

# Assessment of the needs of student nurses regarding critical thinking in nursing practice

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## Abstract

This study involved a quantitative, quasi-experimental and contextual design. The target population for this phase was senior student nurses registered at the University of Namibia, in their fourth year of nursing studies in the training hospitals of Windhoek and Oshakati. A total of 46 fourth-year nursing students, registered at the Faculty of Medical and Health Sciences in the Department of Nursing, were included for phase 1 except for the two students who took part in the pilot study. The students were from both campuses, namely the Windhoek and Oshakati campuses, doing the four-year Diploma in Comprehensive Nursing curriculum, which incorporates the principles of critical thinking. An imaginary case scenario was developed for students to analyse and answer some relevant questions to enable the researcher to determine the level of understanding and integration of critical thinking. In this study each student's answers were deductively analysed by calculating central values, more specifically the mean for each question, to determine their application of critical thinking skills in the management of a nursing problem.

The researcher has, with literature support, arrived at "umbrella" concepts, namely the most important concepts that nurses in Namibia need and without which they cannot practice. These umbrella concepts are to be included in the educational programme.

**Keywords:** Assessment; Needs; Critical Thinking and Nursing Practice.

## 1. Introduction

The concept of critical thinking has been defined by different people over the years and yet it has never been possible to produce a single definition. The expression "critical thinking" has become so popular that people who are unable to agree on most of the important things in life are likely to claim that they think critically (Carroll, 2007, p.1). Critical thinking has been covered by a wide array of disciplines that cited specific reasons why critical thinking was important within their field, and still it is difficult to come up with a single definition for critical thinking. The ability to think critically has been identified by researchers, both past and present, as a skill that is reflective of higher order thinking (Thurmond, 2001, p.377; Hagerman, 2004, p.1).

It is, however, necessary to emphasize that critical thinking in day-to-day activities cannot be thought of as something that seeks out perfect solutions but rather as a process and mental orientation that includes cognitive and affective domains of reasoning. Critical thinking in daily activities is thinking with a purpose, and with skill and confidence. It is also about paying careful attention to what we hear and read so that we can understand and respond appropriately. As critical thinkers we are not striving to become unfeeling or emotionless people, but rather to make judgments in which our feelings and emotions are properly expressed (Jones, 2001, p. 2; Simpson & Courtney, 2002, p. 93; Salmon, 2002, p. 2; Brown & Rutter, 2004, p. 3; Howard College, 2006, p. 1).

Critical thinking means that we take nothing for granted, but rather ask questions so that we become informed about situations around us and are willing to examine conflicting positions in a fair-minded way and accept that even beliefs that we have held all

our lives might be wrong! Once an individual has used the critical thinking process in one area of life or work, it is more likely that the same individual will apply the process in other domains (Robinson, 1998, p.3; Potter & Perry, 1999, p. 65; Carroll, 2007, p. 2 ). Makathini (1992, p.24) has described an ability to think critically as an antecedent to problem solving. Furthermore, critical thinking is regarded as a practical activity that helps learners develop a broad understanding of situations that are meaningful to them (Mpaka & Uys, 1999, p.16). Buchanan (n.d., p.1) describes the term "critical thinking" as intimidating, but concludes by saying that critical thinking, by definition, is "what you generate, is what you know".

During a quantitative study conducted by Facione (1990, p. 4) 46 critical thinking experts participated in a Delphi study. Critical thinking was then conceptualized in terms of cognitive skills and affective dispositions. Consensus have been reached that critical thinking is purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference, explanation as well as self-regulation. The author also indicated that the critical thinker is habitually inquisitive, well-informed, trustful in reason, openminded, flexible, fair minded in evaluation, honest in facing personal biases, prudent in making decisions and willing to reconsider. The critical thinker is also reasonable in selection of criteria, keep focused on criteria and remain persistent in seeking results. Nurturing the developing of critical thinking encompasses the six core critical thinking concepts as well as the sub skills that serve as support to the main concepts (Facione 1990, p.6).

A clear and accurate conceptualization of these concepts is necessary for the development of effective instructional programmes. In this study, the six core critical thinking concepts and its sub skills have been conceptualized in Chapter 5. It also served as the foun-

dation to the educational programme that was developed in phase 3 of the study.

Though the panel strove to characterize certain core concepts, the experts did not claim that a person should be proficient in all the core concepts to be perceived as a critical thinker. The panel furthermore considered these concepts as essential to the design and implementation of critical thinking instruction (Facione, 1990, p.16).

In many instances critical thinking is referred to as a process. A process is defined as a series of “things” done in order to achieve a particular result (Hornby, 2005, p. 1157). Firstly, the process of critical thinking refers to the series of thoughts and concepts utilized and employed to think purposefully.

Secondly, critical thinking engages both an attitude of inquiry and a reasoning process involving a number of intellectual skills and other concepts without which the process would not be complete (Alfaro-Le Fevre, 2002, p. 29; Botes, 2000, p.28). Thirdly, the critical thinking process refers to a disciplined, self directed and rational thinking process that certifies what we know and reveals what we are ignorant of. It is also the art of thinking about one’s thinking to make it clearer, precise, accurate, relevant, consistent and fair (Wilkinson, 1996, p. 27; Alfaro-Le Fevre, 2002, p. 29). Fourthly, critical thinkers need an open mind which includes reflective thinking as part of the process and lastly they must be autonomous and responsible for their own decisions (Botes, 2000, p.28).

