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Introduction:
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Subject and methods:
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Tables, figures or graphs should be typed or drawn on one page and relative placement should be noted in the text.

Discussion:
It should illustrate the findings with other relevant studies in the field of studies in the field of study

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Summaries the key findings, outcomes or information in your report

Recommendations

Are the actions you are suggesting should take place bearing in mind your conclusion

References:

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Three copies of the manuscripts and CD that should be sent to Tanta Scientific Nursing Journal

Contents

Head Nurses' Evaluation and Nurses' Self Evaluation for Performing Chest Nursing Care Procedures

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Abstract

Background : Head nurse evaluation of the nurses' performance of chest care procedures is vital to quality patient care at ICU. While nurses' self-evaluation help nurses to pay attention to their own performance, raise their self-awareness and efficacy to make efforts for improvement in performing of six chest care procedures. So head nurses and nurses actually need an educational training program for enforcing them for continuous performance improvement and updating knowledge .**Objective**: study head nurses' evaluation and nurses' self -evaluation of performing chest nursing care procedures. **Setting**: Tanta University Hospitals at Mobark ,Chest , and Tanta University International Educational Hospital. **Tools** two tools used Tool I: Evaluation and self -evaluation for nurses' actual performance of chest nursing care procedures observation checklists. And tool II: Knowledge assessment of chest nursing care procedures steps, evaluation and self -evaluation process. **Result** Preprogram researcher head nurses evaluation and nurses self -evaluation showed that nurses performance were at unsatisfactory level for all items of the six chest care procedures. Head nurses 55%,95%,100% and 85% showed poor level for plan ,needed information ,principles of evaluation and methods ,respectively . All head nurses evaluation and nurses self- evaluation level of knowledge pre- program was poor . Actually no one of nurses showed excellent level preprogram for performing items of vibration, coughing and suctioning procedures which changed post program to 65%, 78.8% and 100% , and at 3 month post program changed to 65%, 83.3% and 100% respectively . All head nurses and 80% of nurses had poor overall knowledge about six chest care procedure standard evaluation and self- evaluation principles preprogram .Implementation of educational program improved head nurses and nurses overall knowledge about chest care, evaluation and nurses self -evaluation statistically significant at $P < 0.01$.**Conclusion:** Head nurses at Tanta university hospital were not evaluating nurses performance of chest care procedures leading to unsatisfactory nurses performance .Actually head nurses have insufficient knowledge to evaluate nurses performance and nurses have insufficient knowledge to perform chest care procedures according standard and cannot make self-evaluation for their performance. Implementation of educational program about evaluation principles,chest care procedure standard and self-evaluation principles successfully improved nurses staff performance and knowledge. **Recommendation**: Conduct regular training programs workshops and seminars for head nurses to update their knowledge and skills related to evaluation of nurses performance. Conduct periodical in service training program for nurses to refresh their knowledge and skills related to chest care procedure performance according to standard of its performance. Head nurses should encourage nurse self-evaluate their performance and provide supportive health work environment to help nurses improved their performance of chest care procedures .

Key words head nurse evaluation, nurses self- evaluation. Chest care procedures

Introduction

Nursing is a professional issue and is central to patient care outcomes and which caring, the basis of good nursing. Present-day health services are highly complex and high quality care is mandatory. In order to face these challenges and ensure that the best care is given by nurses, it is necessary to evaluate the nurses' performance competence [(1)]. Nurses play a crucial role in patient-care and rapidly changing complex health care environment, there is a crucial demand for head nurses capable of making evaluation[(2)].

Head nurse performance is very significant because of their strong effect on the nurses. They interact with most nurses on an everyday basis and must action like role models, if their role weak unsuccessful to stimulate their nursing staff, it may affect dramatically the performance of the nurses [(3)].Head nurse is labeled as a fulcrum of managerial success of the nursing unit and as having a pivotal role in the hospital as a whole. She has three main areas that constitute her role[(4)].

Make staff management to utilize, guide, evaluate and correct staff nurses in their nursing practice to ensure its smooth running to fulfill hospital goals for improving nursing staff performance .So increasing the quality of nursing care, head nurse are challenging to do efforts to get efficient and effective patient out–come[(4)].Head nurses encourage nurses self-evaluation as the critical factor in improving performance standards within their hospital . It provides nurses with the capacity to predict and cope with change effectively. Head nurses good performance evaluation of nurses points out areas where nurses need to improve their self –performance [(5)].

Evaluation in the healthcare context can be a complicated activity and some of the potential challenges of evaluation are described, alongside possible solutions. Further resources and guidance on evaluation activity to support nurses' ongoing development are identified[(6)]. Evaluation of chest care procedures delivery is an important aspect of nursing practice is being increasingly used and led by head nurses. It aims to encourage nurses think about how self- evaluation of practice activity of procedure performance and to consider why and how they should use self -evaluation in their practice[(7)].

Frequently chest care techniques, such as turning, postural drainage percussion, vibration, coughing exercise and suctioning employed in a critical care

units. Nurses are primarily responsible for their provision; also implemented these procedures and must consider chest care to be a part of their role, or how they perceive their knowledge and confidence pertaining to these techniques [8]. Intensive care practice is a very demanding multidisciplinary environment where nurses and head nurses are vital members. The early application of procedures can improve patient‘s thereby preventing some of the ICU-associated complications[9].

Self-evaluation is a systematic process involving the nurse and process of self-evaluation: is ongoing and sharply-focused, involves monitoring and evaluating the effectiveness of existing provision and staff nurse achievements the need to have a clear and agreed view of the hospital development, to identify priorities which will have a positive effect on performance which requires the nurse to evaluate their performance critically[10].

A systematic process of self-evaluation as review, identify strengths and areas for improvement , prioritize areas for improvement, plan and implement action for improvement monitor and evaluate outcomes [11].

Not having an effective evaluation system increases the risk of inefficiency, poor morale so nurses are critical to delivery of high-quality and efficient care relevant to nursing standard [12]. The nurses need to know exactly what is necessary to provide high-quality nursing care and that measures are in place to determine whether care meets the standards. Competence in nursing practice must be evaluated by the nurse's practices self-evaluation and head nurses supervisor [13]. So the aim of present study is to improve head nurses and nurses knowledge about chest care performance procedure standard, principles of evaluation and self evaluation.

Aim of research to study head nurses evaluation and nurses' self- evaluation of performing chest nursing care procedures.

Research hypothesis 1-knowledge of head nurses and nurses about chest nursing care standard procedure will be changed.2- Evaluation skill of head nurses will be enforced for evaluating nurses' performance for chest nursing care procedures. 3-Self evaluation skill of nurses will be enforced for self evaluating of their performance of chest nursing care procedures.

Design: Quasi-experimental research design was used to achieve the aim of research to fits the study nature about head nurses' evaluation and nurses' self

evaluation of performing chest nursing care procedures at intensive care units. **Setting** study was conducted at intensive care units (ICU) of Tanta University Hospitals at Mobark Hospital ,Chest Hospital and Tanta University International Educational Hospital. Mobark (ICU) capacity (16) beds, Chest Hospital (ICU) bed capacity (15) and Tanta University International Educational Hospital (ICU) bed capacity (15) bed .

Subjects All (n=20) head nurses and all (n=80) nurses working at previous mentioned (ICUs) at Tanta University Hospitals. The subject from Mobark hospital ICU (n= 6) head nurses and (n= 27) nurses, from Chest Hospital ICU. (n= 8) head nurses and (n= 30) nurses and from Tanta University International Educational Hospital ICU. (n= 6) head nurses and (n= 23) nurses. **Tools** Data was collected using two tools to fulfill the purpose of study.

Tool I: Evaluation and self -evaluation for nurses' actual performance of chest nursing care procedures observation checklists. This tool developed by researcher guided by Langenderfer (1998) [14], Gass (2009) [15] and related recent literature. The tool used by researcher and head nurses to evaluate nurses' performance as well as used by nurses for self- evaluation. The tool used to assess the actual nurses' **performance** of chest nursing care 6 procedures (turning, postural drainage, chest percussion, vibration, cough techniques and suctioning) and composed of two parts as follows: **Part one:** Subject characteristic of nursing staff as hospital name, age, marital status, years of experience, level of education, attendance of educational program and positions. **Part two**: **Chest nursing care procedures :Head nurses' evaluation observation, checklists. Procedure phases** of the six chest care procedures namely turning, postural drainage, chest percussion, vibration, cough techniques and suctioning. Each procedure have specific checklist include items on the following: 1-Assessment indications and contraindications. 2-Preparation of equipment.3-Preparation of patient by communication and teaching.4-Implementation of procedure and following infection control.5-Evaluation desirable and undesirable outcomes. This part was used to assess the nurses performance of chest nursing care procedure according to researcher and head nurses evaluation ,it include six chest care procedures as follow: Turning patient

includes 20 items (1-20).Postural drainage of patient includes 23 items (1-23). Percussion of patient includes 36 items (1-36).Vibrations of patient includes 19 items (1-9).Cough exercise of patient includes 19 items (1-19).Suctioning of patient includes 36 items (1-36).

Part three: Chest nursing care procedures: Nurses' self -evaluation. The same 6 check lists as parts two used for nurses self- evaluation of performing six chest care procedures.

Scoring system Part two and three the levels of head nurses and researcher evaluation and nurses self- evaluation of the six chest care procedures measured by three points Likert Scale (0-2)**,** were complete done=(2),partially done =(1) and incorrectly done=(0).

