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Problem Based Learning strategy verses lecture effect on academic achievement of Technical Health Nursing Students

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***Background**:*
***Abstract:**Problem- Based Learning (PBL) is teaching and learning model that provide contextual problems to the classroom, so that teacher can stimulate students to learnthrough authentic problems. PBL can be verychallenging to implement, as it requires a lot of planning and hard work.PBL is a student-centered instructional strategy in which students' learning is triggered by a problem, which they collaboratively solve, followed by a reflection on their experiences. PBL encourage students to develop varieties of skills such as critical thinking, communication skills, collaboration skills, creativity, and innovation skills.**Aim:** This study aimed to assess the effects of using PBL strategy on academic achievement of technical health nursing students.* ***Subjects and method:** A quasi-experimental design was adopted to carry out this study. The study was carried out at health technical institute at Mansoura city. Convenient sampling technique was used to recruit this study include all students (100) were at second year of health technical institute. Students were located into two groups **traditional strategy group** include 50 students at second term in the academic year 2016-2017 **and problem-based learning strategy group** include**s** 50 students in the first term in the next academic year 2017-2018. **Results**: scores of students who learn withproblem based learning methodis higher than scores of student who learnwith traditional method. There was statistically significant difference between scores of pre and posttest. **Conclusion**: the main conclusion drawn from the current study is that problem-based learning method more effective than traditional method because students acquired varies of skills help them to be active leaner and independent through learning process.*

***Keywords:**Achievement, Critical thinking, perception, Problem-Based Learning, Traditional lecture.*

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I. Introduction

Recently, learning approach can affect student's activities in the process of teaching and learning, therefore research on learning approach continues to be developed by educational experts. Creativity is one of the skills that must be owned by the nation's children in the 21st century as a tool build their thinking better and answer the increasingly complex challenges of the future. The 21st century learning framework expects 4C skills and innovation as a result of learning including; critical thinking and problem-solving skills, communication skills, collaboration skills, creativity, and innovation skills. Recently learning approach is believed to affect student's activities in the process of teaching and learning.Therefore research on this aspect continues to be developed by educational experts, **(Wahyu*, Kurnia & Syaadah, 2018)**

Problem-based learning has been widely recognized as one of the approaches for effective learning based on constructivism theory **wahyu, sopandi and kusniat, (2019**). PBL is a learning approach that has the characteristics to solve problems in daily life, Problem solving activities can enhance student's high-level understanding and thinking skills on learning a subject matter **(Overton and Randle 2015) &(Aidoo, Boateng, Kissi& Ofori, 2016)**

PBL method relies on the problem as a vehicle to guide learners to relevant content information. The principal idea behind problem-based learning is that the starting point for learning should be a problem, query, or puzzle that the learner wishes to solve. PBL challenge nursing education to explore ways to enhance student learning and clinical decision-making **(Hamdan et al, 2014)** so, nurse educators must adapt new teaching methods that promote active learning and increase critical thinking skills in students nurse.

PBL is effective in terms of developing students' affective properties, such as attitude toward courses, desire and motivation, making knowledge permanent, and acquiring skills like problem solving gathering knowledge, and doing research. PBLis active learning approach, plays a significant role in increasing students' level of interest, achievement and help to determine high-level cognitive skills such as analysis, synthesis, and

assessment, which are necessary for problem solving in the process. It also contributes to the development of skills like thinking and establishing cause–effect relationships. PBL applications teach students how to work as a team (**Demiral and Tagyar 2016).**

Lai, (2011) stated that there are several advantages in using PBL as one of teaching and learning models. By using PBL increases student understands and increasing student's activates during teaching and learning process**.** PBL helps students in transferring their factual knowledge to understand the contextual problem. Also,it develops student's responsibility and improve student's thinking ability. PBL brings the happiness in the classroom through teaching and learning process and give studentschance to apply their knowledge to solve problems (**(Anazifa, 2016)**

However, not all the teaching and learning process has developed student's critical thinking skill. Teaching and learning process still conducted by teachers who give whole information to students using conventional model such as question- answer method. Whereas, critical thinking skills do not merely appear instantly it needs efforts to develop. **(Koutoukidis, Stainton & Hughson, 2016)**