Although the researcher has demonstrated an understanding of the process of critical thinking, it should be emphasized that the process is complex and not easy to define. The process of critical thinking is viewed differently by authors and may also be described as a process that proceeds in stages. The stages of this process involve the reasoned consideration of evidence, contexts, conceptualizations, methods and criteria. The critical thinker could also find him/herself asking who? why? what if? when? and where? What needs to be emphasized is the interrelatedness of the different concepts employed to meet a desired goal. Moreover, critical thinking is not a step-by-step process but rather a process of continuation where the thinker proceeds to meet the goal set for a certain situation. The order in which the thinker proceeds depends on the nature of the situation (Botes, 2000, p. 27; Lipe & Beasley, 2004, p.3).

The essence of critical thinking in nursing cannot be underestimated. Just as critical thinking is important in addressing everyday problems, it is imperative in nursing practice. Many authors have developed their own description of the phenomenon to suit their own understanding of the concept of critical thinking, equally so in nursing. Critical thinking in nursing requires individuals to process complex data about the client/patient while planning, managing and evaluating patient care in the clinical setting (Longacre, n.d, p. 7). It has furthermore been described as the “balance between framework thinking and flexible viewing of the situation” and as “universally expected behaviour” (Shin, 1998, p. 415) of professional nurses engaged in practice. One area where nurses are expected to perform well is the comprehensive nursing care of a client/patient. This includes promotive, preventive, curative and rehabilitative care (Case, 1998, p. 240; Lindberg et. al., 1998, p. 4).

Caring for a client/patient refers to a highly individualized, complex activity that involves distinct ideas, emotions and perceptions and is therefore an ideal term to explore in the nursing profession. In some of the literature the term “reasoning” is seen as synonymous with the term critical thinking in nursing because nursing care involves active, focused, persistent and purposeful activities, which are performed to address the needs of the client/patient. Reasoning in nursing care involves activities such as choosing the best option to relieve the symptoms of a client/patient or deducing which position would enhance a patient’s breathing where more than one option exists but only the best must be chosen. However, the focus of critical thinking in nursing should remain on how we can improve the patient’s care (Kyzer, 1996, p. 66; Alfaro- LeFevre, 1999, p.8; Alfaro- LeFevre, 2004, p.2).

Caring has been part of society for as long as human beings have existed, from the time when the first person became unwell or injured. Watson (Talento, 1995, p.317) believes that caring for a patient is the most valuable attribute a nurse has to offer to humanity, yet caring has, over a period of time and due to a number of factors like the development of technology, been compromised. However, caring responses accept the whole person not only as he is but also for what he will become. The focus of caring is derived from a humanistic perspective combined with a scientific base to support ill people and help them to reduce their health problems. Nursing is furthermore considered a unique blend of art and science applied within the context of the interpersonal relationship of caring (Talento, 1995, p.317; Wilkinson, 1996, p.4).

Furthermore, nursing concerns human beings in need and refers to the specific body of knowledge necessary to care for the needs of other people. Although the human caring role is under threat from technology and medical advances, the human touch in caring can never be replaced.

In these circumstances, where nurses have to care for clients/patients, they frequently find themselves in very complex situations with many problems which they are responsible for solving. Since caring embraces the whole person in all phases of life, superficial actions and interventions are not sufficient to address these problems. Instead, a nurse is needed who possesses the necessary up-to-date knowledge and skills (Mellish & Paton, 2000, p.3).

Critical thinking seems to be one of these skills which serve as the key to resolving these problems. This makes critical thinking an inseparable part of caring in nursing. Moreover, Reilly and Obermann (1999, p.217) consider critical thinking to be discipline-specific, which implies that nurses may engage in critical thinking differently from philosophers or teachers. If nurses fail to think critically, they become part of the problem instead of the solvers of the problem (Alfaro-LeFevre, 1999, p.4; Mellish & Paton, 2000, p.3).

In their role as problem solvers, nurses work in many different roles and settings that are related either directly or indirectly to client/patient care. Nursing includes the making of judgments and decisions. The providers of clinical care do this when they engage in direct patient care and aspects of their roles outside direct patient care.

Judgment can be influenced by many factors in nursing care. This in turn influences the nurse’s outside role with regard to client/patient care, for example the nurse must consider the family of the client/patient and their feelings.

Therefore, sound critical thinking in the professional domain of nursing is essential to problem solving, clinical reasoning, clinical judgment and decision making and cannot just be switched on occasionally. Much emphasis is placed on the connection between critical thinking and clinical judgment in the clinical setting. Such thinking needs to be nurtured and developed. Critical thinking is essential in this development process to ensure safe, competent, skillful nursing practice (Eichhorn, n.d, p.3; Case, 1998, p. 240; Fonteyn, 1998, p.12; Koziar, Erb, Berman & Snyder, 2004, p. 245; Hoffman & Elwin, 2004, p. 8; ADEA, 2006, p.930).

However, critical thinking can be hampered by the fact that nurses have not escaped the dramatic advances and transformation in health care during the past few years. Some of the changes faced by the nurse are the rapid growth in technology, consumer demand, decreased length of hospitalization, increase in the aging population and increase in complex disease processes while the expectation exists that patients need to be cared for in the best way possible (Simpson & Courtney, 2002, p.90).

To determine the best methods of care is in their everyday practice, nurses are constantly required to make decisions about the care they will deliver to the patients assigned to them. It may be asked how nurses make decisions about care that are effective and appropriate.