Levels of evaluation and self-evaluation-

Unsatisfactory ≥ 60%-75%. -

Satisfactory > 75 %-80%.-

Excellent > 80%

Tool II: Knowledge assessment of chest nursing care procedures steps, evaluation and self evaluation process (Appendix II). This tool developed by researcher to assess head nurses and nurses' knowledge of chest nursing care (six procedures) steps ,principles of performance evaluation and self evaluation , based on Lammogila (2013) [16], Walsh et al. (2007) [17] and current relevant literatures . The tool include four parts as follows: **Part one** Identification data of both head nurses and nurses.

Part two Knowledge assessment of six chest nursing care standard procedures:- This part include questions on steps of standard nursing care of chest six procedures .The test include questions on **Steps of** chest care procedures standard performance consists of 7 questions (1-7). **Indication** of chest care procedures standard performance consists of 6 questions (8-13) **Contraindication** of chest care procedures standard performance consists of 7 questions (14-20) **Equipment** required equipment of chest care procedures according standard performance consists of 3 questions (21-23). **Preparation of patient** regarding chest care procedures performance standard consists of 9 questions (24-32).

Evaluate desirable and undesirable outcome 4 question (33-36) about assessment of desirable and undesirable outcome of care standard **Infection control** implementation of chest care procedures following infection control consists of 4 question (37-40) **Part three Knowledge assessment for evaluation**

principles. This part include questions on evaluation process for its plan, needed information principles, methods and steps of implementation as follow: **Plan** consists of 5 questions (41-45) about evaluation plan process - **Needed information** 2 questions (46-47) about required information of evaluation process - **Principles** 7 questions (48-54) about principles of evaluation process - **Methods and steps of implementation** 7 questions (55-60) about methods and steps of evaluation process.

Part four Knowledge assessment on self evaluation principles.This part include questions on self -evaluation process for its plan, needed information principles, methods and steps of implementation. As follow:- **Plan** consists of 5 questions (61-65) about self evaluation principles - **Needed information** 2 questions (66-67) about required information of self-evaluation principles- **Principles** 9 questions (68-76) about principles of self –evaluation -**Methods and steps of implementation** 6 questions (77-82) about methods and steps of implementation of self-evaluation to identify gap and treat

Scoring system

The correct answer take score (1) and incorrect answer take score (0).

Level of knowledge will be:

Good = (> 75%)

Average = (60- <75)

Poor = (> 60 %) **.**

Method:1 -An official permission to conduct the study was obtained through litter from authorities at Faculty of nursing, Tanta University to director and nursing directors of hospitals under study.

Ethical Consideration Informed consent obtained from the head nurses and nurses after explaining the process of the study. - Confidentiality of nursing staff relevant information is ascertained to them instead of nature of study and the right of withdrawal from the study is reserved. 2- The tools (I,II) developed by researcher and tool (1) presented to seven experts in the administration and medical surgical area of specialty the experts were two lecturer and one assistant professors of nursing administration and one lecturer of and three assistant professors of medical-surgical nursing at Faculty of Tanta and Moniefia universities. They were asked to evaluate tools relevance and appropriateness on 4 points rating scales as; not relevant =1, little relevant = 2 ,relevant =3 and strongly relevant =4 . Necessary modification were done included clarification ,omission of certain question.

3- The opinions of the experts on tools (1) of the study were analyzed and determined the following; Tool 1 face validity (92%) ,content validity index (CVI)100% internal consistency reliability (95%) **.** 4- **A pilot** study was conducted on (10%) of subjects to test the tools for clarity, and applicability then needed correction were done. The study was carried out two times on a sample of (2) head nurses and (8) staff nurses they randomly share from mentioned hospital and excluded from the sample.

The first time implemented after the development of the tools and second time implemented before starting the actual data collection to test the clarity of items and applicability and the relevance of the questions

The estimated time needed by head nurses and staff nurses to fill the scale was (20-30) minute for each sheet. 5 - **Reliability of tool** (1) was tested use Croncbach's Alpha coefficient test. Its value was (0.868). **Constructional of educational program** The first step in the construction of this program was the statement of instructional objectives .These objectives were derived from the assessed need of the sample and literature review.**__Objectives of the program** The main objective of the program is to enforcement head nurses evaluation and nurses self- evaluation for chest care performance according standard steps of six procedures.

Specific objective -Mention definition ,objectives ,principles and steps of evaluation and forms of self –evaluation.- Identify standard of six chest nursing care procedures' including turning, postural drainage ,chest percussion, vibration ,cough techniques and suctioning . **Contents** Program content was designed to provide knowledge for both head nurses and nurses for enforcement for effective functioning of head nurses evaluation and nurses self evaluation related implementation of chest care procedures according to standard performance included by five sessions. **Selection of educational methods** Selection of educational program content was governed by studying the subject characteristic to provide knowledge related to standard performance of chest care procedures, evaluation and self-evaluation principles. **Learning strategies** Appropriate learning strategies were used as demonstration , power point, group discussion ,lecture and hand out. **Implementation of the program.** The study was carried on (20 head nurses ,80 nurses) The subject divided into six

groups and the educational program include five sessions, every session (2hours) e.g (10 hours) for each group were conducted for nurses and head nurses at their work places of hospitals.

The subject informed about objective of the program and its sessions. **Evaluation the program** -Tool (I) Pre, immediate and three month post implementation of educational program done on head nurses and nurses to assess actual performance of chest nursing care procedures regarding followed the standard steps. Tool (II) Pre, immediate and three month post implementation of educational chest nursing care program done to assess and evaluate changes of both head nurses and nurses level of knowledge about chest nursing care.

Statistical analysis of the data Data were fed to the computer and analyzed using IBM SPSS software package version 20.0**. (**Armonk, NY: IBM Corp**)** Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard deviation. Significance of the obtained results was judged at the 5% level. **The used tests ere 1 - Chi-square test** For categorical variables, to compare between different groups . **2 - Fisher's Exact or Monte Carlo correction** Correction for chi-square when more than 20% of the cells have expected count less than 5. **3 - Friedman test** For abnormally distributed quantitative variables, to compare between more than two periods or stages

Result: **Table** (1) Shows characteristics of subjects both head nurses and nurses including age, education level ,years of experience, marital status, attendance previous training on evaluation, number and subject . The total subject 55% age ranged from 20- 30 years with mean 30.17 ± 9.27 .Total subject (72.0%) were married, 93% not have training and 86.0% not have subject in evaluation except 35% of head nurses had subject in administration. Head nurses 55% their age ranged (41-50) with mean 40.90 ± 4.27 . All head nurses had B ScN and majority (65%) have 10-<20 years of experience. Majority (68.8%) of nurses aged 20-30years with mean 27.49 ± 8.18 , 58.5% had diploma degree with <10 years of experience .

Figure (1) Shows researcher evaluation of excellent level of nurses total performance of turning care procedures pre, immediately post and 3month post program. Preprogram none of nurses had excellent level of total performance. But changed to be majority immediate and

three months post program showed excellent level of performance.

Table (2) shows researcher evaluation of nurse's excellent total performance of six chest care procedures pre, immediate, and 3 months post program. The table reveals statistically significant improvement of nurses excellent level of total performance of each chest care procedures ($p< 0.001$*). Equal percent (1.3%) of nurses showed excellent level preprogram for performing turning ,postural drainage and percussion procedures which improved to range (96.3% -80%) post program and range (98.8%-81.3%) 3month post program. While no one of nursing staff showed excellent level preprogram for vibration, coughing and suctioning procedures which changed post program to 65%, 78.8% and 100% and at 3 month post program to 65%, 83.3% and 100% respectively .

Table (3): Head nurses evaluation and nurses self -evaluation in level of performance of turning procedure items pre, post and 3 month post program. The table shows statistical significant improvement of head nurses evaluation and nurses self-evaluation of performance for all items of turning procedure at **($p < 0.001$)**. Head nurses evaluation for preprogram showed that range (100%-95%)of nurses were at unsatisfactory level of performance for all items of turning procedure except (60%) were at unsatisfactory level for item of preparing equipment . But post program nurses 95% were at excellent level for all items except for item of prepare patient by communication and teaching they were 85% and for item of following infection control they were 70% .While at 3 month post program range (100-90%)of nurses showed excellent performance for all items of procedure .

Nurses self- evaluation preprogram showed that range (98.8-92.5%) were unsatisfactory perform all items of turning procedure except for item of implementation procedure by follow infection control they were 83.9% .But post program range (91.3%-85%) were at excellent level except that at the items of following infection control they were 78.8% .While post 3month program range (91.3-85%) were at excellent level except for the item of following infection control they were 78.8% .

Table (4): Head nurses evaluation and nurses self -evaluation of levels for performing postural drainage procedure items pre, post and 3 month post program. The table shows statistical

significant improvement of head nurses evaluation and nurses self-evaluation of performing all items of postural drainage procedure at ($p< 0.001$).

Pre -program head nurses evaluation for nurses performance of postural drainage procedures showed that nurses 100%, 95% ,85% were at unsatisfactory level for assessment and contraindication and item of evaluate desirable and un desirable out come and prepare patient for teaching respectively .They 60%,55% were at unsatisfactory level of performance items of preparation of equipment and implementation procedure following infection control respectively .But they 100-85% improved immediately post and 100-90%post 3 month were at excellent level for all item of the procedure.

Nurses self- evaluation preprogram showed that range (98.8-86.3%) unsatisfactory perform all items of postural drainage procedure except (67.5%) were for item preparation of equipment. But immediate post program range (92.5%-81.3%) were at excellent level except (76.3%) they were at the items of implementation infection control .While 3month post program range (100-85%) were at excellent level except (77.5%) they were at the item of following infection control

Table (5) Head nurses evaluation and nurses self -evaluation of level of performing percussion procedure items pre, post and 3 month post program. The table shows statistical significant improvement of head nurses evaluation and nurses self-evaluation of performance for all items of percussion procedure at ($p < 0.001$). Head nurses evaluation for preprogram showed that (100%) of nurses were at unsatisfied level of performance for all items of percussion procedure except for implementing procedure following infection control only (65%) were at unsatisfactory level.

