-188). Thousand Oaks, CA: Sage.
- Long, T.A., & Gomberg, S.M. (1995). Critical care. In R. Jones, & S. Beck (Eds.), *Decision Making in Nursing* (pp. 225-241). London: Delmar Publishers.
- Lowenberg, J.S. (1994). The nurse-patient relationship reconsidered: an expanded research agenda. *Scholarly Inquiry for Nursing Practice: An International Journal*, 8(2), 167-183.
- Loye, D. (1983). *The sphinx and the rainbow*, Shambhala: New Science Library.
- Luker, K.A., Hogg, C., Austin, L., Ferguson, B., & Smith, K. (1998). Decision making: The context of nurse prescribing. *Journal of Advanced Nursing*, 27, 657-665.
- MacDonald, M. (2001). Finding a critical perspective in grounded theory. In R.S. Schreiber, & P.N. Stern (Eds.), *Using grounded theory in nursing* (pp. 113-157). New York: Springer.
- Mack, E. (1996). The effect of cultural factors. In R. Jones, & S. Beck (Eds.), *Decision Making in Nursing* (pp. 87-96). London: Delmar Publishers.
- Macleod, M. (1993). On knowing the patient: experiences of nurses undertaking care. In A. Radley (Ed.), *Worlds of illness: Biographical and cultural perspectives on health and disease* (pp. 179-197). London: Routledge.
- Macleod, M. (1994). "It's the little things that count": The hidden complexity of nursing practice. *Journal of Clinical Nursing*, 3, 361-368.
- Maloni, J., Stegman, C., Taylor, P., & Brownell, C. (1986). Validation of infant behavior by neonatal nurse. *Nursing Research*, 35, 133-138.
- Marriner, A. (1983). *The nursing process: A scientific approach to nursing care*, St Louis: C.V. Mosby.

- Marshall, J. (1977). Assessment of problem-solving ability. *Medication Education*, 11(5), 329-314.
- Martin, K. (1998). *When a baby dies of AIDS: The parents' grief and search for reason*, Alberta: Qualitative Institute Press
- Matthew, C., & Gaul, N. (1979). Examining the cognitive process utilized in nursing diagnosis. *Advances in Nursing Science*, 2(1), 17-26.
- Mays, N., & Pope, P. (2000). Qualitative research in health care: Assessing quality in qualitative research. *British Medical Journal*, 320, 50-52.
- McCormack, B. (1993). Intuition: Concept and analysis and application to curriculum development. *Journal of Advanced Nursing*, 2, 11-17.
- McCutcheon, H.H.I., & Pincombe, J. (2000). Intuition: An important tool in the practice of nursing, *Journal of Advanced Nursing*, 35(3), 342-348.
- McFadden, E.A., & Gunnett, A.E. (1992). A study of diagnostic reasoning in pediatric nurses. *Pediatric Nursing*, 18(5), 517-538.
- McGuire, C.H. (1985). Medical-problem-solving: a critique of the literature. *Journal of Medical Education*, 60, 587-595.
- McLaughlin, F.E., Cesa, J., Johnson, H., Lemons, M., Anderson, S, Larson, P., & Gibson, J. (1979). Nurses' and physicians' performance on clinical simulation test: hypertension. *Research in Nursing and Health*, 2, 61-72.
- Mead, G.H. (1962). *Mind, self, and society*, Chicago: University of Chicago Press.
- Meerabeau, L. (1992). Tacit nursing knowledge: An untapped resource or a methodological headache? *Journal of Advanced Nursing*, 17, 108-112.
- Melia, K.M. (1982). Tell it as it is: the qualitative methodology and nursing research: Understanding the student nurses' world. *Journal of Advanced Nursing*, 7, 327-335.
- Melia, K.M. (1987). *Learning and working: The occupational socialization of nurses*, London: Tavistock.
- Meltzer, B.N., & Herman, N.J. (1990). Epilogue: Human emotion, social structure and symbolic interactionism. In L.T. Reynolds (Ed.), *Interactionism: Exposition and critique*. (2<sup>nd</sup> ed., pp.181-225). Dix Hills, N.Y.: General Hall, Inc.
- Miller, M., & Babcock, D. (1996). *Critical thinking applied to nursing*, St. Louis: Mosby.
- Minick, P. (1995). The power of human caring: Early recognition of patient problems.