If nurses want to face up to and cope with these challenges, they are required to be multi-skilled in higher order thinking and reasoning, to address the challenge of safe, competent and effective

care, and to formulate sound clinical judgments as the basis of safe client care while minimizing clinical errors. Nurses must be able to sift through the wealth of information that is available to them and make judgments that are based on sound reasoning skills (Simpson & Courtney, 2002, p.90; Tiwari, Chan, Sullivan, Dixon & Tang, 2000, p.1; Cronin & Rawlings-Anderson, 2004, p.116).

The development of sound critical thinking will enable the nurse to be clear in any situation in order to reach the best outcome by making the right decisions. It has to be emphasized that if workers (professionals) are good critical thinkers – who can identify, analyze and solve problems in collaboration with one another, this will add value to the workplace (nursing practice). In this regard it has to be emphasized that nursing is an applied discipline, and knowledge is of little use if it has no implication for or impact on practice. It should furthermore be emphasized that the application of thought processes that allow a professional to base accurate decisions in patient care on the deliberate and open-minded review of all available options have become the cornerstone of professional practice (Cronin & Rawlings-Anderson, 2004, p.iv; ADEA, 2006, p.926).

It is therefore clear that decision-making is central to the concept of caring in nursing. This was highlighted by a study conducted by Hoffman and Elwin (2004, p.8) on the relationship between critical thinking and confidence in decision making. They emphasized the fact that nurses continuously have to make decisions while planning and delivering care. The researchers discovered that there may not necessarily be a direct link between confidence and critical thinking. They did, however, recommend that continuous development courses be conducted to raise awareness among nurses of the importance of a questioning attitude to patient care delivery.

### 2.3.2 Critical thinking in nursing care

Nursing is never a superficial, meaningless activity. It involves deeply significant activities that must be carried out by a nurse fully engaged in the practice of nursing. The opinion has often been expressed that critical thinking in nursing is imperative if the demands and challenges of nursing practice are to be met. Brookfield as quoted by Simpson and Courtney (2002, p. 93) proposed however that critical thinking involves not only cognitive skills but also emotions while the critical thinker continuously questions fixed ideas on right and wrong. It was also argued that with increased patient acuity and the movement of patient care to community settings, the demand for nurses who can think critically, reason logically and quickly choose patient care strategies is greater than ever. Therefore, learning to think critically in nursing practice involves expanding a person's thought processes within decision making and professional judgment when gathering and analyzing patient data, and planning and evaluating direct patient care (Case, 1998, p. 240; Sedlak & Doheny, 1998, p. 42).

Other definitions and descriptions of the concept of critical thinking that fit perfectly into the framework of the nursing profession refer to knowing how to learn, creative thinking, generation and evaluation of new ideas and the ability to visualize outcomes. In addition, critical thinking also involves decision making and problem solving in order to find the best way to manage a situation, based on most current research and practice, statements and arguments. Critical thinking in nursing includes the identification of reasons and beliefs on which the nurse can base his or her actions (Bandman & Bandman, 1988, p.1; Reilly & Obermann, 1999, p.217; Alfaro-LeFevre, 1999; p. 8; Alfaro-LeFevre, 2004, p.8).

Although all the above descriptions are applicable to the nursing milieu, over decades authors have agreed that critical thinking refers to the art of thinking about your own thinking while you are thinking. This would enable you to make it better, clearer, more accurate and defensible – to be purposeful and goal directed in this process of problem solving and decision making (Alfaro-LeFevre, 1999, p. 9).

Having said all this, it may well be asked what critical thinking in nursing involves.

In nursing critical thinking is particularly important because of its potential impact on patient care. Critical thinking in nursing entails that purposeful, outcome-directed (results-oriented) thinking

which is driven by the needs of the client/patient, the family and community, and which needs to be addressed by a knowledgeable, skilful and experienced nurse, guided by professional standards and ethical codes. It requires strategies that maximize human potential and compensate for problems created by human nature. Critical thinking becomes the skill no nurse can be without (Alfaro-LeFevre, 1999, p.9; Thurmond, 2001, p. 375).

Hence, while engaging in all the above strategies the critical thinker constantly re-evaluates, and corrects him/herself through practice, while at the same time striving to improve and to avoid mistakes in thinking. This is made possible for the nurse because in nursing critical thinking sharpens self-awareness. However, it requires a concerted effort, a good deal of practice and diligence from the practitioner (Andolina, 2001, p. 3; Bandman & Bandman, 1988, p.1; Alfaro-LeFevre, 1999, p.4; Salmon, 2002, p.6).

Critical thinking in nursing care encompasses cognitive and affective facets that will fit perfectly into the "helping trust relationship" (Talento, 1995, p. 320) which the nurse has to establish while solving the patient's problems and making decisions that may have a lifelong impact on the patient's wellbeing. Allowance for existential phenomenological factors, as in Watson's carative factor 10, allows the nurse to understand people in terms of the way things appear to them, from their frame of reference. This corresponds to the affective dispositions of critical thinking. The researcher is of the opinion that should a nurse apply this part of Watson's theory on caring it would be a very successful integration of critical thinking into caring for the whole person while utilizing the scientific nursing process as discussed in 2.3.3.

Within the context of nursing practice, the clinical setting is the ideal place to develop critical thinking skills as it provides the basis for facilitating the cognitive development that is requisite to individual nursing care. Within the care of the client/patient, critical thinking is the skill that enables a nurse to think a client/patient's case through in order to manage it effectively (Conger & Mezza, 1996, p.11; Sedlak & Ludwick, 1996, p.19).