Conventional model such as traditional lecture-based courses tend to emphasize teaching rather than learning, passive rather than active learning, and having rather than creating knowledge **Narkeesh, LekhniPriya and Kanimozhi, (2014).** The instructor is the transmitter and the learners are the receivers of the knowledge being transferred. The early twentieth century technique was followed for decades and still in practice at many places. The instructor is the center of this model delivering factual knowledge to the whole group of learners and having a complete authority in the classroom. Students can absorb large quantities of new material, it makes the learning process mostly effortless on the part of the students, who need only pay attention during the lecture and take notes where they see fit (**Udemy, 2017)**

Moreover, lecture method is limited and less effective. The students may lose their concentration within half an hour due to passive role, less participation, minimum role play and does not build their engagement level with the course being taught. **Scribd, (2015)** and **Oxford Book University, (2011).** Therefore, this study aims to evaluate the effects of using PBL strategy on academic achievement of technical health nursing students.

II. Aim of the study

The aim of this study is to assess the effects of using PBL strategy on academic achievement of Technical Health Nursing Students

Research hypothesis

Using PBL strategy will improve the academic achievement of Technical Health nursing students in oncology modules.

III. Subject and Method

3.1. Study design:

A quasi-experimental design will be used in this study

3.2. Study Setting:

Health Technical Institute at Mansoura City

3.3. Subjectsand sampling

All students (100) were at second year of health technical institute. Students were located into two groups / 50 students of each group as the following:

- **Traditional group: include** students at second term in the academic year 2016-2017 will be use traditional method (n= 50).
- **Problem based learning group: include** students in the first term in the next academic year 2017-2018 will be use PBL (n= 50).
- **Sampling technique:** Convenient sampling technique was used to recruit this study

3.4. Tools of the study

Data were collected by using the following tools:

Tools I: socio-demographic scale to assess clients socio-demographic data: This tool was adopted from **Fahmy and El-Sherbini Socio Economic Scale, (1983)** which was modified by **El Gelany, El-Wehady and El-Wasify, (2012)** and included demographic characteristics of the studied students such as age, residence, marital status, faculty and academic year. In addition to socio economic level of clients which included 7 domains, Education and cultural domain, Occupation domain, Family possessions domain, Family domain, Home sanitation domain, Economic domain, and Health care domain, with a total score of 84. This scale will be used to assess socio economic level of studied clients.

Tool II: Self-administered structured questionnaire to assess students' knowledge related to oncology courseby using multiple choice questions and true or false question. This questionnaire will be used as pre and post the intervention with experimental and control groups to measure students' knowledge regarding oncology.

Tool III: Problem based learning module:

Based on the literature review the problem based learning module will be develop by researcher include scenarios related to general oncology.

Tool IV- Students' performance evaluation scale for PBL strategy

This scale was adopted from Criterion- Referenced System that developed by **Montemayor, (2004)**. This scale will be used by tutor to evaluate certain criteria of students' performance and abilities throughout the problem-based sessions (PBL). Students also will use the same scale for self- evaluation. The evaluation scale is a 6-point Likert scale that starts with "not developed skills" to end by "excellent level of performance". This scale consisted of four parts: reasoning and decision-making skills, self- learning, collaborative work skills and personal characteristics and commitment.

Tool V- Peer evaluation scale

Montemayor, (2004) scale will be used after modification to evaluate students' performance by their peers throughout problem-based learning sessions

Tool VI: Performance in applying problem solving steps:

Well-structured scenarios about oncology problems will be used to evaluate student's skills in applying problem solving process. Scenarios followed with key questions on the four steps of problem solving:

- Define the Problem
- Create Alternative Solutions
- Evaluate alternatives and select one
- Implement and follow up on the solution

Tool VII: Self-administered structure questionnaire to assess students' attitude regarding teaching style

The attitude scale will be comprised of statement requiring negative and positive response on a 5- point Likert scale ranged from "strongly disagree" to "strongly agree".