But immediately post program 95%-85% of nurses were at excellent level for all items except for item of preparation patient by communication and teaching they were 75% and for item of prepare equipment they were 80% .While 3 month post program equal percent (90%)of nurses showed excellent performance for items of assessment indication and contraindication and items of evaluate desirable out- come. As well as items of prepare equipment and prepare patient by communication and teaching showed that equally percent (80%) of nurses were at excellent level. Beside that all nurses showed excellent level in following

infection control at implementing the procedure .

Nurses self- evaluation preprogram showed that 97.5,98.8% were at unsatisfactory level of performing at items of assessment indication and contraindication and evaluate desirable and undesirable out- come of percussion procedure .Equal percent (77.5%) of nurses showed unsatisfactory level for performing item of implementation procedure by follow infection control and prepare equipment and 88.8% showed unsatisfactory at items of prepare patient equipment . But immediate post program nurses self -evaluation showed that 81.3 % of nurses showed excellent level of prepare patient communication and teaching .While range (57.5%-66.3%) of nurses were at excellent level of rest items. Post 3month program nurses 83.8% , 70% perform implementation procedure following infection control and assessment indication ,contraindication of percussion , also range (67.5-57.5%) perform items prepare patient by communication and teaching and evaluate desirable and undesirable out come at excellent level respectively .

Table (6): Head nurses evaluation and nurses self -evaluation of level of performing coughing exercise items of procedure pre, post and 3 month post program. The table shows statistical significant improvement of head nurses evaluation and nurses self-evaluation of performance for all items of coughing exercise procedure at ($p < 0.001$). Head nurses evaluation for preprogram showed that all (100%) of nurses were at unsatisfied level of performance for all items of coughing exercise procedure but changed post program nurses range (100%-95%) and at 3 month post program range (100-90%) showed excellent performance for all items of coughing exercise procedure .

Nurses self- evaluation preprogram range (100%-98.8%) showed unsatisfactory level of performing all items of coughing exercise procedure except they were (21.3. %) for item of preparation equipment . Post program range (88.8%-75 %) were at excellent level for items of evaluate desirable and undesirable outcome , implementation procedure following infection control ,prepare equipment, prepare patient communication and teaching . Also nurses 68.8 % of nurses showed excellent level at item of assessment indication and contraindication of coughing procedure at excellent level

immediately post . 3month post program range (75 %-82.5%) were at excellent level for all items except they were (91.3%) for item of evaluate desirable and undesirable out come .

Table (7): Head nurses evaluation and nurses self -evaluation of level for performing suctioning procedure items pre, post and 3 month post program. The table shows statistical significant improvement of head nurses evaluation and nurses self-evaluation of performance for all items of suctioning procedure at ($p < 0.001$). Head nurses evaluation for preprogram showed that all (100%) of nurses were at unsatisfied level of performance for all items of suctioning procedure except at item of prepare patient by communication and teaching they were (95%) . But post program nurses range (100%-90%) and at 3 month post program range (100-90%)of nurses showed excellent performance for all items of suctioning procedure

Nurses self- evaluation preprogram showed that nurses range (100%-98.8%) showed unsatisfactory perform once of all items of suctioning procedure changed post program to range (88.8-96.3%) were at excellent level for all items except they were (73.8%) for item of prepare patient by communication and teaching. While post 3month post program nurses range (85 % -97.5%) were at excellent level for performing all items of suctioning procedure .

Figure (2): represents Level of head nurse's and nurses overall knowledge about chest care procedures evaluation and self-evaluation pre, immediately post and 3 month post program. All head nurses preprogram showed poor level of knowledge changed post program to 45% and showed 90% of head nurses 3month post program poor level of knowledge .While 55% of head nurses showed at average level of total knowledge. All nurses preprogram showed poor level of knowledge changed post program to 60% showed average level of knowledge while 37.5% of nurses showed at good level of knowledge . 3month post program 45% of nurses poor level of knowledge . While 55% of nurses showed at average level of total knowledge respectively.

Table (8): represents Levels of head nurses total knowledge about chest care procedure, evaluation and self –evaluation principles pre, post and 3 month post program. The table shows statistical significance differences between head nurses knowledge of pre, post and 3 month for total knowledge for ,chest care evaluation and total knowledge at

(p<0.001). Preprogram all head nurses showed poor level for all items of knowledge changed post program to 60 % , 70% , showed good level knowledge about chest care procedures and evaluation principles respectively and all head nurses showed poor level knowledge about self -evaluation principles pre and immediately post .Post 3 month program 85% ,95% ,30% of head nurses showed poor level knowledge about chest care procedures , self-evaluation principles and evaluation principles respectively .

Table (9): represents Levels of nurses total knowledge about chest care procedure, evaluation and self -evaluation pre, post and 3 month post program. The table shows statistical significance differences between nurses knowledge of pre, post and 3 month for total knowledge for ,chest care evaluation and total knowledge at p<0.001. Preprogram range (100%-97.5%) of nurses showed poor level for all items of knowledge changed post program to 73.8% , 71.3% and 21.3% showed good level post program .Post 3 month program 12.5%,56.3% and 43.8%showed average level of knowledge respectively .

Table (10): Correlation between performing six chest nursing care procedures according to researcher's observation and nurses' self-evaluation of their performance pre , immediate post and 3 month post program . The table showed significant positive correlation at (p< 0.001 - p < 0.006) was detected in performing six chest nursing care procedures according to researcher's observation and nurses' self-evaluation.

Table(11) Correlation between performing six chest nursing care procedures according to head nurse's observation and nurses' self-evaluation of their performance pre , immediate post & 3 month post program . The table shows significant positive correlation at P<0.001 in pre -program at turning procedure, postural drainage , percussion and suctioning , and at 3month post program for percussion and suctioning procedures.

Subject characteristics

Table (1) Characteristic of subjects both head nurses and nurses (N=100)

Items	Total head nurses &nurses (n = 100)		Head nurses (n = 20)		Nurses (n = 80)	
	No	%	No	%	No	%
Age (years)						
20-30	55	55.0	0	0.0	55	68.8
31-40	22	22.0	9	45.0	13	16.3
41-50	23	23.0	11	55.0	12	15.0
Mean ± SD	**30.17 ± 9.27**		**40.90 ± 4.27**		**27.49 ± 8.18**	
Education level						
Diploma	47	47.0	0	0.0	47	58.8
Technical institute	31	31.0	0	0.0	31	38.8
BScN	22	22.0	20	100.0	2	2.5
Experience (years) in I.C.U						
<10	60	60.0	0	0.0	60	75.0
10-<20	27	27.0	13	65.0	14	17.5
20 or more	13	13.0	7	35.0	6	7.5
Mean ± SD	**8.31 ± 8.04**		**18.45 ± 3.99**		**5.78 ± 6.68**	
Marital status						
Married	72	72.0	18	90.0	54	67.5
Not married	25	25.0	0	0.0	25	31.3
Other	3	3.0	2	10.0	1	1.3
Training on evaluation						
No	93	93.0	13	65.0	80	100.0
Yes	7	7.0	7	35.0	0	0.0
Number of training						
No	93	93.0	13	65.0	80	100.0
Once	7	7.0	7	35.0	0	0.0
Subjects in evaluation						
No	86	86.0	13	65.0	73	91.3
Administration	14	14.0	7	35.0	7	8.8

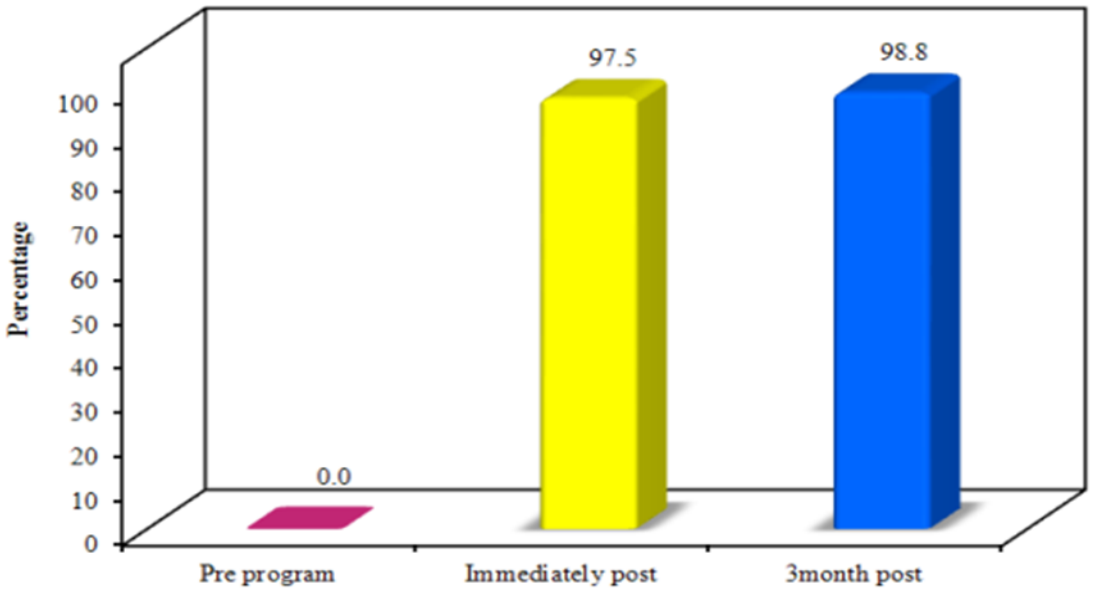

Figure (1): Researcher evaluation of excellent level of nurses' total performance of turning procedures pre, post 3month post program (n = 80)