The researcher is of the opinion that the above understanding and description of the concept of critical thinking in nursing care is ideally suited to the Namibian situation, and imperative in caring for the client/patient. It will enable the nurse in Namibia to "think on her feet" in such a way that problems can be resolved instantly to secure satisfaction for the client/patient within situations that may well be very complex. Since the nurse may find the challenges presented by health care in Namibia demanding owing to the geographical composition of the country, she/he needs to be prepared for any unforeseen circumstances. One of the ways to prepare Namibian nurses is to sensitize them towards the term critical thinking and its application in nursing practice and to facilitate the development of their critical thinking skills. Poor thinking in nursing can easily be as costly as inexperience or inadequate knowledge of the professional field (Facione, Facione & Giancarlo, 1997(b), p.1).

On the other hand, critical thinking skills give the nurse a broader outlook, creative solutions and the multiple pathways needed to care for the patient in a successful way, especially since changes to the profession have produced challenges that the nurse has to cope with (Reilly & Perrin, 1999, p. 1; Simpson & Courtney, 2002, p. 91).

Although these challenges may be of a diverse nature, it is necessary to prepare the nurse to deal with these problems. A qualitative study on critical thinking was conducted by Botes (2000, p. 26) amidst ethical dilemmas in nursing practice. The emphasis of this study was an assessment of the ability of the nurse to engage in decision-making to meet a desired goal. The study concluded that nurses did not think critically about the ethical problems they were confronted with. They lacked open-mindedness and inquisitiveness. The researcher recommended that the development of critical thinking be included in nursing education so that nurses became effective decision makers in the care of patients. One of the ways to include critical thinking in nursing education is to teach students about the scientific nursing process in nursing.

Against the background sketched above, and through regular contact with student nurses in the health services, the researcher identified the following problem: student and professional nurses in Namibia are not critical thinkers in nursing practice and therefore do not confront problem scenarios with an inquisitive and open mind but rather choose the “easier” and comfortable familiar way of handling problems. The implication of this is that patients will suffer as a result because superficial care will be rendered to them instead of well-thought out and focused care of high quality. The complex legal, educational and professional problems confronting nurses today underline the need for more than just a superficial approach and the ability to follow orders. Nurses are called upon to practise higher order thinking skills in a critical spirit (Green, 2000, p.1). According to Burnard (2005, p.86) the time has come for nurse educators to wake up to the current need for critical thinking in nursing practice.

The research question that emerged was:

- How can critical thinking in student nurses in Namibia be facilitated to enable them to render quality care to patients in the health care settings of Namibia?

## 2. Aim of the study

The researcher’s main purpose was to determine the ability of the learners to use critical thinking in practice. The results would strengthen the need for the development of a critical thinking programme. To further this purpose, specific objectives were stated.

## 3. Objectives of the study

The objective for phase 1 was to determine the ability of student nurses, in their final year of study, to critical thinking in practice. The researcher was interested in the ability of the student nurse to apply and integrate aspects of critical thinking in the management of a nursing problem.

## 4. Methodology

In phase 1 the researcher entered the field of nursing practice in Namibia in order to do a need assessment with regard to the application of critical thinking skills by a selected group of students in nursing practice. Needs assessment in this phase is synonymous with the situation analysis that is conducted when a programme is developed.

### 4.1. Design

A quantitative, descriptive design utilizing a case scenario was employed for this phase.

### 4.2. Population

The target population for this phase was senior student nurses registered at the University of Namibia, in their fourth year of nursing studies in the training hospitals of Windhoek and Oshakati. A total of 46 fourth-year nursing students, registered at the Faculty of Medical and Health Sciences in the Department of Nursing, were included for phase 1 except for the two students who took part in the pilot study. The students were from both campuses, namely the Windhoek and Oshakati campuses, doing the four-year Diploma in Comprehensive Nursing curriculum, which incorporates the principles of critical thinking.

The following inclusion criteria were set:

- The students should have completed the third-year curriculum in General nursing at the Department of Nursing, which incorporates ear, nose and throat infections, as presented in the case scenario, as one of the areas of specialization.
- The students should have done and completed the third-year curriculum in Community Health Nursing, where physical

examination of a client, examination of the ear per se, is integrated as part of the practical learning experience and requirements. Physical examinations on all body systems are done extensively during this period.

- IMCI (Integrated Management on Childhood Illnesses) where ear infection appears to be a prominent condition in smaller children that nurses in Namibia are required to manage should have been completed. During this training, the students also learn about the treatment protocol and general management of cases.
- The completion of the five-week compulsory rural placement community practice is a requirement. During this period the students were allocated to rural community health clinics where they were expected to physically examine clients, diagnose conditions and manage cases, particularly clients suffering from acute ear infections.

In the light of the above, with the emphasis on a developed base of knowledge, the researcher was of the opinion that final-year nursing students should be able to analyze the given case scenario with ease.

## 4.3. Sample and sampling method

No sample was drawn. All the student nurses in their fourth year of study who were registered at the University of Namibia were included in the study. The total population as described above was included. Participation in the study was voluntary.

## 4.4. Development of the instrument for data collection

An imaginary case scenario was developed for students to analyze and answer some relevant questions to enable the researcher to determine the level of understanding and integration of critical thinking of the fourth-year nursing students. The case scenario contained a relevant condition in relation to the disease profile in Namibia. The format of the case scenario focused on a pediatric disorder that was covered in the theoretical as well as clinical curriculum and the education of the group of students concerned.