3.6. Methods

1-Ethical consideration:

1. Ethical consideration: An ethical approval obtained from Research Ethics Committee of Faculty of Nursing, Mansoura University. Official permission to conduct the study was obtained from the director of Health Technical Institute at Mansoura City after clarifying the purpose, process and the starting time of the study. Oral informed consent was obtained from the study participants informed about the purpose of the study and, they assured that their identities and response to the questionnaire would be confidentialwith no effect on their academic evaluation. Answering will be voluntary. Additionally, they informed that they have the right to withdraw at any time from the study.

2. Literature review

Review of local and international literature on the various aspects of the cancers teaching and learning methods using scientific published articles, internet search and textbooks. This review was a guide for developing the study tools.

Developing of the problem-based learning tools

Tools of data collection were developed by the researcher based on reviewing the relevant literature. Validity testing was done to the tool by submitting the tool to 5 a jury of experts in community health nursing. Their recommended modification had been done. Face validity of the developed tools will be tested by conducting pilot study. Pilot study carried out on 10% (10) of study sample who were selected randomly who are studying oncology course in the second semester (2016-2017) from the same setting to evaluate the clarity, applicability and reliability of the research tools and estimate the approximate time required for data collection. According the necessary modification was done, some questions were added, and others were clarified or omitted. This sample was excluded from the main study sample to test the content and consistency validity of the tools. The cronbachs alpha formula was (.504) for Students' performance evaluation scale for PBL strategy, it was (.566) for peer evaluation scale and it was (.654) for Self-administered structure questionnaire to assess students' attitude regarding teaching style

1- **Developing of the educational strategies**

The students in traditional group were (50) students divided into 5 groups each group 10 students. The sessions were conducted at lab in health technical institute, its duration 5 hour × 1 day /6week =30h. Different teaching and learning methods were used during the Sessions namely lecture, black board, power point presentation and discussion.

2- **Problem-based learning group**

The students in the PBL group were 50 students divided into 5 groups each group included 10 students. The study group received orientation on an overview of the problem-based learning; Students have responsibility for their own learning by identifying their learning issues and needs. The students work with the learning materials in the form of problem scenario, a list of objectives that the student is expected while working on the problem, a reference list of materials that pertain to the basic objectives, questions that focus on important concepts and applications of the knowledge base.Time allotted to each scenario was fixed. Students work on the problem in teams, they were evaluated in multiple ways by instructors, peers, and by themself, using questionnaires, interviews, observation. Students work in teams to complete the project, resolve the problem, and accomplish the learning objectives.

Five groups, each group consists of 10 students, four roles were involved: Project leader - proposes meeting agendas, suggests division of labor, and develops the overall project plan.-Facilitator - described the process to be followed during the steps of the project plan, determined appropriate time to proceed in plan, and suggested adjustments to the plan as needed.Recorder - took group notes of each meeting, team member – took individual notes, participated in discussion, and reviewed resource materialsthe first week include 3 sessions:

- 1st session: started with orientation about course and concepts of problem-based learning for 2 hours then role play was used
- 2nd session: focused on the basic principles of library utilization and oncology search for 1 hour
- 3rd session: in the last 2h introducing the trigger scenarios to the student each group worked to explore the learning issue of the scenario and select a team leader to acquire the leadership and communication. The researcher helps students to establish the ground roles and the responsibility of each member in the group work. In addition, they formulate a readable format and presentation of their discussions.

- Within the first week one hour / day for self-study and group independent discussion. Each group had a compulsory weekly one tutorial hour to check that student response to the course and to assess their PBL activities. During the compulsory tutorial hour the students were asked to illustrate their decisions about their goals and learning objectives as well as their plan to achieve these objectives. Moreover, researcher provided tutorial advice for students as a guide
- During the 2nd wk. Each group was asked to observe setting which correlate to the obtained knowledge from the trigger scenario with the real area to be mentioned in their final presentation which is oncology center at Mansoura University.
- During the 3rd week each group presented their conclusions about the assigned trigger scenario in 50-55 minute. The presenter group were asked questions by audiences and tutor and comments were recorded
- During the 4th, 5th, 6th week The students presented final conclusion to all students
- Activities are distributed over 5 weeks and the sixth week evaluation for all
- Two scenarios were discussed every week.

- **Preliminary Data collection**

The researcher started by introducing herself to the students and giving them a brief orientation about aim and design of the study.Pretest tool (form No 2) was distributed to the student at the beginning of the semester to assess their knowledge about cancers.

