Student's Problem Solving Abilities at Technical Institute of Nursing

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Abstract

Background: Education is an ongoing process, providing personal and professional stimulation to improve life. Since life is full of problems, the aim of education is to help individuals to acquire the knowledge, skills, and attitudes necessary to overcome these problems. **Aim of Study**: to assess nursing student's problem solving abilities at technical institute of nursing. **Subjects and methods**: descriptive analytical study was carried out at *Al-zahra* Technical Institute of Nursing affiliated to Al Azhar University. The sample included all 83 nursing students enrolled in the fifth year during the academic year (2017/2018). One tool were used in data collection, namely a self-administered questionnaire to assess abilities of problem solving (PS). **Results**: students' age ranged between 19 and 20 years. The majority of the nursing students computer abilities (79.5%) and were aware of problem- solving (92.8%) although only 61.4% studied it. Meanwhile, 80, 7% of them stated used PS in their personal life. Students in problem solving knowledge and skills were high deficiency. Student's knowledge scores had significant strong positive correlation with the skills score. **Conclusion:** None of the nursing students had adequate knowledge and skills of PS. The skills score had statically significant weak positive correlation with student's GPA. And positive correlation between nursing students' scores of knowledge and skills (r=0.907). **Recommendation:** The study recommends more use of the (PS) education approach and PBL strategy in all nursing curricula; course planners need training in developing educational problems.

Introduction

Today's information community expects nursing graduates to be able to efficiently solve patients' problems and to confidently make a clinical decision *(Currey et al., 2015)*. Nursing education programs share the goal of preparing of competent graduates who will successfully make the transition to the world of professional practice. One essential way to meet these demands engage in continuing professional education through best planned and managed learning process *(Al-Naggar and Bobryshev, 2012)*.

Currently, nursing education is witnessing an emphasis on the development of self-directed learning and critical thinking through application of innovative learning approaches as Problem-Based Learning

(PBL) *(Demirel and Dagyar, 2016)*. In this approach, students are typically confronted with healthcare problems as stimuli for learning. A multi-stage process is used in small group tutorials to develop students reasoning skills, promote the learning of basic science, in a clinically useful way, develop independent learning skills, and motivate learning *(Gijselaers, 2015)*. It is a motivating, challenging, and enjoyable learning approach *(Ghosh and Sobek, 2015)*, and more than pedagogy, it is a curriculum *(Amoako-Sakyi and Amonoo-Kuofi, 2015)*. Students actively participate and use skills of inquiry and critical thinking as well as peer teaching and peer evaluation *(Csapo and Funke. 2017)*.

Moreover, the Problem Solving (PS) ability is considered a prerequisite to nurses'

professional practice *(Ibrahim and Al-Shahrani, 2018)*. It is the production and attainment of the various potentially effective alternatives in order to cope with the problem and increasing the probability of choosing the most effective one among these alternatives. With the nurses and midwives using the problem solving skills effectively, both the professionalization of the occupation will be contributed and the quality of the patient care will be improved *(Ancel, 2016)*. Nursing education must raise the PS skills of nurses through the application of the "nursing process" education as scientific PS *(Bayindir and Olgun, 2015)*. Therefore, the nurse educators must use innovative teaching strategies such as PBL and PS.

Significance of the study

Complexity of today's society is characterized by an infinite, dynamic and changing mass of information, these rapid changing labor market demanding a more flexible labor force that is directed toward a growing proportion of knowledge-intensive work in team and lifelong learning. As a consequence, today's information community expects nursing graduates not only to have a specific knowledge base but also to be able to apply this knowledge to solve complex patients' problems in an efficient way and to further develop their ability to plan, communicate, teach, and make a clinical decisions with confidence. Moreover, the core of nursing education is to help students to apply knowledge from nursing and other disciplines in making independence decisions and solve the problems in nursing practice situations.

Aim of the study:

The aim of this study was to assess nursing student's problem solving abilities at the technical institute of nursing.

Subjects and Methods

Research design and setting: the descriptive analytical design was used to carry out this study at Al-zahra Technical Institute of Nursing affiliated to Al Azhar University.

Subjects: The study involved all 83 nursing students enrolled in the fifth year at the *setting* during the academic year (2017/2018) with no inclusion or exclusion criteria.

Data collection tools: one tool was used in data collection, namely a self-administered questionnaire.

▪ **Self-administered** *questionnaire:* This tool was developed by the investigator based on *Lipe (2004)*, *Osman (2010)*, *Badrawy (2012)* and *Ali (2015)*. It consisted of three parts. **The first part**: was for collection of student's demographic data as well as some information about the academic achievement, problem solving awareness, previous related study, and use in study and personal life. **Second part:** was for assessing student's problem solving applied knowledge. It comprised 38 True/False items categorized into six dimensions: study of the problem, solving the problem, psychological treatment of the problem, use of previous experience, dealing positively with the problem, and denial of the problem. Each correct response was scored 1 and the incorrect zero. The scores of the items were summed-up, and the total divided by the number of the items giving a mean score for each dimension and for the total scale. These scores were converted into percent scores and means and standard deviations were computed. Student's knowledge was considered satisfactory if the percent score was 60% or higher and unsatisfactory if less than 60%**. The third part**: was for assessing the practices toward problem solving skills by students through the use of a simulated case study .The case study was followed by a list of 51 True/False questions covering the six steps of PS: problem identification, determination of the needed information, setting objectives based on information, setting a plan based on objectives, approach to application of the

plan, and setting success indicators. The scoring was the same as for the second part, but the ability to practice PS was considered adequate if the percent score was 60% or higher and inadequate if less than 60%.