The case scenario consisted of 15 realistic questions. The questions were open-ended and students had to write their own answers as they thought best. The researcher formulated open questions in such a manner that the students were able to display creativity and initiative in their answers. Therefore, without being restricted to certain answers, the students had the opportunity to indicate how they would have managed the case. The main aim of the case scenario was to present the students with a case they were familiar with and which had been included in their theoretical and clinical instruction, as already described under the reasons for the inclusion of the questions in the study. [See addendum 1.1]

A case scenario serves as a research instrument for gathering data about a specific concept (Roberts & Stone, 2003, p. 70), in this case critical thinking.

## 4.5. Validity and reliability

Validity concerns the soundness of the evidence produced by the study – that is, whether the findings are cogent, convincing and well grounded. It also refers to the degree to which an instrument measures what it is supposed to measure (Polit & Beck, 2004, p. 416; Polit & Beck, 2006, p.41). The instrument based on the imaginary case scenario that was used for the data collection in phase 1, had content-related validity. Face validity was also ensured by asking relevant questions to the case scenario (Burns & Grove, 2005, p. 377), because it concerned a paediatric case which was familiar to the nursing students. The students were also expected to apply whatever critical thinking skills they had to answer open questions on the case presented, which is in line with the overall purpose of the study, namely to develop an educational programme to facilitate critical thinking of student nurses. This ensured content validity (Babbie & Mouton, 2001, p. 123). Validity in the study was furthermore ensured by compiling a case scenario

based on a common paediatric case and relevant questions. This was a means of ensuring content validity

Reliability, on the other hand, refers to the accuracy and consistency of information obtained in a study and can be determined in different ways (Polit & Beck, 2004, p. 416; Burns & Grove, 2005, p. 374). Reliability was ensured by the two criteria, namely equivalence and consistency. Equivalence is the comparison of two versions of the same instrument measuring the same event, referred to as inter-rater reliability. It indicates the degree to which two raters or observers, operating independently, assign the same ratings or values for an attribute being measured or observed (Polit & Beck, 2004, p. 416). In the case of this research study, inter-rater reliability or equivalence was ensured by using two assessors to assess the instrument and checking inter-rater reliability.

The answers of students were analyzed by both the researcher and an independent evaluator to determine whether the evaluators interpreted the questions in the same way and to detect any discrepancies. Moreover, student answers were rated twice to determine consistency in the researcher's ratings. Inter-rater reliability was determined by pilot testing.

Pilot testing of the instrument is a small-scale version or trial run, done in preparation for a major study (Polit & Beck, 2004, p.727).

Testing the instrument forms part of the pilot study. Testing an instrument in a research study implies validity, reliability and pilot testing of the instrument. In a quantitative research design this is important to secure accurate measurement, and reflects the truth and scientific merit of a study (Polit & Beck, 2006, p.41).

The instrument was given to two (2) fourth-year nursing students to complete, in order to detect any problems regarding the questions set. By analyzing the case scenario of the pilot test the researcher detected that some questions was not stated clearly enough and did elicit the answers anticipated. The answers of the students were also analyzed by an independent co-evaluator in order to secure inter-rater reliability. It turned out that some questions had to be more clearly stated because ratings of the answers by the two evaluators were different as a result of the ambiguity of the answers.

The instrument was then revised and extensive detailing of questions was done to exclude ambiguity. The items addressed involved verbs and questions that were misunderstood by respondents. Clearer instructions were given so that the students could understand the questions and would not have any doubt on how to answer them. The instrument was piloted again, involving the same students, and it was apparent that the students understood it. The inter-rater reliability was again determined by calling for input from an independent evaluator. The evaluations then turned out to be more similar.

#### 4.6. Data collection

Data collection refers to the precise and systematic gathering of information relevant to the research purpose or the specific objectives, questions or hypotheses of a study, indicating exactly what the researcher wants to determine and how the data will fit into the activities envisaged for the study. It is therefore considered to be the process of selecting subjects from whom data will be gathered (Burns & Grove, 2005, p. 421).For this particular study the researcher was interested in how the fourth-year nursing students would manage a problem case on a common illness, by utilizing their critical thinking skills.

The students were given enough time to answer the questions pertaining to the scenario. Since consistency in data collection is important, all fourth-year students, on both campuses, received the same case scenario and the same questions (Burns & Grove, 2005, p. 421). The scenario was handled by the researcher at the Windhoek campus and by a research assistant (also a lecturer in the Department of Nursing) at the Northern campus.

#### 4.7. Data analysis

In this study each student's answers were deductively analyzed by calculating central values, more specifically the mean for each question, to determine their application of critical thinking skills in the management of a nursing problem. During the analysis of the answers to the case scenarios, the researcher tried to identify the critical thinking concepts utilized by students to answer the questions on the particular scenario. As many critical thinking concepts as possible were deduced from the students' answers and described. The concepts arrived at formed the initial foundation of the conceptual framework for the educational programme which was developed in phase 2. However, owing to the vast number of concepts, the researcher had to embark on a process of concept synthesis.

The approach to the data analysis of this phase was deductive. The descriptive data arising from the items the students answered were analyzed from the perspective of exploring and describing participants' responses to the questions posed, and the critical thinking skills they applied in responding to the question. To answer each question, certain critical thinking abilities were required from the respondent.