- **Data collection**

The tutorial evaluation during the course was done, this evaluation depended on objective that were planned to be covered in each session. Students' scores were obtained every tutorial meeting and were summed at the end of the course, self-evaluation, peer evaluation and student's opinion took place by the end of the course

- **Data analysis**

Data were stored, coded, organized, categorized and then transferred into especially designed formats, it was analyzed using SPSS (Stands For Statistical Product And Service Solutions) version 16**,** it were presented by using descriptive statistics in the form of frequencies and percentage. Chi-square test for categorical variables, to compare between different groups**,** McNemar and Marginal Homogeneity Test Used to analyze the significance between the different stages, Student t-test for normally distributed quantitative variables, to compare between two studied groups.

IV. Results

Table (1) presents socioeconomic levelof traditional and problem-based learning groups. It wasillustrating that (98.0%) of both groups were in low socioeconomic level and only (2%) of both groups were in middle level of socioeconomic level.

Table (2) illustrate thattotal score level of knowledge regarding cancers pre post learning intervention.All students in traditional group and problem based learning group showed poor score level pre

learning intervention and (84%), (100%) of traditional learning and problem based learning respectively showed good score level post learning intervention.

Table (3):clarifies tutorial evaluation of students performance' during PBL session.The majority (80.0%) of students was able toanswers questions or shares theiropinions without reading notes/books and discriminated the important information of the problemfrom that which is not and formulated conclusionshowed very good level of performance. Moreover, (62%), (68.0%) were able to show evidence of thorough reading of documented sourcesandshow breadth and depth of knowledge about the problemrespectively, Concerning attitude during discussion (84.0%)of students showed excellent level of performance related to theirappearance and closing correspond with that of a medical professional, and (78.0%, 76.0% , 68.0%) of the students showed very good level of performance towards responsibility and commitment**,** Stand up for their point of viewandshow ability to change their point of view in light of new information given respectively.

Table (4):reveals self-evaluation of students performance'during PBL session. More than two thirds (74%,82%, 66%,68%) of students showedexcellent level of performance related to breadth and depth of applying knowledge about the problem, discriminates important information of the problem from that which is not,interprets to the information given in the problem respectively, Concerning to collaborative work (86.0%, 82%, 80%) of students in relation to honesty,respect classmates opinion, Show responsibility and commitment and shares bibliographic sources with classmates had excellent level of performance

Table (5): reveals the opinion of students regarding PBL session. It was noticed that most of the students were very satisfied related to encourage the use of the internet database (90%), have an effective access to educational goals and develop communication skills(84%). The teacher facilitates interaction(98%), participation among students and interaction(96%), increased desire of learning(92%), PBL successful method of teaching(98%), field training places are related to the scenario(90%).

Table (1): Distribution of traditional and problem based learning groups according to socioeconomic level

Socioeconomic level	Traditional group		PBL group	
	No.	%	No.	%
< 50 % low	49	98.0	49	98.0
25-50 % middle	1	2.0	1	2.0

Table (2): Distribution of traditional and problem-based learning groups total score level of knowledge regarding cancers pre post learning intervention

Item	Traditional learning (n = 50)				Problem based learning (n = 50)				Test of significance	p
	Pre		Post		Pre		Post			
	No.	%	No.	%	No.	%	No.	%		
Total knowledge										
Poor	50	100.0	8	16.0	50	100	0	0.0	Fisher Exact	.000
Good	0	0.0	42	84.0	0	0.0	50	100.0		

Poor less than =50
Fair =50-65%
Good= more than 65%

*FE**: Fisher Exact***
p: p value for comparing between the studied group
**: Statistically significant at p ≤ 0.001*

Table (3): Distribution of students according to the tutor's evaluation of their performance' throughout problem-based learning sessions (n =50)