Researcher evaluation of nurses performance of Six chest care procedures

Table (2): Researcher evaluation of nurses excellent level of total performance of each chest care procedures (n = 80)

Chest care procedure	Good level						p
	Pre program		Immediately post		3month post		
	No.	%	No.	%	No.	%	
-Turning procedure	1	1.3	77	96.3	79	98.8	<0.001*
-Postural drainage procedure	1	1.3	66	82.5	71	88.8	<0.001*
-Percussion procedure	1	1.3	64	80.0	65	81.3	<0.001*
-Vibration procedure	0	0.0	52	65.0	52	65.0	<0.001*
-Coughing exercise procedure	0	0.0	63	78.8	67	83.8	<0.001*
-Suctioning procedure	0	0.0	80	100.0	80	100.0	<0.001*

Table (3): Head nurses evaluation and nurses self –evaluation of performing turning procedure items pre, post and 3 month post program (N= 20 & 80)

Turning procedure		pre program			post program			3 month post program			p1
		Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactor	Un satisfactory	
		No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Assessment indication turning	Head nurse evaluation	0 0.0	0 0.0	20 100.0	19 95.0	1 5.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	1 1.3	0 0.0	79 98.8	68 85.0	10 12.5	2 2.5	68 85.0	10 12.5	2 2.5	<0.001*
χ^2 (p)		0.253 (^{FE}p=1.000)			0.922 (^{MC}p=0.651)			2.839 (^{MC}p=0.229)			
Preparation equipment	Head nurse evaluation	8 40.0	0 0.0	12 60.0	19 95.0	0 0.0	1 5.0	19 95.0	0 0.0	1 5.0	<0.001*
	Nurses self - evaluation	6 7.5	0 0.0	74 92.5	70 87.5	0 0.0	10 12.5	73 91.3	0 0.0	7 8.8	<0.001*
χ2(FEp)		14.037* (0.001*)			0.919 (0.456)			0.306 (1.000)			
Prepare patient communicatio	Head nurse evaluation	0 0.0	1 5.0	19 95.0	17 85.0	3 15.0	0 0.0	19 95.0	1 5.0	0 0.0	<0.001*
	Nurses self – evaluation	2 2.5	4 5.0	74 92.5	68 85.0	11 13.8	1 1.3	72 90.0	8 10.0	0 0.0	<0.001*
χ^2(p)		0.392 (^{MC}p=1.000)			0.570 (^{MC}p=1.000)			0.488 (^{FE}p=0.683)			
Implementati following infection control	Head nurse evaluation	0 0.0	0 0.0	20 100.0	14 70.0	5 25.0	1 5.0	18 90.0	2 10.0	0 0.0	<0.001*
	Nurses self - evaluation	6 7.5	7 8.8	67 83.8	63 78.8	14 17.5	3 3.8	56 70.0	19 23.8	5 6.3	<0.001*
χ^2 (^{MC}p)		2.624 (0.215)			1.158 (0.529)			2.754 (0.243)			
Evaluate desirable &undesirable outcome	Head nurse evaluation	0 0.0	0 0.0	20 100.0	19 95.0	1 5.0	0 0.0	19 95.0	1 5.0	0 0.0	<0.001*
	Nurses self – evaluation	0 0.0	1 1.3	79 98.8	73 91.3	6 7.5	1 1.3	73 91.3	6 7.5	1 1.3	<0.001*
χ^2 (p)		0.253 (^{FE}p=1.000)			0.543 (^{MC}p=1.000)			0.543 (^{MC}p=1.000)			

χ^2: Chi square test MC: Monte Carlo FE: Fisher Exact p: p value for comparison between head nurses evaluation and nurses in different period p_1: p value for Friedman test comparing between the studied periods *: Statistically significant at $p \leq 0.05$

Table (4): Head nurses evaluation and nurses self -evaluation of level for performing of postural drainage procedures items pre, post and 3 month post program (N=20 & 80)

Postural drainage procedure		pre program			post program			3 month post program			p_1
		Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un Satisfacto	
		No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Assessment indication ,contraindicat	Head nurse evaluation	0 0.0	0 0.0	20 100.0	19 95.0	1 5.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	1 1.3	0 0.0	79 98.8	65 81.3	10 12.5	5 6.3	69 86.3	6 7.5	5 6.3	<0.001*
χ^2 (p)		0.253 (^{FE}p=1.000)			1.539 (^{MC}p=0.497)			1.913 (^{MC}p=0.323)			
Preparatioequipment	Head nurse evaluation	8 40.0	0 0.0	12 60.0	17 85.0	0 0.0	3 15.0	19 95.0	0 0.0	1 5.0	<0.001*
	Nurses self - evaluation	26 32.5	0 0.0	54 67.5	73 91.3	0 0.0	7 8.8	73 91.3	0 0.0	7 8.8	<0.001*
χ^2 (p)		0.401 (0.527)			0.694 (^{FE}p=0.414)			0.306 (^{FE}p=1.000)			
Prepare patient teaching	Head nurse evaluation	3 15.0	0 0.0	17 85.0	19 95.0	0 0.0	1 5.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self – evaluation	11 13.8	0 0.0	69 86.3	74 92.5	0 0.0	6 7.5	80 100.0	0 0.0	0 0.0	<0.001*
χ^2 (p)		0.021 (^{FE}p=1.000)			0.154 (^{FE}p=1.000)			-			
Implement procedure following infection control	Head nurse evaluation	0 0.0	9 45.0	11 55.0	20 100.0	0 0.0	0 0.0	19 95.0	1 5.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	1 1.3	79 98.8	61 76.3	14 17.5	5 6.3	62 77.5	17 21.3	1 1.3	<0.001*
χ^2 (p)		34.028* (^{FE}p<0.001*)			5.427* (^{MC}p=0.045*)			3.267 (^{MC}p=0.233)			
Evaluate desirable undesirable outcome	Head nurse evaluation	0 0.0	1 5.0	19 95.0	18 90.0	2 10.0	0 0.0	18 90.0	2 10.0	0 0.0	<0.001*
	Nurses self - evaluation	3 3.8	6 7.5	71 88.8	65 81.3	10 12.5	5 6.3	68 85.0	6 7.5	6 7.5	<0.001*
χ^2 (p)		0.398 (^{MC}p=1.000)			0.853 (^{MC}p=0.768)			1.328 (^{MC}p=0.560)			

χ^2: Chi square test MC: Monte Carlo FE: Fisher Exact p: p value for comparison between head nurses evaluation and nurses in different period p_1: p value for Friedman test comparing between the studied periods *: Statistically significant at $p \leq 0.05$

Table (5): Head nurses evaluation and nurses self -evaluation for performing percussion procedure items pre, post and 3 month post program (N= 20 & 80)

Percussion procedure		pre program			post program			3 month post program			p_1
		Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	
		No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Assessment indication ,contraindication percussion	Head nurse evaluation	0 0.0	0 0.0	20 100.0	17 85.0	2 10.0	1 5.0	18 90.0	2 10.0	0 0.0	<0.001*
	Nurses self -evaluation	0 0.0	2 2.5	78 97.5	52 65.0	14 17.5	14 17.5	56 70.0	15 18.8	9 11.3	<0.001*
χ^2 (p)		0.510 (^{FE}p=1.000)			2.701 (^{MC}p=0.254)			3.247 (^{MC}p=0.192)			
Preparation equipment	Head nurse evaluation	0 0.0	0 0.0	20 100.0	16 80.0	1 5.0	3 15.0	16 80.0	1 5.0	3 15.0	<0.001*
	Nurses self -evaluation	6 7.5	12 15.0	62 77.5	53 66.3	15 18.8	12 15.0	53 66.3	15 18.8	12 15.0	<0.001*
χ^2 (MCp)		4.827 (0.070)			2.180 (0.348)			2.180 (0.348)			
Prepare patient communication & teaching	Head nurse evaluation	0 0.0	0 0.0	20 100.0	15 75.0	5 25.0	0 0.0	16 80.0	4 20.0	0 0.0	<0.001*
	Nurses self –evaluation	1 1.3	8 10.0	71 88.8	51 63.8	24 30.0	5 6.3	54 67.5	23 28.8	3 3.8	<0.001*
χ^2 (^{MC}p)		2.213 (0.479)			1.073 (0.624)			0.973 (0.695)			
Implementation following infection control	Head nurse evaluation	0 0.0	7 35.0	13 65.0	19 95.0	1 5.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self -evaluation	0 0.0	18 22.5	62 77.5	65 81.3	15 18.8	0 0.0	67 83.8	12 15.0	1 1.3	<0.001*
χ^2 (p)		1.333 (0.248)			2.251 (^{FE}p=0.183)			3.876 (^{MC}=0.187)			
Evaluate desirable undesirable outcome	Head nurse evaluation	0 0.0	0 0.0	20 100.0	18 90.0	2 10.0	0 0.0	18 90.0	2 10.0	0 0.0	<0.001*
	Nurses self -evaluation	0 0.0	1 1.3	79 98.8	46 57.5	30 37.5	4 5.0	46 57.5	30 37.5	4 5.0	<0.001*
χ^2(p)		0.253 (^{FE}p=1.000)			6.991* (^{MC}p=0.025*)			6.991* (^{MC}p=0.025*)			

Table (6): Head nurses evaluation and nurses self -evaluation of level for performing coughing exercise items pre, post and 3 month post program (N= 20 & 80)