The tools were face and content validated by a jury group consisting of five experts in the field of nursing administration from the Faculties of Nursing at Ain-shams and Cairo Universities. Modifications and rephrasing were done based on their opinions.

Pilot study:

A pilot study was conducted on eight students representing almost 10% of the main study sample size to determine the clarity and applicability of the tools, and the time consumed in filling them out. These students were included in the main study sample since no major changes were done in the tools.

Field work:

The actual fieldwork started from February to August 2018. Official permissions were obtained from pertinent authorities. The investigator met with the students and explained to them the aim and the nature of the study and the method of filling in the forms. This was done either individually or through group meetings. Distribution of the study tools was done, and the completed forms were collected in the same setting. The time consumed in answering the questionnaire ranged between 20 and 30 minutes. This was done in the presence of the investigator to avoid communication among students and to clarify any ambiguities.

Administrative and ethical considerations

The Ethics Committee of the Al-Zahra Technical Institute of Nursing, Al-Azhar University, approved the study proposal. Official permissions to conduct the study were secured from pertinent authorities. All participants gave their written consent to participate in the study. They were informed about the study purpose and about their rights to refuse or withdraw at any time without giving reasons. Confidentiality of any obtained information was ascertained.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Cronbach alpha coefficient was calculated to assess the reliability of the developed scale through its internal consistency. Qualitative categorical variables were compared using chi-square test. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the practice scores, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value <0.05.

Results

Table (1): The study sample consisted of 83 nursing students whose age ranged between 19 and 20 years as shown in The great majority were singles (92.8%). Their medians GPA (Grade Point Average) were 88.0 and ranged between 60 and 99. Only 3 (3.6%) of them reported having had previous academic failure.

Table (2): indicates that the majority of the nursing students computer abilities (79.5%) and were aware of problem- solving (92.8%) although only 61.4% studied it. Meanwhile, 80,7% of them stated used PS in their personal life.

Table (3): shows that nursing students' knowledge of Problem Solving (PS) was low with almost items. The only exception was the item of dealing positively with the problem, which was satisfactory among 80.7% of them.

Table (4): shows high deficiency at the problem solving skills. The percentages

of adequate skills ranged between 1.2% for defining objectives and 32.5% for plan application.

Table (5): demonstrates a statistically significant strong positive correlation between nursing students' scores of knowledge and skills (r=0.907).

Table (6): As displayed in nursing students' skills scores had a statistically significant weak positive correlation with their GPA (r=0.184).

Table (7): In multivariate analysis the study was identified as the main

statistically significant independent positive predictor of nursing students' knowledge score, in addition to their GPA. Conversely, their previous academic failure was a negative predictor. The model explains 79% of the variation in the knowledge score. As for nursing students' skills score, the study was its main statistically significant independent positive predictor, in addition to their knowledge score, GPA, and previous academic failure. The model explains 94% of the variation in the skills scores.

Table (1): Personal characteristics of nursing students in the study sample (n=83).

Items	Frequency	Percent
Age:		
19	51	61.4
20	32	38.6
Range	19.0-20.0	
Mean±SD	19.4±0.5	
Median	19.0	
Marital status:		
Single	77	92.8
Married	6	7.2
GPA (%):		
<75	7	8.4
75-	16	19.3
85+	60	72.3
Range	60.0-99.0	
Mean±SD	86.4±8.4	
Median	88.0	
Previous academic failure:		
No	80	96.4
Yes	3	3.6

Table (2): Computer skills and awareness about Problem Solving (PS) among nursing students in the study sample (n=83).

Items	Frequency	Percent
Have computer skills:		
No	17	20.5
Yes	66	79.5
Aware of problem-solving:		
No	6	7.2
Yes	77	92.8
Studied problem-solving:		
No	32	38.6
Yes	51	61.4
Used problem-solving in study:		
No	29	34.9
Yes	54	65.1
Used problem-solving in personal life:		
No	16	19.3
Yes	67	80.7

Table (3): Knowledge of Problem Solving (PS) among nursing students in the study sample (n=83).

Knowledge of problem solving	Frequency	Percent
Study of the problem:		
Satisfactory	3	3.6
Unsatisfactory	80	96.4
Solving problem:		
Satisfactory	3	3.6
Unsatisfactory	80	96.4
Psychological dealing with problem:		
Satisfactory	5	6.0
Unsatisfactory	78	94.
Use of previous experience:		
Satisfactory	4	4.8
Unsatisfactory	79	95.2
Dealing positively with problem:		
Satisfactory	67	80.7
Unsatisfactory	16	19.3
Problem denial:		
Satisfactory	27	32.5
Unsatisfactory	56	67.5

Table (4): Skills related to Problem-solving among nursing students in the study sample (n=83).