The tutor's evaluation of their performance' throughout problem-based learning sessions	Not developed		Poor		Fair		Good		Very good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Application of knowledge base												
Show evidence of thorough reading of documented sources	0	0.0	0	0.0	7	14.0	12	24.0	31	62.0	0	0.0
Show breadth and depth of knowledge about the	0	0.0	0	0.0	5	10.0	11	22.0	34	68.0	0	0.0

problem												
Answers questions or shares her opinions without reading notes/books	0	0.0	0	0.0	0	0.0	10	20.0	40	80.0	0	0.0
Apply acquired knowledge to the problem	0	0.0	0	0.0	7	14.0	16	32.0	27	54.0	0	0.0
Clinical reasoning and decision making skills												
Discriminate important information of the problem from that which is not	0	0.0	0	0.0	0	0.0	10	20.0	40	80.0	0	0.0
Prioritizes the information	0	0.0	0	0.0	0	0.0	4	8.0	30	60.0	16	32.0
Interprets to the information given in the problem	0	0.0	0	0.0	0	0.0	8	16.0	31	62.0	11	22.0
Is able to support his clinical reasoning and decision making with evidence	0	0.0	0	0.0	1	2.0	13	26.0	35	70.0	1	2.0
Show evidence and critical understanding of facts	0	0.0	0	0.0	0	0.0	13	26.0	31	62.0	6	12.0
Show ability to generate diagnostic hypothesis	0	0.0	0	0.0	9	18.0	26	52.0	15	30.0	0	0.0
Is able at formulating conclusion about the problem	0	0.0	0	0.0	9	18.0	23	46.0	18	36.0	0	0.0
Self –directed learning (self –study)												
Defines learning objectives	0	0.0	0	0.0	2	4.0	15	30.0	32	64.0	1	2.0
Show evidence of accomplishment of learning objectives	0	0.0	0	0.0	5	10.0	16	32.0	28	56.0	1	2.0
Show evidence reading diverse recent sources	0	0.0	0	0.0	4	8.0	20	40.0	26	52.0	0	0.0
Make effort to improve	0	0.0	0	0.0	9	18.0	23	46.0	15	30.0	3	6.0
Seeks counseling to orient her study	0	0.0	0	0.0	4	8.0	17	34.0	28	56.0	1	2.0
Drives herself to limits of her knowledge and abilities	0	0.0	0	0.0	4	8.0	19	38.0	26	52.0	1	2.0
Identify her opportunity areas	0	0.0	0	0.0	5	10.0	22	44.0	23	46.0	0	0.0
Establish learning goals define concrete action plan	0	0.0	0	0.0	2	4.0	20	40.0	26	52.0	2	4.0
Collaborative work												
Work toward achievement of groups learning goals	0	0.0	0	0.0	4	8.0	11	22.0	28	56.0	7	14.0
Show effective interpersonal activities	0	0.0	0	0.0	3	6.0	11	22.0	34	68.0	2	4.0
Interested in participating daily discussion	0	0.0	0	0.0	0	0.0	14	28.0	30	60.0	6	12.0
Shares bibiliographic sources with classmates	0	0.0	0	0.0	0	0.0	12	24.0	34	68.0	4	8.0
Respect classmates opinion	0	0.0	0	0.0	1	2.0	7	14.0	22	44.0	20	40.0
Help classmates who lag behind	0	0.0	0	0.0	0	0.0	19	38.0	27	54.0	4	8.0
Gives feedback in constructive way	0	0.0	0	0.0	0	0.0	23	46.0	26	52.0	1	2.0
Work as hard as the rest of teammates	0	0.0	0	0.0	7	14.0	21	42.0	22	44.0	0	0.0
Attitude during discussion and professionalism												
Accept feedback with openness	0	0.0	0	0.0	0	0.0	15	30.0	33	66.0	2	4.0
React positively to feedback criticism	0	0.0	1	2.0	9	18.0	29	58.0	11	22.0	0	0.0
Manage her impulsiveness adequetly	0	0.0	0	0.0	2	4.0	22	44.0	26	52.0	0	0.0
Stand up for her point of view	0	0.0	0	0.0	0	0.0	9	18.0	38	76.0	3	6.0
Mahes an effort to adequate her behavior to circumstances	0	0.0	0	0.0	1	2.0	36	72.0	12	24.0	1	2.0
Show ability to change her point of view in light of new information given	0	0.0	0	0.0	0	0.0	14	28.0	34	68.0	2	4.0
Attend every class and arrive on time	0	0.0	0	0.0	0	0.0	3	6.0	33	66.0	14	28.0
Show responsibility and commitment	0	0.0	0	0.0	0	0.0	2	4.0	39	78.0	9	18.0
Is honest	0	0.0	0	0.0	0	0.0	0	0.0	33	66.0	17	34.0
Her appearance and closing correspond with that of medical professional	0	0.0	0	0.0	0	0.0	0	0.0	8	16.0	42	84.0