Coughing exercise		pre program			post program			3 month post program			p_1
		Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	
		No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Assessment indication ,contraindica coughing	Head nurse evaluation	0 0.0	0 0.0	20 100.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	0 0.0	80 100.0	55 68.8	6 7.5	19 23.8	60 75.0	7 8.8	13 16.3	<0.001*
χ^2(p)		-			**8.547* (MCp=0.009*)**			**5.744* (MCp=0.044*)**			
Preparation equipment	Head nurse evaluation	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	-
	Nurses self - evaluation	63 78.8	0 0.0	17 21.3	63 78.8	0 0.0	17 21.3	63 78.8	0 0.0	17 21.3	-
χ^2 (FEp)		**5.120* (0.020*)**			**5.120* (0.020*)**			**5.120* (0.020*)**			
Prepare patient communicatite aching	Head nurse evaluation	0 0.0	0 0.0	20 100.0	18 90.0	2 10.0	0 0.0	18 90.0	2 10.0	0 0.0	<0.001*
	Nurses self – evaluation	1 1.3	0 0.0	79 98.8	60 75.0	18 22.5	2 2.5	60 75.0	18 22.5	2 2.5	<0.001*
χ^2 (p)		**0.253 (FEp=1.000)**			**1.720 (MCp=0.497)**			**1.720 (MCp=0.497)**			
Implementatpr ocedure following infection control	Head nurse evaluation	0 0.0	0 0.0	20 100.0	19 95.0	1 5.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	1 1.3	79 98.8	66 82.5	9 11.3	5 6.3	66 82.5	9 11.3	5 6.3	<0.001*
χ^2 (p)		**0.253 (FEp=1.000)**			**1.307 (MCp=0.562)**			**3.089 (MCp=0.183)**			
Evaluate desirable undesirable outcome	Head nurse evaluation	0 0.0	0 0.0	20 100.0	19 95.0	1 5.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	0 0.0	80 100.0	71 88.8	6 7.5	3 3.8	73 91.3	7 8.8	0 0.0	<0.001*
χ^2 (p)		-			**0.398 (MCp=1.000)**			**1.882 (FEp=0.339)**			

Table (7): Head nurses evaluation and nurses self -evaluation of level for performing suctioning procedure items pre, post & 3 month post program(N= 100 & 80)

Suctioning procedure		pre program			post program			3 month post program			p_1
		Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	Excellent	Satisfactory	Un satisfactory	
		No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Assessment indication ,contraindication of suction	Head nurse evaluation	0 0.0	0 0.0	20 100.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	0 0.0	80 100.0	76 95.0	3 3.8	1 1.3	76 95.0	3 3.8	1 1.3	<0.001*
χ^2 (p)		-			0.748 (^{MC}p=1.000)			0.748 (^{MC}p=1.000)			
Preparation equipment	Head nurse evaluation	0 0.0	0 0.0	20 100.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	1 1.3	79 98.8	71 88.8	9 11.3	0 0.0	76 95.0	4 5.0	0 0.0	<0.001*
χ^2 (^{FE}p)		0.253 (1.000)			2.473 (0.198)			1.042 (0.581)			
Prepare patient by communication & teaching	Head nurse evaluation	0 0.0	1 5.0	19 95.0	18 90.0	2 10.0	0 0.0	18 90.0	1 5.0	1 5.0	<0.001*
	Nurses self –evaluation	0 0.0	1 1.3	79 98.8	59 73.8	19 23.8	2 2.5	68 85.0	10 12.5	2 2.5	<0.001*
χ^2 (p)		1.148 (^{FE}p=0.362)			2.009 (^{MC}p=0.354)			1.374 (^{MC}p=0.478)			
Implementation procedure following infection control	Head nurse evaluation	0 0.0	0 0.0	20 100.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluation	0 0.0	0 0.0	80 100.0	77 96.3	3 3.8	0 0.0	78 97.5	2 2.5	0 0.0	<0.001*
χ^2(p)		-			0.773 (^{FE}p=1.000)			0.510 (^{FE}p=1.000)			
Evaluate desirable undesirable outcome	Head nurse evaluation	0 0.0	0 0.0	20 100.0	20 100.0	0 0.0	0 0.0	20 100.0	0 0.0	0 0.0	<0.001*
	Nurses self - evaluatio	0 0.0	0 0.0	80 100.0	72 90.0	7 8.8	1 1.3	75 93.8	5 6.3	0 0.0	<0.001*
χ^2(p)		-			1.846 (^{MC}p=0.471)			1.316 (^{FE}p=0.580)			χ^2(p)

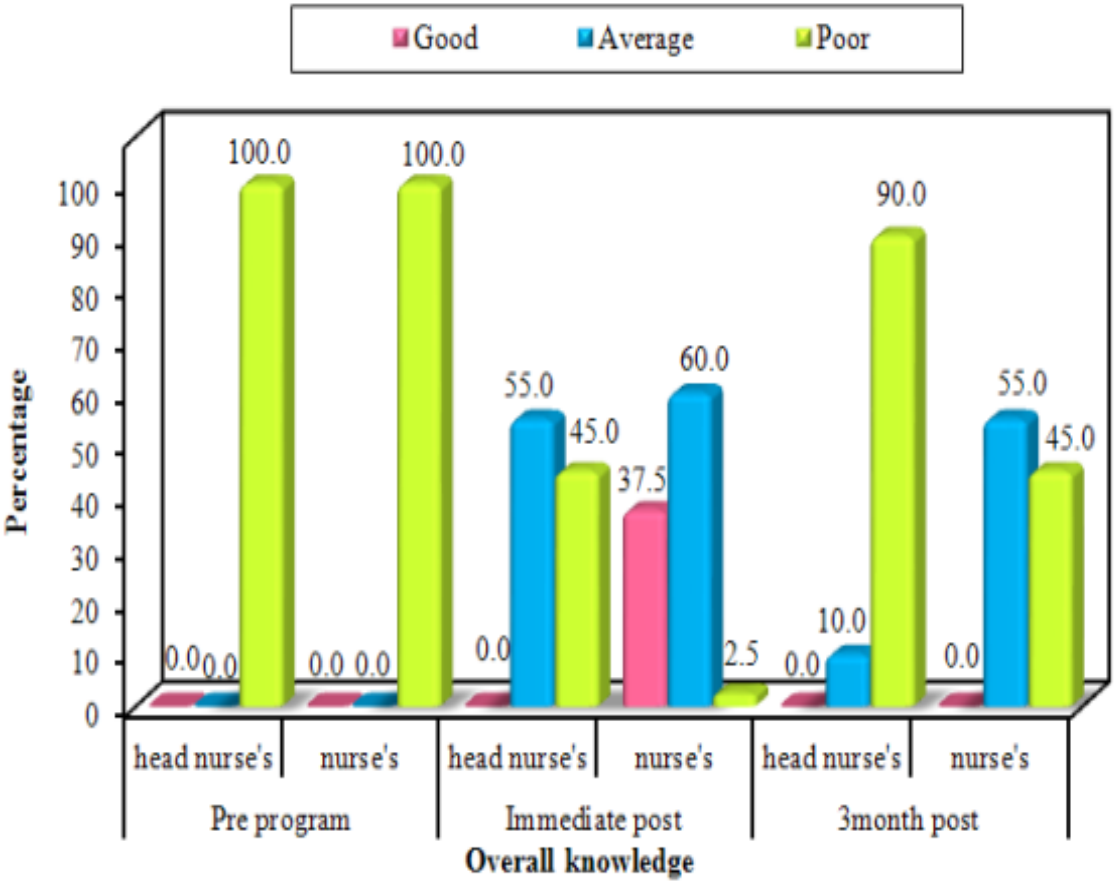

Figure (2) Level of head nurses and nurses overall knowledge about chest care procedures evaluation and self- evaluation pre , post and three month post program

Table (8): Levels of head nurse's total knowledge about chest care procedure ,evaluation and self evaluation principles items (N=20)

Knowledge items	Pre program			Immediate post program			Post program			p
	Good	Average	Poor	Good	Average	Poor	Good	Average	Poor	
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Knowledge about chest care procedures	0 0.0	0 0.0	20 100	12 60.0	8 40.0	0 0.0	0 0.0	3 15.0	17 85.0	<0.001*
Knowledge about evaluation principles	0 0.0	0 0.0	20 100	14 70.0	6 30.0	0 0.0	3 15.0	11 55.0	6 30.0	<0.001*
Knowledge about Self- evaluation principles	0 0.0	0 0.0	20 100	0 0.0	0 0.0	20 100	0 0.0	1 5.0	19 95.0	<0.001*
Total	0 0.0	0 0.0	20 100	0 0.0	11 55.0	9 45.0	3 15.0	2 10.0	18 90.0	<0.001*

Table (9): Levels of nurses total knowledge about chest care procedure, evaluation & self-evaluation items pre, post and 3 month post program (N=80)

Knowledge items	Pre program			Immediate post program			Post program			p
	Good	Average	Poor	Good	Average	Poor	Good	Average	Poor	
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	
Knowledge about chest care procedures	0 0.0	0 0.0	80 100	59 73.8	20 25.0	1 1.3	0 0.0	10 12.5	70 87.5	<0.001*
Knowledge about evaluation principles	0 0.0	2 2.5	78 97.5	57 71.3	19 23.8	4 5.0	7 8.8	45 56.3	28 35.0	<0.001*
Knowledge self - evaluation principles	0 0.0	0 0.0	80 100	17 21.3	29 36.3	34 42.5	23 28.8	35 43.8	22 27.5	0.368
Total	**0 0.0**	**0 0.0**	**80 100**	**30 37.5**	**48 60.0**	**2 2.5**	**0 0.0**	**11 55.0**	**9 45.0**	<0.001*