- Scholarly Inquiry for Nursing Practice: An International Journal*, 9(4), 303-321).
- Mishel, M. (1988). Uncertainty in illness. *Image: Journal of Nursing Scholarship*, 20, 225.
- Mitchell, P.H. (1984). Diagnostic reasoning in the critical care setting. In D.L. Carnevali, P.H. Mitchell, N.F. Woods, & C.A. Tanner (Eds.), *Diagnostic reasoning in nursing*, (pp. 105-106, 175-178). Philadelphia: J.B. Lippincott.
- Moreira, A.S.P., Fodrigues, A.R.F., & Coler, M.S. (1997). A model for analysis of the nurse-patient interactive process (MAIP). *Journal of Psychiatric and Mental Health Nursing*, 4, 303-306.
- Morse, J.M. (1994). Emerging from the data: The cognitive process of analysis in qualitative inquiry. In J.M. Morse (Ed.), *Critical issues in qualitative research methods* (pp.23-43). Thousand Oaks, CA: Sage.
- Morse, J.M. (1997). Considering theory derived from qualitative research. In J.M. Morse (Ed.), *Completing a qualitative project: Details and dialogue* (pp.163-189). Thousand Oaks, CA: Sage.
- Morse, J.M. (2001). Situating grounded theory within qualitative inquiry. In R.S. Schreiber, & P.N. Stern (Eds.), *Using grounded theory in nursing* (pp. 1-15). New York: Springer.
- Morse, J.M., & Field, P.A. (1996). *Nursing research – The application of qualitative approaches*, London: Chapman & Hall.
- Morse, J.M., Havens, G.A.D., & Wilson, S. (1997). The comforting interaction: developing a model of nurse-patient relationship. *Scholarly Inquiry for Nursing Practice: An International Journal*, 11(4), 321-343.
- Moser, C.A. (1958). *Survey methods in social investigation*, London: Heinemann.
- Moustakas, C. (1990). *Heuristic research: Design, methodology, and applications*, Newbury Park: Sage Publications.
- Muha, C., & Smith, K.S. (1998). The use and selection of sources in information seeking. *Journal of Health Communication*, 3, 109-120.
- Mullen, P.D. (1986). Generating grounded theory. *International Quarterly of Community Health Education*, 6(3), 177-214.
- Muller, A., & Poggenpoel, M. (1996). Patients' internal world experiences of interacting with psychiatric nurses. *Archives of Psychiatric Nursing*, X, 143-150.
- Mumford, E. (1970). *Interns: From students to physicians*, Massachusetts: Harvard

University Press.