Table (4): Distribution of students according to self-evaluation of their performance' throughout problem-based learning sessions (n =50)

Self-evaluation of their performance' throughout problem-based learning sessions	Not developed		Poor		Fair		Good		Very good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Application of knowledge base												
Show evidence of thorough reading of documented sources	0	0.0		1.7		1.7	7	11.7	9	15	32	53
Show breadth and depth of using knowledge about the problem	1	2.0	0	0.0	1	2.0	3	6.0	8	16.0	37	74.0
Answers questions or shares opinions without reading books	0	0.0	0	0.0	1	2.0	6	12.0	26	52.0	17	34.0
Applies acquired knowledge to the problem	1	2.0	1	2.0	2	4.0	5	10.0	17	34.0	24	48.0
Clinical reasoning and decision-making skills												
Discriminates important information of the problem from that which is not	0	0.0	1	2.0	0	0.0	4	8.0	4	8.0	41	82.0

Prioritizes the information	0	0.0	0	0.0	3	6.0	5	10.0	20	40.0	22	44.0
Able to support clinical reasoning and decision-making skills	0	0.0	0	0.0	5	10.0	7	14.0	15	30.0	23	46.0
Show evidence and critical understanding of facts	0	0.0	2	4.0	3	6.0	2	4.0	17	34.0	26	52.0
Show ability to generate diagnostic hypothesis	0	0.0	2	4.0	6	12.0	10	20.0	13	26.0	19	38.0
Is able to formulate conclusions about the problem	2	4.0	0	0.0	2	4.0	10	20.0	15	30.0	21	42.0
Interprets to the inform given in the problem	0	0.0	0	0.0	4	8.0	2	4.0	11	22.0	33	66.0
Self-directed learning												
Defines learning objectives	1	2.0	0	0.0	6	12.0	6	12.0	13	26.0	24	48.0
Show evidence of accomplishment of learning objectives	0	0.0	1	2.0	2	4.0	9	18.0	22	44.0	16	32.0
Makes efforts to improve	0	0.0	0	0.0	1	2.0	5	10.0	14	28.0	30	60.0
Identifies her opportunity areas	1	2.0	0	0.0	0	0.0	2	4.0	13	26.0	34	68.0
Establish learning goals	1	2.0	0	0.0	1	2.0	9	18.0	10	20.0	29	58.0
Defines a concrete action plan to meet learning needs	0	0.0	0	0.0	2	4.0	10	20.0	19	38.0	19	38.0
Collaborative work												
work towards achievement of group ,s learning goals	0	0.0	0	0.0	1	2.0	1	2.0	14	28.0	34	68.0
Show effective interpersonal abilities	1	2.0	0	0.0	1	2.0	4	8.0	14	28.0	30	60.0
Is interested in participating in daily discussion	0	0.0	0	0.0	0	0.0	4	8.0	10	20.0	36	72.0
Shares bibliographic sources with classmates	0	0.0	0	0.0	0	0.0	5	10.0	5	10.0	40	80.0
Respect classmates opinion	0	0.0	0	0.0	0	0.0	2	4.0	7	14.0	41	82.0
Attitude during discussion and professionalism												
Accept feedback with openness	0	0.0	0	0.0	2	4.0	2	4.0	19	38.0	27	54.0
Reacts positively to feedback and criticism	0	0.0	0	0.0	0	0.0	8	16.0	12	24.0	30	60.0
Stand up for her point of view	0	0.0	0	0.0	1	2.0	4	8.0	7	14.0	38	76.0
Makes an effort to adequate her behavior to circumstances	0	0.0	0	0.0	3	6.0	2	4.0	10	20.0	35	70.0
Attend every class and arrive on time	0	0.0	0	0.0	0	0.0	7	14.0	5	10.0	38	76.0
Show responsibility and commitment	0	0.0	0	0.0	0	0.0	1	2.0	8	16.0	41	82.0
Is honest	0	0.0	0	0.0	1	2.0	0	0.0	6	12.0	43	86.0
her appearance and clothing correspond with that of a medical professionalism	0	0.0	0	0.0	0	0.0	4	8.0	10	20.0	36	72.0
Contributes to group harmony (listens to conflicting opinions	0	0.0	0	0.0	4	8.0	2	4.0	12	24.0	32	64.0
Tolerates shortcomings of others	4	8.0	0	0.0	2	4.0	3	6.0	10	20.0	31	62.0

