Interpretive Ability on Common Haematological Tests and critical thinking ability among B.Sc Nursing students

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Abstract

Introduction: Initiation of patient management and prediction of patient prognosis depend on investigation reports. Interpretive ability of common blood investigations demands high level of critical thinking and it is a less focused in nursing education. Therefore, this study aimed at identifying the relationship between interpretive ability of common hematological tests and critical thinking ability among nursing students. **Methods**: The study design adopted was cross sectional descriptive survey. It was conducted among 140 nursing students studying in third and fourth year of Bachelor of Science (B. Sc.) nursing. The data was collected using demographic tool, interpretive exercises and Yoon's Critical Thinking Disposition. **Results**: The median of interpretive ability score on common blood investigations was 13 (IQR – 11, 14). The mean critical thinking score of nursing students was 96 (SD 9.5). Analysis of the relationship between interpretive ability on common blood investigations and critical thinking ability revealed a weak positive correlation which was statistically not significant (r=0.141, p=0.096). There was a significant relationship between interpretive ability and intellectual eagerness (r=0.181, p=0.032) and intellectual fairness (r=0.174, p=0.039). There was a significant association between interpretive ability and academic performance of the students in the university examinations (F=4.5, p=0.012). Interpretive exercises stimulate critical thinking among students. **Conclusion**: The students with high intellectual curiosity and intellectual fairness have good interpretive ability, and good academic performance improves ability to interpret common haematological tests.

***Key words**: Nursing care, Nursing students, Baccalaureate Nursing Education, hematological tests, thinking*

Introduction

The educational preparation, regulation, and practice benchmark among the nurses are varied internationally[1]. There is no fixed model for a nursing trainee to improve professional practice and the gap between nursing education and clinical practice is always of concern[2]. Despite this, the nurses migrate across the world due to growth opportunities and better prospectus[3]. In order to alleviate these challenges and maintain standards several countries assess nurse's competencies before entry. For example, the National Council of State Boards of Nursing administers the U.S. Nurse Licensure Examinations (NCLEX-RN and NCLEX-PN) to assess nurse's competency to practice in the country. Failure rate in this examination is very high among the foreign educated nurses, in comparison to the, nurses educated in the native country[4]. Interpretive exercises are commonly used form of test items for licensure exams, for example NCLEX items are prepared in the interpretive exercise format[4].

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Interpretive exercises are a series of related objective items based on a common set of data in the form of introduction. The 'common set of data' are presented as written materials consisting of patient's history and investigations, tables, charts, graphs (ECG), maps, or pictures (X-ray, Scans) in view of objectives to be achieved[5,6]. The series of related test items may also take diverse forms but most commonly used are multiple-choice or true-false items. The items can be formed with an objective to establish relationships in data, to recognize pertinent conclusions, to appraise assumptions and inferences, to examine proper applications of data, and the like[7].

Nurses attend patients with varied symptoms. Therefore, the ability to notice the variations and application of suitable interventions are exceedingly essential for nurses. Nurses with good critical thinking ability can provide better nursing care[8]. Moreover, in an era of skyrocketing health care costs, critical thinking is essential in providing cost effective and accessible care to the patients[9]. Though all types of teaching methods cannot improve critical thinking problem based learning, simulation and concept aping are useful[10-13]. Simulation is beneficial in transferring the knowledge to clinical care[10,11].

Interpretive ability on common hematological tests is the least explored area in the field of medicine. No studies were traced on interpretive ability of nurses on hematological tests using interpretive exercises. Therefore, we aimed at testing interpretive ability and critical thinking of nursing students.

Material and Methods

The study was conducted in a selected nursing college of Karnataka, southern India. The college is recognized by the nursing regulatory body and all the approved nursing courses are implanted in the college. The third and fourth year Bachelors of Science (B. Sc.) Nursing students enrolled in a selected college of nursing were recruited for the study. The nursing curriculum in India is regulated by Indian Nursing Council (INC), a professional body that establishes and monitors a uniform standard of nursing education in India. B.Sc. Nursing course is offered for four years with theoretical and practical experiences imbibed in it with six months integrated internship in the clinical areas. The sample size was calculated and a total of 140 students were recruited.

Data was collected using demographic proforma, interpretive exercises on common hematological tests and Yoon's critical thinking disposition inventory[14]. The demographic proforma comprised of information on year of study and age, information on previous years' academic performance in five subjects in the university examination and exposure in eight clinical areas. The academic performance score was collected in: 1) Medical Surgical Nursing-1, 2) Medical Surgical Nursing-2, 3) Pathology, Pharmacology and Genetics, 4) Nutrition and Bio-chemistry and 5) Anatomy and Physiology subjects, as the knowledge of these subjects are directly related to the interpretation of hematological tests.

Interpretive exercise tool consisted of 26 multiple choice items based on four virtual patient scenarios. The items focused on interpretation of six type of abnormal hematological tests namely complete blood counts, renal function test, serum electrolytes, liver function test, lipid profile and arterial blood gas analysis reports. The tools were validated by experts and the reliability of the interpretive exercise was established by using split half method (r=0.723).