- Munhall, P.L., & Oiler, C.J. (1986). *Nursing research: Qualitative perspective*, Norwalk: Appleton-Century-Crofts.
- Munhall, P.L. (1998). Qualitative research. In P.J. Brink, & M.J. Wood (Eds.), *Advanced design in nursing research* (pp.335-355). Thousand Oaks, CA: Sage.
- Murphy, G., & Friedman, C. (1996). Differences in knowledge representations of experienced and inexperienced clinicians as captured by repertory grids. *Academic Medicine*, 71(1-January Supplements), S16-S18.
- Murray, N., Sujan, H., Hirt, E.R., & Sujan, M. (1990). The influence of mood on categorization: A cognitive flexibility interpretation. *Journal of Personality and Social Psychology*, 59, 411-425.
- Narayan, S.M., & Corcoran-Perry, S. (1997). Line of reasoning as a representation of nurses' clinical decision making. *Research in Nursing and Health*, 20, 353-364.
- Navin, P.M. (1991). *How Experienced Nurses Gather and Use Data*, Michigan: UMI Dissertation Services.
- Nazareth, I., & King, M. (1993). Decision making by general practitioners in diagnosis and management of lower urinary tract symptoms in women. *British Medical Journal*, 306, 1103-1106.
- Newell, A. & Simon, H.A. (1972). *Human problem solving*, Englewood Cliffs: Prentice-Hall.
- Nichols, R. (1993). Nursing interventions. In H. Wright, & M. Giddey (Eds.), *Mental health nursing* (pp. 205-208). London: Stanley Thorne Ltd.
- Offredy, M. (1998). The application of decision making concepts by nurse practitioners in general practice. *Journal of Advanced Nursing*, 28(5). 988-1000.
- O' Kelly, G. (1998). Countertransference in the nurse-patient relationship: a review of the literature. *Journal of Advanced Nursing*, 28(2), 391-397.
- Orme, L., & Maggs, C. (1993). Decision-making in clinical practice: how do expert nurse, midwives and health visitors and make decisions? *Nurse Education Today*, 13, 270-276.
- Osso, M. B. (1995). *Knowing the patient: A process of pattern recognition*, Michigan: UMI Dissertation Services.
- O' Toole, A.W., O' Toole, R, Webster, S.W., & Lucal, B. (1996). Nurses' diagnostic

- work on possible physical child abuse. *Public Health Nursing*, 13(5), 337-344.
- Orme, L., & Maggs, C. (1993). Decision making in clinical practice: How do expert nurses, midwives and health visitors make decisions? *Nurse Education Today*, 13, 270-276.
- Padrick, K. (1990). Clinical decision making in nursing: a comparison of simulations and practice situations. *Dissertation Abstracts International*, B 50/10, 4455.
- Panniers, T.L., & Kellogg-Walker, E. (1994). A decision analytic approach to clinical nursing. *Nursing Research*, 43(4), 245-249.
- Papineau, D. (1996). The philosophy of science. In N. Bunnin, & E.P. Tsui-James (Eds.), *The Blackwell companion to philosophy* (pp. 290-325). Oxford: Blackwell.
- Parker, J., & Gardner, G. (1991). The silence and the silencing of the nurse's voice: a reading of patient's progress notes. *Australian Journal of Advanced Nursing*, 9, 3-9.
- Parker, C.B., Minick, P., & Kee, C.C. (1999). Clinical decision making processes in perioperative nursing. *AORN Journal*, 70, 45-62.
- Parse, R.R. (1996). Building knowledge through qualitative research: The road less travelled. *Nursing Science Quarterly*, 9(1), 10-16.
- Paterson, J., & Zderard, L. (1988). *Humanistic nursing*, New York: National League for Nursing.
- Patton, M.Q. (1990). *Nursing research: Principles and methods*, New York: JB Lippincott.
- Pennington, D.C. (2000). *Social cognition*, London: Routledge.
- Peplau, H. (1951). *Interpersonal relations in nursing*, New York: G.P. Putman's Sons.
- Polanyi, M. (1983). *The tacit dimension*, Gloucester, M.A.: Peter Smith.
- Polit, D.F., & Hungler, B.P. (1995). *Nursing Research: principle and methods*, (5th edn.). Philadelphia: J.B. Lippincott.
- Polit, D.F., & Hungler, B.P. (1999). *Nursing research: Principles and methods*, (6<sup>th</sup> edn.). New York: JB Lippincott.
- Polge, J. (1995). Critical thinking: The use of intuition in making clinical nursing judgments. *Journal of the New York State Nurses Association*, 26(2), 4-9.
- Pyles, S.H., & Stern, P.N. (1983). Discovery of nursing gestalt in critical care nursing:

- The importance of the Gray Gorilla Syndrome. *Journal of Nursing Scholarship*, 15(2), 51-57.
- Radwin, L.E. (1989). Cues and strategies used in the diagnosis of pain conditions. In R. Carroll-Johnson (Ed.), *Classification of nursing diagnosis: Proceedings of the eighth national conference* (pp. 381-390). Philadelphia: Lippincott.
- Radwin, L.E. (1990). Research on diagnosis in nursing. *Nursing Diagnosis*, 1, 70-77.
- Radwin, L.E. (1995). Knowing the patient: A process model for individualized interventions. *Nursing Research*, 44, 364-370.
- Radwin, L.E. (1998). Empirically generated attributes of experience in nursing. *Journal of Advanced Nursing*, 27, 590-595.
- Rew, L. (1988). Intuition in decision making. *IMAGE: Journal of Nursing Scholarship*, 20(3), 150-153.
- Rew, L. (2000). Acknowledging intuition in clinical decision making. *Journal of Holistic Nursing*, 18(2), 94-108.
- Rew, L., & Barrow, E.M. (1987). Intuition: A neglected hallmark of nursing knowledge. *Advances in Nursing Science*, 10(1), 49-62.
- Reynolds, L.T. (1993). *Interactionism: Exposition and critique* (3<sup>rd</sup> ed.). Dix Hills, N.Y.: General Hall, Inc.
- Richmond, I., & Roberson, E. (1995). The customer is always right: Patients' perceptions of psychiatric nursing action. *Journal of Nursing Care Quality*, 9, 36-43.
- Richardson, L. (2000). Writing: A method of inquiry. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of qualitative Research* (pp.923-948). Thousand Oaks, CA: Sage.
- Ricolfi, L. (1997). *La ricerca qualitativa*. Rome: NIS.
- Riessman, C.K. (1990). *Divorce talk: Women and men make sense of personal relationships*. New Brunswick, NJ: Rutgers University Press.
- Roberts, S.J., & Krouse, H.J. (1995). Negotiated and nonnegotiated nurse-patient interactions. *Clinical Nursing Research*, 4(1), 67-77.
- Roberts, J., While, A., & Fitzpatrick, J. (1995). Information-seeking strategies and data utilization: Theory and practice. *International Journal of Nursing Studies*, 32(6). 601-611.
- Roberts, J., While, A.E., & Fitzpatrick, J. (1996). Exploring the process of data acquisition: Methodological challenges encountered and strategies employed.

*Journal of Advanced Nursing*, 23(2), 366-372.

- Robrecht, L. (1995). Grounded theory: evolving methods. *Qualitative Health Research*, 5(2), 169-177.
- Rogers, C. (1986). Carl Rogers on the development of the person-centered approach. *Person-Centered Review*, 1(3), 257-259.
- Rogers, J.C., & Holm, M.B. (1991). Occupational therapy diagnostic reasoning: A component of clinical reasoning. *The American Journal of Occupational Therapy*, 45(11), 1045-1053.
- Routasalo, P. (1996). Non-necessary touch in the nursing care of elderly people. *Journal of Advanced Nursing*, 23, 904-911.
- Sandelowski, M. (1994). We are the stories we tell: narrative knowing in nursing practice. *Journal of Holistic Nursing*, 12, 23-33.
- Schrader, B.D., & Fishcer, D.K. (1987). Using intuitive knowledge in neonatal intensive care nursery. *Holistic Nursing Practice*, 1(3), 45-51.
- Schreiber, R.S. (2001). The "how to" of grounded theory: Avoiding the pitfalls. In R.S. Schreiber, & P.N. Stern (Eds.), *Using grounded theory in nursing* (pp. 55-84). New York: Springer.
- Schreiber, R.S., & Stern, P.N. (2001). Introduction. In R.S. Schreiber, & P.N. Stern (Eds.), *Using grounded theory in nursing* (pp. xvi-xviii). New York: Springer.
- Schroder, P.J. (1985). Recognizing transference and countertransference. *Journal of Psychosocial Nursing*, 23(2), 21-26.
- Schwandt. T.A. (1998). Constructivist, interpretivist approaches to human inquiry. In N.K. Denzin, & Y.S. Lincoln (Eds.), *The landscape of qualitative research* (pp.221-259). London: Sage.
- Schwandt. T.A. (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (pp.189-214). Thousand Oaks, CA: Sage.
- Schwartz, H., & Jacobs, J. (1979). *Qualitative sociology: A method to the madness*. New York: the Free Press.
- Schwartz, H., & Strauss, A.L. (1973). *Field research: Strategies for a natural sociology*, New Jersey: Prentice-Hall.
- Schwartz, W.B., Gorry, G.A., Kassirer, J.P., & Essig, A. (1973). Decision analysis and clinical judgment. *The American Journal of Medicine*, 55, 459-472.