Table (5): Distribution of students according to their opinion regarding problem-based learning sessions (n=50)

Their opinion regarding problem-based learning sessions ~~in intervention group~~	Very un satisfied		Un satisfied		Moderately satisfied		Satisfied		Very satisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%
Elements related to cognitive learning										
Have an effective access to educational goals	0	0.0	0	0.0	2	4.0	6	12.0	42	84.0
Helps to keep information for a long period of time	0	0.0	0	0.0	0	0.0	18	36.0	32	64.0
Increase the chances of participation in the educational process	0	0.0	2	4.0	2	4.0	7	14.0	39	78.0
Stimulate critical thinking	0	0.0	2	4.0	4	8.0	16	32.0	28	56.0
Stimulate rational thinking	0	0.0	0	0.0	1	2.0	12	24.0	37	74.0
Develop communication skills	0	0.0	0	0.0	0	0.0	8	16.0	42	84.0
Helps to identify strengths and weaknesses	0	0.0	0	0.0	2	4.0	10	20.0	38	76.0
Make the learning process more enjoyable and exciting	0	0.0	0	0.0	0	0.0	11	22.0	39	78.0
Encourage obtain information from different sources	0	0.0	0	0.0	0	0.0	9	18.0	41	82.0
Helps to develop leadership skills	0	0.0	0	0.0	2	4.0	12	24.0	36	72.0
Encourage the use of the Internet database	0	0.0	0	0.0	0	0.0	5	10.0	45	90.0
Discover my special talents	0	0.0	1	2.0	0	0.0	11	22.0	38	76.0
Encourage teamwork	0	0.0	0	0.0	3	6.0	7	14.0	40	80.0
Gain problem solving skills	0	0.0	0	0.0	1	2.0	11	22.0	38	76.0
Elements related to collective learning										
Interaction and collaboration between students is one of the most valuable part of the educational process	0	0.0	0	0.0	0	0.0	2	4.0	48	96.0

The teacher facilitates interaction and participation among students	0	0.0	0	0.0	0	0.0	1	2.0	49	98.0
Feeling comfortable when exchanging ideas among students	0	0.0	0	0.0	0	0.0	11	22.0	39	78.0
Students in groups are supportive of each other	0	0.0	0	0.0	0	0.0	7	14.0	43	86.0
Elements related to the development of problem solving skills										
Increase the ability to solve real problems	0	0.0	0	0.0	1	2.0	11	22.0	38	76.0
Encourage the creation of alternatives to solve the problem	0	0.0	0	0.0	1	2.0	11	22.0	38	76.0
Link theories to field work	0	0.0	0	0.0	0	0.0	15	30.0	35	70.0
Increased desire of learning	0	0.0	0	0.0	0	0.0	4	8.0	46	92.0
Students' opinion on the scientific subject										
The scenario is clear	0	0.0	0	0.0	0	0.0	6	12.0	44	88.0
The script is written in an easy and understandable way	0	0.0	0	0.0	0	0.0	7	14.0	43	86.0
Field training places are related to the scenario	0	0.0	0	0.0	0	0.0	5	10.0	45	90.0
PBL successful method of teaching	0	0.0	0	0.0	0	0.0	1	2.0	49	98.0

V. Discussion

Problem-based learning is a teaching method that encourages critical thinking, group interaction, and application of the theory into practice. Transition to active forms of learning, with integrating problem-solving strategies, will help to raise the quality of education**(Gönc, Lorber&Nirat, 2016)**