The critical thinking was assessed using Yoon's Critical Thinking Disposition Inventory. This is a standardized tool and has 27 items with five point Likert scale which is developed by Yoon. The tool had 27 items distributed in 7 domains and the Cronbach's alpha of the original study was 0.9. The possible minimum score is 27 and the maximum is 135. In the present research setting the tool was pretested and reliability was estimated by Cronbach's alpha for the tool(r=0.8).

Administrator of the institution permitted to conduct the study among B.Sc. Nursing students. Institutional Ethics Committee (IEC) clearance was procured. Permission was obtained from the class coordinators of third and fourth year B. Sc. Nursing. The objectives of the study was explained to each students and they gave written consent before the data collection.

Result

Demographic Characteristics:

The descriptive analysis of demographic

characteristics showed that the 57.1% of the students were from 3rd year B.Sc. Nursing and 60% of the students were in the age group between 21-22 years. The academic performance of majority of the students were within the range of 50-64% in all subjects.

Interpretive Ability:

The median of interpretive ability score on common hematological tests was 13 and the interquartile range of 25th and 75th percentile was 11 and 14 respectively. The maximum score obtained by the students was 22 and minimum score was 4. The ability of the students in interpreting the results of complete blood counts, renal function test, serum electrolyte and liver function test was good (figure 1). However, there was a need for improvement in identifying lipid profile and abnormal arterial blood gas analysis findings.

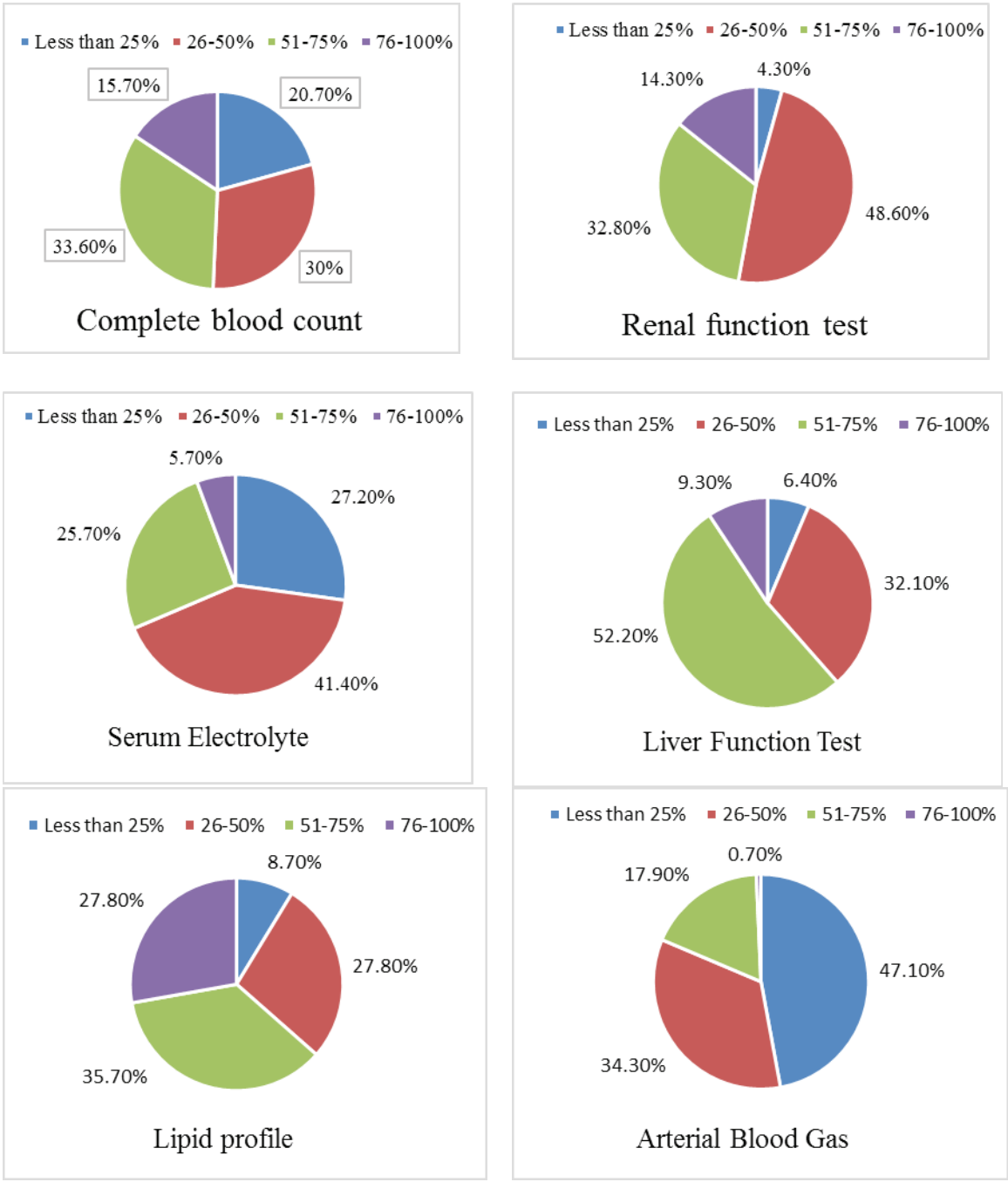

Figure 1: Interpretive ability of the nursing students on common hematological tests.