- Scriven, M. (1979). Clinical judgment. In H.T. Engelhardt, S.F. Spicker, & B. Towers (Eds.), *Clinical Judgment: a critical appraisal*. (pp. 3-16). Dordrech: D. Reidel.
- Shamian, J. (1991). Effect of teaching decision analysis on student nurses' clinical intervention decision making. *Research in Nursing and Health*, 14, 59-66.
- Smith, K.F., & Biley, F. (1997). Understanding grounded theory: Principles and evaluation. *Nurse Researcher*, 4(3), 17-30.
- Star, S.L. (1998). Grounded classification: Grounded theory and faceted classification. *Library Trends*, 47(2), 218-232.
- Stern, P.N. (1980). Grounded theory methodology: Its uses and processes. *Image*, 12(1), 20-23.
- Stern, P.N. (1985). Using grounded theory method in nursing research. In M. Leininger (Ed.), *Qualitative Research Methods in Nursing* (pp.149-161). New York: Grune and Stratton.
- Stern, P.N. (1994). Eroding grounded theory. In J.M. Morse (Ed.), *Critical issues in qualitative research methods* (pp. 212-223). Thousand Oaks, CA: Sage.
- Stern, P.N. (1996). Conceptualizing women's health: Discovering the dimensions. *Qualitative Health Research*, 6, 152-161.
- Strauss, A.L. (1987). *Qualitative analysis for social scientists*, Cambridge: Cambridge University Press.
- Straus, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. London: Sage.
- Strauss, A., & Corbin, J. (1994). Grounded theory methodology: An overview. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp.273-285). Thousand Oaks, CA: Sage.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*, New York: Cambridge University Press.
- Suppes, P. (1979). The logic of clinical judgment: Bayesian and other approaches. In H.T. Engelhardt, S.F. Spicker, & B. Towers (Eds.), *Clinical judgment: A critical appraisal* (pp. 145-159). Cambridge: Cambridge University Press.
- Swallow, S., & Fox, M. (1996). Investor psychology in New Zealand. *New Zealand Journal of Psychology*, 25(1), 21-23.
- Sweeney, M.A., & Olivier, P. (1981). *An introduction to nursing research*, New York: JB Lippincott.

- Tanner, C.A. (1982). Instruction on the diagnostic process: an experimental study. In M.J. Kim, & D.A. Mortiz (Eds.), *Classification of Nursing Diagnosis* (pp. 145-152). New York: McGrawhill.
- Tanner, C.A. (1984). Factors influencing the diagnostic process. In D.L. Carnevali, P.H. Mitchell, N.F. Woods, & C.A. Tanner (Eds.), *Diagnostic reasoning in nursing* (pp. 61-81). Philadelphia: J.B. Lippincott.
- Tanner, C.A. (1987). Teaching clinical judgment. In J.J. Fitzpatrick, & R.L. Taunton (Eds.), *Annual Review of Nursing Research* (pp. 153-173). New York: Springer.
- Tanner, C., Benner, P., Chesla, C., & Gordon, D. (1993). The phenomenology of knowing the patient. *IMAGE: Journal of Nursing Scholarship*, 25, 273-280.
- Tanner, C.A., Padrick, K.P., Westfall, U.E., & Putzier, D.J. (1987). Diagnostic reasoning strategies of nurses and nursing students. *Nursing Research*, 36(6), 358-363.
- Taylor, B. (1994). *Being human: Ordinaries in nursing*, London: Churchill Livingstone.
- Taylor, C. (1997). Problem solving in clinical nursing practice. *Journal of Advanced Nursing*, 26, 329-336.
- Thompson, C. (1999). A conceptual Treadmill: The need for 'middle ground' in clinical decision making theory in nursing. *Journal of Advanced Nursing*, 30(5), 1222-1229.
- Thomas, S., Wearing, A., & Bennett, M. (1991). *Clinical decision-making for nurses and health professional*, Philadelphia: W.B. Saunders.
- Tichenor, C.J., Davidson, J., & Jensen, G. (1995). Cases as shared inquiry: Model for clinical reasoning. *Journal of Physical Therapy Education*, 9(2), 57-62.
- Triplet, R.G. (1992). Discriminatory biases in the perception of illness: The application of availability and representativeness heuristics to the AIDS crisis. *Basic and Applied Social Psychology*, 13, 303-322.
- Trow, M. (1957). Comment on participant observation and interview: A comparison. *Human Organization*, 16(3), 33.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 85, 1124-1131.
- Walker, R. (1985). *Applied qualitative research*, London: Gower.
- Warner, H.R., Toronto, A.F., & Veasy, L.G. (1964). Experience with Bayes'