Problem solving skills	Frequency	Percent
Problem identification:		
Adequate	14	16.9
Inadequate	69	83.1
Information needed:		
Adequate	2	2.4
Inadequate	81	97.6
Defining objectives:		
Adequate	1	1.2
Inadequate	82	98.8
Problem solving plan:		
Adequate	12	14.5
Inadequate	71	85.5
Plan application:		
Adequate	27	32.5
Inadequate	56	67.5
Indicators of success;		
Adequate	6	7.2
Inadequate	77	92.8
Total practice:		
Adequate	0	0.0
Inadequate	83	100.0

(*) Statistically significant at $p<0.05$

Table (5): Correlation matrix of students' knowledge and skills toward problem solving.

Scores	Spearman's rank correlation Coefficient	
	Knowledge	Skills
Knowledge		
Skills	.907**	

(**) Statistically significant at $p<0.01$

Table (6): Correlation between students' knowledge and skills and their characteristics.

	Spearman's rank correlation Coefficient	
	Knowledge	Skills
Age	.003	-.010
GPA	.121	.184**
Computer skills	-.011	.043

Table (7): Best fitting multiple linear regression model for the total knowledge and skills.

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Knowledge score							
Constant	11.99	7.29		1.644	0.101	-2.37	26.36
Intervention	42.44	1.42	0.88	29.991	<0.001	39.66	45.23
GPA	0.30	0.08	0.11	3.595	<0.001	0.13	0.46
Previous failure	-8.63	3.71	-0.07	-2.327	0.021	-15.93	-1.33
r-square=0.79	Model ANOVA: F=307.99, p<0.001						
Variables entered and excluded: age, marital status, previous experience, computer skills							
Skills score							
Constant	14.37	3.48		4.123	<0.001	7.50	21.23
GPA	0.21	0.04	0.08	5.284	<0.001	0.13	0.29
Previous failure	4.33	1.78	0.04	2.431	0.016	0.82	7.83
Knowledge score	0.30	0.03	0.33	9.939	<0.001	0.24	0.36
r-square=0.94	Model ANOVA: F=1054.24, p<0.001						
Variables entered and excluded: age, marital status, previous experience, computer skills							

Discussion

The incorporation of problem-based learning in teaching enhances the critical thinking and problem-solving skills. It also helps in developing a broader prospective of clinical case scenarios *(Chilkoti et al., 2015)*. Moreover, the ability to use the problem solving process is a very important element in professional nursing practice to be able to decrease the cost of healthcare and to increase the quality of care *(Terzioglu, 2006)*, and to assume leadership roles *(Lea and Cruickshank, 2014)*. This study aim was to assess nursing students' problem solving abilities at the Technical Institutes of Nursing. The findings generally indicate that,

According to the present study results, the majority of the students had knowledge about problem solving used it in personal life, although lower percentages affirmed having studied it or used it in study. This important finding points to the deficient educational system in nursing institutes regarding the inclusion of the problem-solving approach in their curricula. Nevertheless, students may find other sources to learn about problem-solving realizing its importance in dealing with personal life issues. In line with this, *Deasy et al., (2014),* found that, Irish nursing students resorted to problem-solving to cope with their distress from institute and personal life.

The present study results identified the influence of certain academic characteristics of the nursing students on knowledge scores of PS Thus, the negative effect of previous history of academic failures and positive effect of GPA was confirmed in multivariate analysis. The findings are plausible and are explained by the reciprocal relationship between problem

solving and academic achievement. This, a student with high academic achievement is expected to learn.. On the other hand, a student with better PS knowledge is expected to have better academic performance and achievement. In line with this, *Ghazivakili et al. (2014)* in a study in Iran found a significant relation between PS skills and students' academic achievements.

The present study was to assess nursing students' skills of PS .The results demonstrate that the majority of the students were having deficient skills of PS In agreement with this, *Abdollahi et al (2018)* found poor PS knowledge and skills among Malaysian university students.

Similar to the knowledge scores, the current study results showed that nursing students' scores of skills were influenced positively by their GPA and negatively by previous academic failure. The reasons underlying these influences are the same as previously explained regarding the knowledge scores. An additional factor was the previous use of PS in study, which had a positive influence on the skills score as expected. In congruence with this, *Trunzo et al (2014)* in a study in the United States revealed that the PS skill was a statistically significant positive predictor of students' academic achievement.

The multivariate analysis of the present study has also revealed a very strong positive correlation between nursing students' scores of knowledge and skills. Moreover, the knowledge score was identified as a significant independent predictor of the skills score. This indicates the importance of acquiring basic theoretical knowledge in improving their skills. In line with this, the importance of linking knowledge to skills has been highlighted by *Phillips and Neumeier (2018)* in a study in Canada.

Conclusion and Recommendation

▪ The students in AL Zhra Technical Institute of Nursing were aware of problem solving and reported having used it in their personal life. The study recommends more use of the PS educational approach in all nursing curricula. Course planners need training in developing educational problems. The teachers and instructors of the Technical Institutes of Nursing should attend training program in problem-solving and its application in education.

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