Each question answered was rated on an ordinal scale of 1 – 5 that represented the following:

- Concept of critical thinking not applied
- Respondent attempted to apply concept of critical thinking
- Principle of critical thinking was applied but answer was theoretically wrong
- Concept of critical thinking successfully applied
- Question not answered

[During the analysis of the answers to the scenario, the researcher was able to determine the understanding, utilization and application of critical thinking skills by the student nurses in the management of the case scenario presented. Analysis was done according to a mark-reading sheet.

Data were organized by means of a frequency distribution to determine the highest and lowest scores, the most common score and the number of students participating in the study (Polit & Beck, 2004, p.455). None of these was apparent before the data were organized.

After organizing the data per item, the mean value per item was determined. The mean is equal to the sum of all scores divided by the total number of scores. The mean is a measure that comes from univariate descriptive statistics. It is usually referred to as an average and is the most widely used measure of central tendency, owing to its stability. The mean furthermore specifies the centre of gravity of the distribution (De Vos, Fouche & Venter, 2002, p. 236; Polit & Beck, 2004, p. 460). The sum of the scores was obtained by adding all scores per item (question) on the case scenario.

The data will now be analysed per item (question on scenario), with a discussion of concepts that indicate that critical thinking was applied during the response. The discussion of the deductive analysis is presented as the questions appeared on the questionnaire, based on the imaginary case that was handed to the students.

#### 4.8. Ethical consideration

The principles of beneficence and non-maleficence were adhered to because the researcher strove to minimize harm and/or discomfort and maximize benefit to the participants in the research study.

The principle of self-determination was adhered to because participants had the right to decide voluntarily whether to participate in the study (Polit & Beck, 2004, p. 147). Prior to conducting the research, the researcher entered into an agreement with participants to clarify the nature of the research and the responsibility of each participant. This served to establish voluntary, fully informed participation of the student nurses in the completion of the questionnaire on the case scenario as well as for participation in the study. The researcher refrained from any form of coercion.

Participants were protected from exploitation and they were assured that any information provided by them would not be used against them.

## 5. Findings

The discussions of the findings will follow the sequence of the fifteen questions as presented to the students in the case scenario. For easy comparison the numbering format in the text corresponds with the numbering of the questionnaire.

Question 1: What risk factors, in your opinion, does Sarah have for developing acute ear infection? Give reasons for your answer.

The students were expected to identify and give reasons for the risk factors that could have contributed to the child's condition, namely acute ear infection. It was possible to pick up some of the answers from the scenario, but the student should also have reasoned from the given information to determine the risk factors.

To answer this question successfully, the following critical thinking skills could have been applied:

The students obtained a mean value of 1.8 out of a possible 5 for analytical reasoning and 2.1, out of a possible 5 for independent thinking. The latter implies that students attempted to think for themselves but could not bring analytical thinking to bear on the exercise, and were therefore unable to assess the child's situation, as stated in the scenario, successfully.

Question 2: Comment on the possible association between passive cigarette smoke and ear infections. Give reasons for your answer.

In order to answer this question, the students had to rely on what they know about the anatomy of the ear but most of all they were supposed to give a reasoned opinion on the possible relation of the child's condition and circumstances. The following critical thinking concepts were incorporated into this question and could be utilized to answer the question:

- Divergent thinking
- Focus on the "relation"

Divergent thinking implies that they should have drawn a conclusion from existing data by focusing on the association as asked in the question and by deleting irrelevant data (Green, 2000, p. 7; Lipe & Beasley, 2004, p. 6). A mean of 1.7 out of a possible 5 was obtained for divergent thinking, where a mean of 2.0 out of a possible 5 was obtained for their ability to focus. Scores of this order indicated that the students were not able to think more deeply about the question, since the answer to the question was not indicated directly in the scenario. They could only focus, to a certain extent, on what was presented to them.

Question 3: Distinguish between the clinical picture of acute ear infection and chronic ear infection.

The above question required students to recall theoretical knowledge about the condition of "acute ear infection" in order to state the difference between acute and chronic ear infection. This specific theoretical knowledge was covered repeatedly in their third and fourth years of study, as indicated in the inclusion criteria.

When the question was analyzed it seemed that students did not have much difficulty in writing the theoretical explanation, as is evident from the mean of 2.6 out of a possible 5. Students were expected to obtain fairly good scores for this question since they had been through three theoretical sessions on different occasions within one year, as discussed in the inclusion criteria, where this condition featured prominently and should not have been difficult for students at their level to recall.

The other critical thinking concepts that were applicable in answering this question were clarification of and discrimination between theoretical facts. With this higher order thinking where the theoretical knowledge merely served as support, the students obtained a mean value of 1.8 in clarification and 2.1 in discrimination, out of a possible 5. It is therefore clear that the students found it hard to explain or substantiate what they had written about the distinction between acute and chronic ear infection.

Question 4: Discuss the association between upper respiratory infection and ear infection. Give reasons for your answer.

In this question students were expected to interpret the theoretical knowledge they possess and then use it to substantiate their explanation of the association between two anatomical structures that are directly involved in the condition of acute ear infection. Theoretical knowledge only would not be enough to answer this question, which required an interpretation and application of the knowledge.

The critical thinking concepts that applied to this question were:

- Reflection
- Analytical explanation to clarify the relation

Students performed weakly in answering these questions. For reflection, where they really had to argue about "if this ...then that" a mean value of 1.8 out of a possible 5 was obtained and for the analytical explanation a mean value of 1.7 out of a possible 5 was obtained. The analysis of this question indicated that students did not have the ability to argue from the basis of the knowledge they have and apply it to a scenario presented to them.