Table(10):Correlation between performing six chest nursing care procedures according to researcher's observation & nurses' self-evaluation of their performance pre , immediate post & 3 month post program (N = 80)

Researcher observation Chest nursing care procedures	Nurses self- evaluation performing chest nursing care procedures					
	Pre program		Immediate post program		Post program	
	r	p	r	p	r	p
Turning procedure	0.772*	<0.001*	0.360*	0.001*	0.306*	0.006*
Postural drainage procedure	0.674*	<0.001*	0.593*	<0.001*	0.652*	<0.001*
Percussion procedure	0.580*	<0.001*	0.552*	<0.001*	0.555*	<0.001*
Vibration procedure	0.607*	<0.001*	0.498*	<0.001*	0.586*	<0.001*
Coughing exercise	0.253*	0.024*	0.540*	<0.001*	0.542*	<0.001*
Suctioning procedure	0.650*	<0.001*	0.511*	<0.001*	0.377*	0.001*

r: Pearson coefficient

Table (11) Correlation between performing six chest nursing care procedures according head nurse's observation and nurses' self-evaluation performances pre , immediate post & 3 month post program (N = 20)

Head nurses observation chest nursing care procedures	Nurses self- evaluation Frequency of performing chest nursing care procedures					
	Pre program		Immediate post program		Post program	
	r	p	r	p	r	p
Turning procedure	0.538*	0.015*	0.559	0.010	0.409	0.074
Postural drainage procedure	0.745*	<0.001*	0.029	0.905	0.013	0.957
Percussion procedure	0.801*	<0.001*	0.402	0.079	0.596*	0.006*
Vibration procedure	0.345	0.137	0.222	0.346	0.312	0.180
Coughing exercise	0.355	0.124	0.479	0.033	0.323	0.165
Suctioning procedure	0.567*	0.009*	0.335	0.148	0.457*	0.043*

r: Pearson coefficient *: Statistically significant at p ≤ 0.05

Discussion

Head nurses evaluation of nurses performance of chest care procedures guarantee high quality care to achieve desired patient outcomes as chest care is an integral aspect of the nursing care of patient suffering with respiratory conditions .Procedures of chest care include turning, postural drainage, percussion, vibrations, coughing exercise and suctioning . Self-evaluation of chest care procedure performance give nurses deeper recognition about weakness points and required training .The aim of present research is to study nursing staff performance of the six chest care procedures and implement intervention program to expand nursing staff knowledge about standard steps for performing chest care procedures and, principles of evaluation and self-evaluation to raise their attention for improvement.

Result of preprogram revealed that minority of nursing staff showed excellent level of total performance of six chest care procedures. Most probably their diploma education level and not attending training program affect negatively their performance level. Actually they have poor knowledge about standard steps of chest care procedures performance, protocols, and technique used, especially for turning and chest percussion. Apparently those nursing staff are in need for improving and updating their knowledge through in-service educational program emphasize the importance of following standard of care and evidence-based practices in performing chest care procedures specially emphasize importance of head nurses supervision to evaluate nurses' performance and repair their weakness to meet quality chest patient care .

Head nurses supervision is considered to have three principal functions including; educational, supportive and managerial functions that could help in attaining personnel and hospital goals **(97) .**It is an important way to support and guide nurses to ensure safe practice and quality of care and helping them in coping with their working situations. Really it helps nurses to maintain their ability to take action under stress and to adopt a more tolerant attitude towards patients. Head nurses supervision has an effect on the quality of care by helping to both improve and maintain of professional standards of nursing care and the nursing practice can be improved through their education of **Fawzi (2015) (18)** conducted a study to explore factors affecting application of infection control measures supported

present study and agree with **Osman (2014)[19]** study about " assessment of nurses performance caring for patient. Both revealed that the majority of nurses had unsatisfactory knowledge and practice regarding infection control measures due to that all of studied nurses didn't receive training courses about chest infection due to lack of in-services training programs and lack of awareness about training courses that improve their performance. care and supervision.

A smaa (2017)[20] conducted a study about nurses performance regarding management of patient with chest infection in neuro –critical care unit in relation to level of nurses knowledge and practices and their demographic characteristic illustrated statistically significant relation between education level ,years of experience and total knowledge level .

Mahran etal (2018) [21] comparative study of critical nurses' knowledge and practice before and after education program about acute exacerbation of chronic obstructive pulmonary disease. Support present study and pointed that the improvement of nurses knowledge was reflected on their performance which was assessed after the education program. Significant improvement was found in the performance of nurses and application of chest care procedure standard after program implementation

Main, Denehy (2016)[22], study about physiotherapy for respiratory and cardiac problems - adults and pediatrics, supported the present study and reported that implementation of standard, with proper understanding of postural drainage basic steps and principle through proper knowledge, revealed to be essential to make it simple and more effective and lead to desirable patient out come . Also **Ciesla, (2011)** [23] conducted a study on the effectiveness of frequent practice of postural drainage on the clients with respiratory disorders pneumonia, revealed that nurses performance of postural drainage helped in the beneficial effects for removal of retained secretions and improved depending on nurses performance and degree of their knowledge .

Emelia .etal (2018)[24] study about intensive care nurses' knowledge and practice on endotracheal suctioning of the intubated patient, and **Fisk. (2018)[25]**study about the effects of endotracheal suctioning in pediatric population .Both studies showed that majority of ICU nurses knew the indication for procedure but, most of nurses demonstrated undesirable overall knowledge on endotracheal

suctioning (ETS) and no one of nurses was on the desired performance level .Nurses with educational training program significantly demonstrated higher knowledge of ETS than non-trained nurses

Dehghani (2014)[26] the study about investigating intensive care units nurses performance and its adjusting with standard, results of a study on suctioning revealed nurses' poor knowledge and performance and non-compliance of suctioning procedure with the standard method. Also **Varghese and , Moly . (2016**) [27] exploratory study on the knowledge and skill of critical care nurses on endotracheal suctioning, showed deficit areas of knowledge and skill in specific phases of suctioning as well as a significant difference between the current practices observed and best recommended practice on suctioning.

Bhat et al., (2014)[28] study about chest physiotherapy techniques in neurological intensive care units of India: reported that the availability of resources is one of the important factors that influence chest care practice in the ICU in terms of equipment availability, training of the nurses , awareness of techniques and standard and , nurses to patient ratio at ICUs Also **Leligdowicz, (2016) [29],** Study about development of an ICU resource assessment survey for the care of critically ill patients in resource-limited settings, reported that an intensive care unit is an isolated confined ward in the hospital where the most critically ill patients are located together and managed using specialized trained nurses able to use chest care procedures equipment for helping patient

Fedorovich and, Littleton .(2017)[30], study about chest physiotherapy: evaluating the effectiveness. Dimensions of critical care nursing, that study has particularly shown the effects on chest care procedures evaluation, and assured that specifically trained respiratory nurses are key to ensuring quality care. A respiratory nurse may be staff nurse, nurse practitioner and supervisor .Adding that an increasingly important element of the specialist respiratory nurse's role is to provide patients with information at patients' level of understanding , and are trained in patient communication skills, and the techniques relevant to respiratory chest care procedures to gain satisfactory nurses performances and good level of patient outcome.

While **Farida (2017)** [31] Study to asses factors affecting nurses performance in selected governmental hospitals in Egypt, concluded that the most factors affecting

on nurses performance was head nurses supervision and evaluation of their performance. **Abd – El-Halem, (2013)[32], Fulton et al., (2014)[33], and Morsi, (2014)**[34] from their studies found a highly statistically significant improvement in nurses' knowledge immediately after program implementation, training had a positive effect in improvement of head nurses knowledge as the knowledge they gained improve their supervision competencies. **Hossein Abadi, etal (2015) [35]** study about effect of multi mentoring educational method on clinical competence of nursing. The results obtained show that constant evaluation of nurses' competency is one of the most principal responsibilities of head nurses.

Mohsen and Azade (2013) [36] Study about nurses self -evaluation of their use and mastery in health assessment skills. Assessment of clinical skills is usually performed by head nurses . However, nurses self-evaluation of their caring skills is stressed in recent years. It is believed that monitoring the professionals' behavior with self-assessment help them develop skills, assist them becoming more independent and confident and empower them to select higher goals and to try to realize these goals and finally assist them to improve and strengthen their skills.

The importance of self- evaluation in professional life and also developed an in-depth analysis on how self-performance can be developed. Many practical strategies were highlighted to develop self-evaluation at individual and professional level. In conclusion, self- evaluation is considered as the therapeutic tool for nurse client relationship. The more the nurse will be self-aware of performance the more a therapeutic environment for caring will be enhanced. Therefore, development of self-evaluation , knowing about oneself performance is not an easy task; it is a painful and time consuming process.

This process starts with conscious awareness of performance and struggling for change through continuous efforts. There is no doubt that Self- evaluation is one of the important components in nurse client relationship. Nurses spend most time with the patients than of any other health care professionals so self-evaluation is considered as an important tool to develop a therapeutic relationship with the client. examine the aspects of self- performance and get in depth understanding of this concept. In addition explore the practical implications of self- awareness of performance in nursing profession.

Present study correlation data revealed significant positive correlation in

performing six chest nursing care procedure according to researcher observation, head nurses evaluation and nurses self -evaluation pre, post and 3 month post. This at pre- program related to head nurses and nurses insufficient knowledge about standard, performance of six chest care procedures and ,evaluation and self- evaluation principles .But for post program data apparently ,because they understand steps of six chest care procedures performance, they know each of chest care procedure assessment , indication , contraindication, preparation of equipment, preparation, communication and teaching for patient ,implementation of each procedure with following infection control and evaluation of their desirable and desirable outcome .