Critical thinking:

The mean score of critical thinking of the participants was 96 (standard deviation – 9.5). The scores in different domains of critical thinking is given in table 1. The mean score in intellectual eagerness was 18.6 ± 2.6, in prudence was 12.7 ± 1.7, in self-confidence was 14.7 ± 2.1, in systematicity was 10 ± 1.6, in intellectual fairness was 14.8 ± 2.2, in healthy scepticism was 13.6 ± 2.3 and in objectivity was 11.7 ± 1.7.

Relationship between Interpretive Ability and Critical Thinking:

To find the relationship between interpretive ability and critical thinking, Spearman correlation was computed and value was 0.141 (p=0.096) indicating a weak positive correlation. Relationship between interpretive ability and different domains of critical thinking was also calculated (table 1). There was a statistically significant weak positive correlation between interpretive ability on common hematological tests and intellectual curiosity (*r= 0.181, p=0.032*). There was also a statistically significant weak positive correlation between interpretive ability on common hematological tests and intellectual fairness *(r= 0.174, p=0.039*). Thus it was inferred that the students with high intellectual curiosity and intellectual fairness have good interpretive ability on common hematological tests. However, it cannot be concluded as the correlation was weak.

Table 1: Spearman Correlation on Interpretive Ability and Domains of Critical Thinking among Nursing Students

Variable	Possible minimum score	Possible maximum score	Mean	SD	r value	p value
Interpretive ability						
Intellectual eagerness/curiosity	12	25	18.6	2.6	0.181	0.032
Prudence	9	17	12.7	1.7	- 0.075	0.375
Self-confidence	9	19	14.7	2.1	- 0.005	0.953
Systematicity	6	15	10	1.6	0.098	0.248
Intellectual fairness	9	20	14.8	2.2	0.174	0.039
Healthy scepticism	9	20	13.6	2.3	0.105	0.217
Objectivity	6	15	11.7	1.7	0.044	0.606
SD = standard deviation, r = Pearson's co-relation, p = level of significance						

The association between interpretive ability on common hematological tests and academic performance of the students was calculated using one way ANOVA and it was statistically significant (F=4.5, p=0.012). Therefore, it was inferred that interpretive ability on common hematological tests and academic performance of the students are dependent on each other. Thus, students with good academic performance have good interpretive ability.

Discussion

One of the reason of low satisfaction of the nurses in the hospital is lack of proper training[15]. Therefore nursing curriculum must focus on improving the knowledge of clinical nurses. Analyzing the condition of the patient is vital to provide comprehensive individualized patient care. Analysis includes collecting history, performing physical examination, inferring investigation reports and assessing general well-being of the patient. Interpreting hematological tests helps in clinical judgement to prioritize the care and plan appropriate interventions.

As the nursing curriculum differs from country to country, the method of evaluating also differs[16]. Interpretive exercises are applied type of objective questions. Hence it helps to measure the higher level of knowledge. In the present study, the nursing students had good interpretive ability on common hematological tests. It is also noted that the students with good academic achievement have better interpretive ability. However, good interpretive ability did not show statistically significant ability in critical thinking.

Jeong (2015) found that critical thinking disposition was positively correlated with perspective taking (r=0.482, p<0.001), fantasy (r=0.227, p<0.001), and empathic concern (r=0.195, p=0.002)[17]. Woo & Tak, (2015) illustrated that critical thinking disposition positively correlates with caring perception (r=0.174, p=0.024) and professional self-concept (r=0.343, p=0.022)[18]. A similar study by Park, Chung, & Kim, (2016) demonstrated significant correlation between nursing competency and critical thinking disposition (r=0.59, p<0.001) and self-directed learning readiness (r=0.54, p<0.001)[19].

The students in the present study setting receive clinical teaching every day at the bed side by qualified faculty members. Students write clinical dairy which includes history, focused physical examination, reports of significant investigations and nursing care plan. The clinical teaching and daily dairy writing must have been useful in getting the positive results. Perhaps, additional research is needed to generalize the findings and usefulness of interpretive exercises. It is also important to assess the change in critical thinking of the students over a period.

Fourth year students had more clinical exposure compared to third years is the limitation of the study. Interpretive exercises evaluate higher learning skills. Hence, these can be adopted as an evaluative method for assessing students learning in nursing curriculum. The tool is not only helpful in evaluating the understanding and memorization of the facts, but also assess their ability in application and synthesis of the facts. Critical thinking is crucial in enhanced patient care. Proper identification of the needs of the patient and tailoring of the nursing intervention accordingly, demands high degree of critical thinking.

Conclusion

The interpretive ability and critical thinking of nursing students augments their learning. Enriched education results in enhanced patient care. This study provides an evidence and recommends the nursing teachers to implement interpretive exercises and critical thinking assessment in their regular teaching activities. In addition, timely interpretation of hematological tests may reduce morbidity and mortality of high risk patients.

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