Question 5: What other related nursing diagnoses could apply to this scenario?

Working from the facts in the scenario, students were expected to evaluate, consider and then make a decision by separating relevant from irrelevant data. The students were expected to make a nursing diagnosis of the child.

In order to answer this question, students would have had to apply the following critical thinking skills: Divergent thinking; Identification of a nursing problem and clinical decision making

Evaluation of facts in order to make a decision and A mean of 1.7 out of a possible 5 was obtained for all the above-mentioned critical thinking abilities. In brief, students were unable to answer this question with success.

Question 6: Describe and explain your approach in detail to Sarah's father about

- a) his cigarette smoking and b) the danger smoking poses to his children

This question was asked to determine whether students are able to display intellectual courage, understand the father's opinion and also to determine whether the students were curious about what the father knows and does not know.

The score for this question was very low. On the question of understanding the opinion of the father, a mean of 1.2 out of a possible 5 was scored; intellectual courage was not exercised (the mean was 1.1) and students mostly displayed no curiosity, as is evident from the mean score of 1.2. The mean scores were calculated out of a possible 5.

In answering this question, students tended to be very paternalistic to the father by telling him what he should and should not do, instead of asking him for his opinion, trying to establish what he knows and trying to understand his behaviour.

Question 7: In your opinion what could be a possible treatment for the child. Give the reasons for your choice of treatment.

This question was included to determine the application of the following critical thinking abilities: use of cognitive knowledge as basic support, evaluation, clarification and goal-directedness

It was clear that the students were aware of the protocol used in the treatment of acute ear infection and they were also able to stay focused on the goal they wanted to reach in the treatment of the child. In most cases the answers corresponded to the protocol of treatment as used in the IMCI [Integrated Management of Childhood Illnesses] regime. Clearly they did use their knowledge to support their answers, as is evident in the mean score of 2.6 out of a possible 5. Since they focused on the prescribed protocol, it helped them to be goal directed since they were able, in many cases, to clarify why they use a particular drug. For clarification a mean of 2.1 out of a possible 5 was obtained, and a mean score of 2.2 out of a possible 5 was calculated for being goal directed.

Students found it difficult to apply the ability to evaluate the regime and explain the rationale behind a specific choice of treatment, however. They were supposed to state that if the first line of choice of antibiotic fails, the second line would be used. They

were also supposed to indicate what the second line of antibiotics consisted of. A mean of 1.8 out of a possible 5 was obtained for this concept.

Question 8: Describe your approach with regard to parents who place their children at risk for health problems

This question focused on the application of affective critical thinking skills, namely: being open minded, being creative and applying intellectual humility. The students were expected to explore the situation with an open mind and be creative in what they said and how they approached the parents. They should have had the intellectual humility to admit that they do not know how the parents think or what they believe and should first have informed themselves about the parents' thinking before prescribing to them what to do.

The scores for these questions were not very high but indicated that students did not apply these skills as expected.

A mean of 1.3 out of a possible 5 was obtained for intellectual humility, a mean score of 1.5 out of a possible 5 for creativity and a mean value of 1.6 out of a possible 5 was obtained for the quality of open mindedness. It was also evident from the students' answers that they liked to tell the parents what to do without having any background information on the rationale behind their actions.

Question 9: What other information about Sarah and her family, other than in the case study, would you need to address Sarah's problem?

To answer this question the students had to display the following critical thinking skills: analysis, an inquiring mind and independent thinking.

The students had to read through the scenario and then analyze the content given. From that analysis, the student should have had some questions/queries in his/her mind and have been thinking autonomously on what he or she still needed to know to render holistic care to this child with acute ear infection.

For analysis and independent thinking a mean value of 1.5 out of a possible 5 was obtained, but the students only got a mean score of 1.4 for an "inquiring mind".

It was clear that students were not able to search for information which was not given to them in the scenario. They did not identify issues that they needed to know in order to give proper care to this child. A holistic approach to the problem tended to be lacking and the role of some relevant elements like the environment was totally ignored.

Question 10: Would you consider that there was any difference between ear infection in children and the same condition in adults? Explain your answer.

Students were again expected to draw conclusions from the scenario and to substantiate their answer with a clear explanation. With a mean value of 2.1 out of a possible 5, for their inferential ability, it was clear that the theoretical knowledge they have of the anatomical structure of the ear in children and adults assisted them to answer the question. They could, however, not manage to clarify their answer with a clear explanation, as was evident in the mean score of 1.8 out of a possible 5.

Question 11: If you were the parent, what would you need to know before taking your child home?

This question was included in the questionnaire to determine whether the students could think themselves into the parent's situation and indicate what the parent would need to know before leaving the health centre. The two critical thinking skills reflected in this question were: intellectual empathy and creativity. Respondents were, to a certain extent, able to think themselves into the parents' situation and some valuable ideas regarding what they would have liked to know emerged from the answers to this question. A mean score of 2.3 out of a possible 5 was obtained.

For mental creativity a mean value of 1.9 out of a possible 5 was obtained here. This is slightly higher than the creative ability that was assessed from the answers to question 8 (mean 1.5), as described above. The reason for this might be that the expected answers differ according the question. However, both scores are considered low, bearing in mind that these students will be enter-

ing the field as professional nurses in less than four months from the time of data collection.