The current study reveals that scores level of students' knowledge and performance posttest problem based learning method were higherthan scores level of student knowledge and performance posttest traditional groupand there was statistically significant difference between scores of pre and posttest. These result in the same line with ***Ernawaty and Sujono (2019)***, ***Wahyu and Syaadah (2018);***conducted inIndonesia***Anazifa, (2016) in*** Yogyakarta,***Carrio, Agell, Banos and Mayano (2016)***In Spain***; Johnson. (2016) in*** Towson, Maryland***; Gusu (2015)***in India***;* **Duke and *Halvorsen, (2017)*** in Michigan USA whofound statistically significant differences overall favoring the PBL group over the traditional group in social studies (effect size = 0.482) and informational reading and ***Jensen (2015)*** indicated that PBL is often superior to traditional, while these finding are in contrast to finding of ***Carrio, Larramona, Ban˜os and Pe´rez (2011)***in Spain***; Witte and Rogge (2012)*** in Belgiumwho stated that students in PBL group don't obtain higher score than students in traditional course and there is no statistically significant difference between two groups.

Concerning tutorial evaluationtoward reasoning, decision making and self-directed learning more than half of students showed very good level of performance about prioritizing the information and interpreting it, defining learning objective, showing evidence of accomplishment of learning objective; showed evidence of diverse and recent bibliographic sources, making effort for improving and seeking counseling to orient study, driving to the limits of knowledge, abilities and establishing learning goal and concrete action plan to meet learning needs.While less than half of students showed good level of performance toward formulating the conclusion.The same finding ***revealed by El-Raouf & Ahmed (2011)***in Egypt results who found that one quadrant of their students showed good level of performance toward the previous items also ***Othman and Shalaby (2014)*** found that less than half of student showed fair level of performance toward support clinical reasoning and decision making with evidence.

Regarding Self-directed learning skills less than half of students and more than two thirds showed very good level of performance, related to show evidence of accomplishment of learning objective and define concrete action plan to meet learning needs. In addition, more than two thirds of students showed excellent level of performance in make effort to improve and identify the opportunity area.This finding in the same line with***Abd el-Raouf & Ahmed (*2011)**study in Egyptwhostated that more than half of student showed excellent level of performance for these two items while ***Soliman, Abd El -Mouty, and Salem (2017***) found that more than one third of Egyptian students, less than half of students showed good and very good level of performance about these two items.

The current study revealed statistically significant difference between scores on the pretest and posttest for the problem based learning and also statistically significant difference between scores of the post traditional group and posttest for the problem based learning group this is in agreement with the study conducted in Malaysia by **Hamdan et al., (2014)** stated that statistically significant difference between scores on the pretest and posttest for the problem based learning method.

Moreover, **Padmanabha, Manu, Madhav, Savkar, Chandrakantha and Neha (2016)** study conducted in India found thatstudents preferred problem-based learning more thantraditional learning because of motivation boost, a higher quality of education, knowledge retention, class attractiveness, and practical use. However, the difference was not statistically significant. Although PBL edged over lecture, but most of students preferred integrated teaching going side by side i.e. PBL along with lecture

Current findings consistent with the previous findings conducted in purdue US by **walker, Leary, Helmo-silver and Ertmer (2015)**suggested that the PBL process has been adapted to move students gradually from teacher direction to taking responsibility for their learning. This has provided the opportunity for students to develop critical thinking, problem solving, information retrieval and evaluation skills (**Hamdan, Kwan, Khan, Ghafar & Sihes, 2014)**

VI. Conclusion

This study concludes that, most of students revealed that PBL is successful method of teaching.Scores level of students'knowledge and performance posttest problem- based learning method were higherthan scores level of student knowledge and performance posttest traditional method. Tutor, self and peers' evaluations indicated excellent level of performance of the students; also students were very satisfied regarding PBL sessions,good quality of PBL. Encourage the use of the internet database, have an effective access to educational goals and develop communication skills. The teacher facilitates interaction, participation among students and interaction, increased desire of learning, PBL successful method of teaching; field training places are related to the scenario.

VII. Recommendation

Educational curriculum should incorporate problem-based learning strategy in teaching.The physical structured and resources should be redesigned to fulfill the requirements of PBL. Capacity building and creating supportive and motivating learning environment are considered the most important prerequisites to PBL implementation. There has to be good space for small group work and information search. Lastly, in depth researches on the appropriateness of PBL for nursing students are recommended.

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