Specially head nurses start to make evaluation for nurses performance using plan, information ,principles and methods of making evaluation .Regarding nurses they gradually improved for performing six chest care procedures following standard and self- evaluating their performance. So implementation of the evaluation program was successful for improving nursing staff knowledge and performance of six chest care procedures. Also the program assisted head nurses to make skillful evaluation for nurses' performance of six chest care procedures .As well as assisted nurses for making self- evaluation skillfully for their performance of chesty care procedures. Really the program was effective to improve knowledge and performance of nursing staff about steps of performing chest care procedure, evaluation and self - evaluation of that performance.

Conclusion

Head nurses and nurses at Tanta university hospitals in Mobark, chest and international educational hospital were lacking knowledge about principles of chest care six procedures ,evaluation of nurses performance of chest care six procedures was at unsatisfactory level and they not follow the standard steps for performing any of chest care procedures Beside head nurses were not making evaluation for nurses performances ,as well as nurses were not making self- evaluation for their performance regarding chest care procedures .Implementation of successful educational program and standard of performing chest care procedure. The program knowledge enforced head nurses to recurrently evaluate nurses performance and evoked nurses for periodically evaluate their performance, correct their faults and strengthen their weakness points. Consequently nurses performance of six chest care procedures improved to be

satisfactory level post program due to nurses following standard steps of performance , periodic self -evaluation and head nurses evaluation of nurses performance. **Suggested recommendation**

Based on the present study finding ,the following recommendation are proposed :

1- Conduct regular training programs workshops and seminars for head nurses to updated their knowledge and skills related to nurses supervision and evaluation of their performance.
2- Conduct periodical in service training program for nurses to refresh their knowledge and skills related to chest care procedure performance according to standard of its performance.
3- Stress the use of regular self -evaluation among nurses at intensive care units to correct their defect in performance of chest care procedures.
4- Conduct orientation programs about standard of chest care procedures for novice nurses before working with chest disease patients.
5- Hospital provide adequate resources and equipment to facilitate nurses performance according to standard of performing chest care procedures.
6- Head nurse stress importance of good communication and teaching for patient among nurses at intensive care units.
7- Head nurses provide adequate regular and timely feedback to nurses concerning their weakness points and correct their wrong or deficient performance.
8- Head nurses should encourage nurses' compliance for infection control measure in performing chest care procedures.
9- Head nurses should provide supportive health work environment to help nurses finding positive new ways to improve quality of chest care procedures performance.
10- The hospital should set clear roles and responsibilities for both head nurses and nurses through a constructive supervision policies, feedback, and support procedures standard implementation.
11- The hospital should encourage a close rapport between head nurses and their nurses for improving their implementation of both evaluation and self evaluation

Recommend research

- Assess barriers for nurses' self-evaluation of performing chest care procedure
- Evaluation and self -evaluation must put in spot light for different studying aspects.

- Replication of current study in other hospitals setting
- Study attributes that promote the development of self-evaluation among nurses.

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Efficacy of Implementation Management program about Infection Control practices for Nursing Staff

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Back ground: Management program about infection control is important to help head nurses gain knowledge to perform their roles, and for nurses to comply with standard infection control measures . **Objective:** Evaluate efficacy of implementing management program about infection control practices for nursing staff. Setting: All departments in Tanta University Emergency Hospital. Subjects: All head nurses (N= 31) and nurses (N =175) working in all departments of emergency hospital. **Tools:** (1) Infection Control Knowledge Questionnaire sheet, (2) Head Nurses' Performance Role on Infection Control Assessment Scale and, (3) Observational checklist, related to Infection Control practices. **Results:** Head nurses 58.1% and nurses 80.0% had poor level of total knowledge about infection control pre- program , while majority (90.3%- 86%) were at high level post program. Head nurses 61.3% had poor level of total specific knowledge pre-program, changed to be 90.3% and 87.1% had good level of knowledge post program . Pre-program majority (90.3%) of head nurses had mild level of performance of educational , consultation, research and support team in surveillance roles decreased to (3.2%) post program. Nurses range (15.4% - 22.9%) showed compliance level to infection control practices pre-program, improved to range (75.4% - 84.0%) post program with highly statistically significant differences (p= < 0.001). **Conclusion:** At Tanta University Emergency Hospital nursing staff basic knowledge, head nurses specific knowledge and role performance and nurses' compliance were low and statistically improved after implementation of needed management program. **Recommendation:** conduct regular training programs for nursing staff and encourage culture of compliance to infection control practices.

Key words: Infection control, Nursing staff, Head nurses role, Nurses' compliance, knowledge and practice.

Introduction

Health care-associated infections, affect patients in a hospital or other health-care facility, and are not present or incubating at the time of admission[1]. They also include infections acquired by patients in the hospital or facility but appearing after discharge, and occupational infections among staff[2]. Infections prolong hospital stays, create long- term disability, increase resistance to antimicrobials, represent a massive additional financial burden for health systems, generate high costs for patients and their family, and cause unnecessary deaths[3].

The magnitude of the problem is more in developing countries than developed countries due to poor hygiene and sanitation which play an important role in increasing the risk of infection[4]. In Egypt, limited data exist on the morbidity, mortality and costs associated with nosocomial infections[4,5].

Infection prevention and control is an integral component of nursing care delivery in any setting to reduce risks for morbidity and mortality in patients and care givers at all levels[6]. Basic principles of infection prevention are simple and include personal hygiene and hand washing. More comprehensive infection risk reduction strategies are needed for the management of indwelling devices such as central venous catheters and equipment for assisted ventilation and for surgical procedures that involve permanently implanted foreign bodies such as total joints[7].

Nursing staff play a vital role in preventing the development and spread of infections among hospital patients. Some nurses, called infection control nurses, specialize in this, but all nurses in a hospital share responsibility for monitoring patients, practicing good hygiene and implementing all other methods designed to keep hospitals sterile and patients safe[8]. They will be personally accountable for their action and are responsible for ensuring that they comply with Infection Prevention and Control policies[9]. They must understand their legal duty to take reasonable care of their health, safety and security and that of other persons who may be affected by their actions and for reporting untoward incidents and areas of concern[7].

Head nurse play vital role in reducing risks for infection through a variety of roles (educational, consultation, administration, supervision, research, support team in surveillance and risk management rols). While nurses share responsibility with other health care personnel for infection risk

reduction in patients across entire continuum of direct care activities[10]. Head nurses have an active roles, they regulary monitoring, evaluating and reporting of outcomes, processed and strategies at national level and in health-care facilities[9]. In addition the nurse should follows principles and practices including standard precautions to prevent and control of infection and it spread[8]. During daily routing care the nurse basic medical aseptic techniques to break the infection change for example, use gloves and a mask during dressing change to break the entry of pathogens[9].

Nursing staff education is an important component of the hospital infection control program[8,9]. The efficiency of infection control measures is highly dependent on the compliance of the hospital staff[11]. To secure their compliance, education is needed to inform the staff and to convince them that these measures are really worthwhile. Without an effective in-service education program, the work of infection control be rendered ineffective[12,13]. So, training programs are needed for both nurses and head nurses to maintain infection control measures[14].

Infection control and prevention in a healthcare setting requires a comprehensive, coordinated program designed to prevent and control nosocomial or healthcare-associated infections. Implementation of patient care practices for infection control is the role of the nursing staff[11]. Nurses should be familiar with practices to prevent the occurrence and spread of infection, and maintain appropriate practices for all patients throughout the duration of their hospital stay[13,14].

Effective infection prevention and control at emergency department aimed to preventing the transmission of infectious diseases from ill patients to health care personnel and to other patients, and reducing the risk of infection associated with receiving emergency care[15]. Basic principles of infection prevention are simple and include personal hygiene and hand washing. So the current study will be carried out in attempt to help nurses to increase their working knowledge and change faulty practices and enhance head nurses role to infection control though an implementation of designated managment program.

Aim of the study

To evaluate efficacy of implementing management program about infection control practices for nursing staff.

Research hypothesis

Implementing of management program expected to enhance head nurses' role and nurses' compliance with infection control practices

Subjects and Method

Study design

Quasi experimental research design was used to achieve the aim of the present research. Such design fits the nature of the problem under investigation. A quasi-experiment is an empirical interventional study used to estimate the causal impact of an intervention on its target population without random assignment.

Setting

The present study was conducted at all departments of Tanta emergency hospital affiliated to Tanta University, including emergency, casualty department surgical departments, burn, medical surgical, neurology, orthopedic and urology departments. Tanta Emergency Hospital is a private section where complete and continuous caring is provided for very sick patient who can benefit from service provided. This hospital has 187 beds, and nursing staff were 108 nurse specialist and 699 nurses.

Subjects

The study subject consisted of nursing staff 206 working at the 8 departments understudy including nurses n=175 and head nurses n=31.

Tools

The data of the study collected using three tools as follows:-

Tool I: Infection Control Knowledge Questionnaire sheet

This tool developed by the researcher guided by Moyo (2013)[13] , Patel (2009)[16] and National Guidelines for Infection Control (2009)[17] to collect data from head nurses and nurses about infection control. It included two parts:

Part one: Characteristics of subjects including age, marital status, level of education, job position, years of experience, department name, attended of educational or training program in infection control.

Part two: Infection control knowledge questionnaire to evaluate nursing staff knowledge about infection control, include 87 questions for nurses, and 137 questions for head nurses were classified into two parts as follows:

a- Nursing staff knowledge

1- Aspects of infection control include item related to:

- Epidemiology of infection include 10 questions.
- Health care associated infection 10 questions - Infection control principles and practice 10 questions.