Question 12: Describe your goal in Sarah's management

In order to answer this question the students had to be goal directed and focused on the management of Sarah, a child with an ear infection. In general, students showed a slight ability to stay focused and displayed the ability to keep certain goals – such as pain relief in their management of the client in mind.

For both concepts a mean value of 2.2 out of a possible 5 was obtained.

Question 13: Write Sarah's report as you would have written it in her health passport.

This question was included to determine whether the students were able to write critically after their management of the case. Many students attempted to write clearly but the majority of respondents failed to write clearly about the management of the case, let alone write critically.

This concept got a mean value of 1.7 out of a possible 5. By analyzing this question it became clear that if the approach to a case was superficial and not well thought through, the report on the case would also be inadequate and not critically expressed.

In answering this question, students wrote the parameters and the treatment but nothing more. Those represented the information they had in front of them. Some did not even comment on the fact that the client was back for the second time. No referrals to other members of the health team, for example to a social worker were mentioned. In most cases the report about Sarah and her management was improper and meaningless.

Question 14: Explain how you feel about the way you approached Sarah's case.

This question gave students the opportunity to reflect on their experience, to ponder over their choices and to become aware of their "self" and how they felt about the way they handled the case scenario.

The following critical thinking skills were assessed in this question: intellectual integrity, reflection, open-mindedness and self-awareness. It seemed to be a difficult task for respondents to reflect on their own feelings and to be open minded about why and how they handled the case. Four respondents left these questions unanswered, which did not frequently happen in the replies to the questions of the scenario. The mean value for the application of intellectual integrity for this question was 1.8 out of a possible 5. For reflection the mean value of 1.9 was obtained. This is almost similar to the mean value of 1.8 for this concept in question 4. Open-mindedness obtained the low mean value of 1.7 out of a possible 5.

It was also found that students did not succeed in writing about themselves and how they presented and managed the case. It is important to note that care of a patient can only improve if a respondent can reflect on how she or he handled the case and detect areas for improvement.

Question 15: Describe the difficulties you encountered in answering the questions about the scenario.

The last question of this scenario called for self-assessment by the respondents. A mean value of 2.2 out of a possible 5 was scored. Three respondents did not answer this question. Students found it hard to assess themselves in order to identify areas of improvement.

Assessment by researcher

Five additional summative questions, namely questions 16–20 on the case scenario, were added to the evaluation tool for the scenario and had to be scored by the researcher only. These questions were not included as part of the questions the respondents had to answer. The rationale behind these questions was to allow the researcher to gain an overall impression on the handling of the scenario by the individual students.

The questions were scored out of a possible 5 with 1 as "not at all", 3 as "satisfactory" and 5 as "to a great extent".

The scores for these questions are described below.

Question 16: Did the student display intellectual perseverance?

For this question it should have been evident that the students displayed the ability to handle difficult situations by providing multiple answers/solutions. A mean value of 2.5 out of a possible 5 was obtained. It was evident that very few students left out any questions. It was also significant that students tried to answer the questions in some way, although not always as expected.

Question 17: Did the student display a questioning mind in answering the questions?

This question was included to assess the overall ability of the students to ask questions and not accept everything as is but to try and find alternatives to certain answers. For this question a mean value of 1.6 out of a possible 5 was obtained. It emerged very clearly that students tend just to accept what they are told rather than to ask questions about the case. For critical thinking to be applied, an inquiring mind is essential.

Question 18: Did the student display diligence in obtaining information?

Diligence in obtaining information is supportive to the inquiring mind that was evaluated in question 17. A mean value of 1.5 was obtained out of a possible 5, which actually supported and clarified the above assumption that students do not question enough. Not having or not applying this ability can have a detrimental effect on the utilization of the nursing process and will affect the care of the patient negatively.

Question 19: Was the overall approach to the case study analytical – was it clear that student stay focused?

It was found that students, in a way, did stay focused and that they tried to analyse the case scenario. A mean of 2.5 out of a possible 5 was obtained, which indicated that these two concepts were almost satisfactorily applied as part of an overall approach to the case scenario.

Question 20: Was the thinking purposeful? – is it clear that student know where heading with this scenario?

The impression was that students were in contact with the case all the time and that they were trying to think purposefully to answer the questions. A mean value of 2.4 out of a possible 5 was obtained for this summative question.

## 6. Conclusion

Although the researcher is of the opinion that the analysed concepts are the ideal for a nurse to possess, it was important to reduce the concepts to a few which are considered most important to include in an educational training programme for nurses in Namibia in order to equip them with the skills needed to handle any situation they can possibly be confronted with. The researcher has, with literature support, arrived at “umbrella” concepts, namely the most important concepts that nurses in Namibia need and without which they cannot practice. These umbrella concepts are to be included in the educational programme.

The term “critical approach” is, for the purposes of this research, regarded as a comprehensive term to describe the execution of critical thinking. Facione (1998, p.7) states clearly that a critical approach does not refer to a person who is always negative or hypercritical but that it refers to a person who has a probing inquisitiveness, a keenness of mind, a zealous dedication to reason and a hunger or eagerness for reliable information.

Norris (1985, p.44) is very clear that no matter what level of critical thinking a person possesses, it is of no value unless the person has a critical spirit. For the purposes of this study the term “critical approach” will be used to encompass all related concepts to critical thinking on the assumption that if a nurse possesses the skill of critical thinking, she/he possesses a critical approach.

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