- theorem for computer diagnosis of congenital heart disease. *Annals of the New York Academy of Science*, 115, 558-567.
- Waston, W.H. (1975). The meanings of touch: geriatric nursing, *Journal of Communication*, 25(3), 104-112.
- Watson, J. (1988). *Nursing: Human science and human care. A theory of nursing*, New York: National League for Nursing.
- Waston, S. (1994). An exploratory study into a methodology for the examination of decision making by nurses in the clinical area. *Journal of Advanced Nursing*, 20, 351-360.
- Webb, C. (1992). Nursing diagnosis. *Nursing Times*, 88(7), 33-34.
- Webb, S., & Lloyd, M. (1994). Prescribing and referral in general practice: a study of patients' expectations and doctors' actions. *British Journal of General Practice*, 44, 165-169.
- Westfall, V.E., Tanner, C., Putzier, D., & Padrick, K.P. (1986). Activating clinical inferences: A component of diagnostic reasoning in nursing. *Research in Nursing and Health*, 9, 269-277.
- White, J.E., Nativio, D.G. Kobert, S.N., & Engberg, S.J. (1992). Content and process in clinical decision making by nurse practitioners. *IMAGE: Journal of Nursing Scholarship*, 24(2), 153-158.
- Wilson, H., & Hutchinson, S. (1996). Methodologic mistakes in grounded theory. *Nursing Research*, 45, 122-124.
- Winnicott, D.W. (1960). Countertransference. *British Journal of Medical Psychology*, 33, 17-21.
- Wolf, F.M., Cruppen, L.D., & Billi, J.E. (1988). Defferential diagnosis and the competing-hypothesis heuristic: A practical approach to judgment under uncertainty and Bayesian probability. In J.A. Dowie, & A.S. Elstein (Eds.), *Professional judgment: A reader in clinical decision making*, (pp. 349-359). Milton Keynes: Open University Press.
- Wojciszke, B. (1994). Inferring interpersonal attitudes: Hypotheses and the information-gathering process. *European Journal of Social Psychology*, 24(3), 383-401.
- Wong, T. (1994). Clinical decision making - a case of theory and practice gap. *Proceedings of the First South-east Asian Nursing Research Conference*, 55-60.
- Woolley, N. (1990). Nursing diagnosis: Exploring the factors which influence the reasoning process. *Journal of Advanced Nursing*, 15, 110-117.

- Wuest, J. (2000). Negotiating with helping systems: An example of grounded theory evolving through emergent fit. *Qualitative Health Research*, 10(1), 51-70.
- Yeun, F.K.H. (1986). The nurse-client relationship: a mutual learning experience. *Journal of Advanced Nursing*, 11(4). 529-533.
- Young, C. (1987). Intuition and nursing process, *Holistic Nursing Practice*, 1(3), 52-62.