2- Standard precautions include item related to:

- Hand hygiene, respiratory hygiene and cough etiquette 10 questions.
- Wearing protective equipment and aseptic techniques (12) question.
- Management of sharps, needle stick injuries and waste disposable 9 questions.
- Environmental cleaning, spills-management and handling and disposal of linen 7 questions.
- Management of patient equipment, cleaning, disinfection and sterilization 8 questions.

3- Isolation precautions 11 questions.

b- Head nurses specific knowledge

Include questions in section (a) and specific questions 10 questions on each of items:

- Role of head nurse on infection control
- Management and leadership skills
- Risk management
- Surveillance and auditing
- Teaching and presentation skills

Scoring system

Answers of participants were scored 87degree for nurses and 137degree for head nurses. It was allotted a score of (1) for correct and (0) for wrong answer.

Level of nursing staff knowledge

- Poor = < 60%,
- Fair = 60 % - 80%,
- Good = > 80%.

Tool II: **Head Nurses' Performance role on Infection Control Assessment Scale**.

This tool was developed by Mariy (2012)[18] and modified by the researcher to include items of head nurses' role on infection control. The scale used by the researcher to evaluate the head nurses' role as follows:

1. Educational role include being a role model, and create learning environment
2. Consultation role include providing of ongoing in-service training to hospital employees on infection control, conducts orientation for new employees on infection control and isolation techniques.
3. Administration role include participating on committees, task forces to study and make recommendations regarding the prevention and spread of infection.
4. Research role include assist in caring out research, application on evidence based practices and conducted of quality improvement activities.

5. Supervision role include monitoring and making corrective practice according to need.
6. Support team in surveillance include assist in the prevention and reporting of sharp injuries among staff, collection and reporting of Healthcare-associated infections and outbreaks and support in audit activities and documentation.
7. Risk management include identify unsafe and hazardous infection control practices, recommend cost effective preventive measures, and help health care facilities set priorities.

Scoring system

Head nurses were scored by 150 degree which observed on a three points Likert scale, (1-3), where 3= Always done, 2= Sometimes done, 1= not done and 0= not applicable.

Levels of head nurses performance:

- Mild = < 60%
- Moderate = 60 % - 75%,
- High = >75%.

Tool III: Observational checklist, related to Infection Control practices.

This tool will be used to assess nurses' compliance to infection control practices at word level related to:-

- Hand hygiene.
- Respiratory hygiene and cough etiquette.
- Wearing protective equipment.
- Aseptic techniques.
- Management of sharps and needle stick injuries.
- Waste disposable.
- Environmental cleaning and spills-management.
- Handling and disposal of linen.
- Management of patient equipment.
- Cleaning, disinfection and sterilization.
- Human resources.
- Isolation precautions.

Scoring system

Nurses were scored by 309 degree which observed on a three points Likert scale, measured by three points Likert scale (1-3), where 3= Always done, 2= Sometimes done, and 1= not done and 0 = not applicable.

Nurses' level of compliance will be as follow

- Minimal compliance = < 60%.
- Partial compliance = 60% - 75 %.
- Compliance = > 75%.

Methods

1- An official permission to carry out the study and for implementation of the program, were obtained through a letter issued from the responsible authorities at the Faculty of Nursing, Tanta University to medical and nursing directors of Tanta

Emergency Hospital, explaining the research aim and procedures. The researcher met with the nursing director of the hospital and supervisors in each department. The aim of study and the tools to be used for data collection were explained to take their agreement, support and cooperation.

2- Ethical consideration: nursing staff consent to participate in the study was obtained. They were informed about the privacy of information obtained from them, nature of the study, their rights to withdraw, and the confidentiality of their names.

3- Tools of study were developed by the researcher based on recent related literature.

4- Tools (I, II, and III) was tested for its content validity and relevance by a jury of nine experts in the area of specialty. They were one professor and two assistant professor from Faculty of Nursing Damanhur University, three assistant professor and three lecturers from Faculty of Nursing Tanta University (nursing service administration department).

5- The expert's responses were represented in four points rating score ranging from (4-1); 4 =strongly relevant, 3 = relevant, 2= little relevant, and 1= not relevant. Necessary modifications were done included; clarification, omission of some questions and adding others and simplifying work related words. The content validity for knowledge questionnaire was 92.82% for nurses' and 94.16% for head nurses, 89.22% for head nurse role performance and 93.37%for nurses' compliance to infection control practices.

6- Reliability of tools was tested using Cronbach,s Alpha and coefficient test. Its value was 0.915 for tool (I a), 0.766 for tool (I b), 0.959 for tool (II), and 0.997 for tool (III).

7- A pilot study was conducted on 10%of total sample randomly selected to test clarity and applicability of tools. Including the content clarity of the tools, relevance, the practicability and feasibility of observation checklist for assessing the head nurses' performance and nurses' compliance to decide any obstacles that may be encountered during data collection as confusion about meaning of specific word or item. It also served in deciding the time required to fill the tools. The pilot study was collected from 1st mars 2018 to 15th mars 2018.The administration time for filling

questionnaire sheet approximately 45minutes.

8- Data collection phase

-Knowledge questionnaire about nursing staff, tool (I) was used before, after and post three month implementation of program.

-Head Nurses' Performance role on infection control assessment scale tool (II) was used before, after and post three month implementation of program to assess head nurses' role on infection control.

-Observational checklist, related to infection control practices tool (III) was used before, after and post three month implementation of program to assess nurses' compliance to infection control practices at word level. Every nurse was observed 3 times for each of 3 assessments.

-Head nurses divided into four groups and nurses into ten groups. The program time for nursing staff was one hour every session for nurses 5 session. Head nurses only get specific additional 5 sessions. Nursing staff prepared to get sessions at their work place hospital during their work shifts morning, afternoon or night.

-The researcher was given direction for nursing staff duration of 3 months at their ward.

-After 3 months of program implementation there was post -test using tools I, II &II to determine the level of knowledge retention for nursing staff, role performance on infection control for head nurses and changes for nurses' compliance to infection control practices.

9- Management program on infection control practices was developed based on review of relevant recent related literature and results of nursing staff knowledge test scores.

10- Data collection started from February month until end of July month. It takes 6 months.

Design of the program

First step was the statement of general and specific objectives

General objective

At the end of the program implementation the nursing staff knowledge, nurses' compliance and head nurses' role performance in infection control will be enhanced.

Specific objectives

At the end of the program nursing staff should be able to understand, apply, comply and manage infection control activities through:

- Introduction of infection control.
- Health care associated infection.
- Infection control principles and practices.
- Standard of infection control precautions.
- Isolation precautions.
- Role of head nurses on infection control.

- skills of head nurses for infection control.

Program content

The content was selected after carful assessment of subject needs. Simple and scientific language was used. This content was designed to provide knowledge related to infection control. The program includes 5 sessions for nursing staff and 5 sessions for specific knowledge to head nurses as follows: Sessions for nursing staff:-

- Session (1) Introduction of infection control.
- Session (2) Health care associated infection.
- Session (3) Infection control principles and practices.
- Session (4) Standard of infection control precautions.
- Session (5) Isolation precautions.
- Session (6) Role of head nurse on infection control.
- Session (7) Management and leadership skills.
- Session (8) Risk management.
- Session (9) Surveillance and auditing.
- Session(10) Teaching and presentation skills.

Teaching- learning strategies

Selections of teaching methods were governed by studying the subject themselves and content of program. The methods used were lecture, role play, group discussion, power point, demonstration, and procedures for practical contents.

Teaching aids

The teaching aids used for attainment of program objectives were data show, posters, handouts, flow sheets, pens, and papers.

Implementation of the program

- Head nurses divided into four groups and nurses into ten groups. The total program time for head nurses was 10 hours for each group and for nurses was 5 hours for each group, one hour every session. The program was applied for nursing staff at their work environment in the study hospital. The nursing staff was already told about the general objectives of the program and of each session. At the beginning of each session, the researcher makes good relationship and motivated nursing staff for involvement.

Evaluation of the program

Evaluation of effectiveness of the program is final step that was planned to determine the extent to which nursing staff subjects have acquired knowledge and practiced it through:

-Pre implementation of the program pre-testing of nursing staff knowledge using (tool I) head nurses role performance using (tool II) and nurses' compliance to infection control practices using (tool III).

-Post testing of nursing staff knowledge, head nurses role performance and nurses' compliance to infection control practices after implementation of the program using (tool I, II and III).

- Comparison was made between the pre ,immediate post-test and 3months post program result to evaluate change in nursing staff knowledge, head nurses role performance and nurses compliance to infection control practices

Statistical analysis

-Data were fed to the computer and analyzed using IBM SPSS software package version 20.0.(Armonk, NY: IBM Corp) Qualitative data were described using number and percent Quantitative data were described using mean, standard deviation. Significance of the obtained results was judged at the 5% level[(19)].

Results

Table (1) shows nursing staff characteristics. Age range of nursing staff was(18- >40) years with total mean 28.61 ± 5.03, head nurses' mean 33.58 ± 5.30, and nurses' mean 27.73 ± 4.44. Nursing staff 75.2%were married, head nurses77.9% and nurses 74.9%. All of head nurses had bachelor degree of nursing and all of nurses had technical diploma degree of education. Nursing staff 49.0% had 10-15 years of experience, about half (51.6%) of head nurses and (48.6%) of nurses. Mean experience of nursing staff8.90 ± 4.88, head nurses 10.00 ± 4.39 and for nurses 8.70 ± 4.95.Equal percent (12.9 %) of head nurses and nurses were worked in most of department under study. High percent (66.5%) of nursing staff, (64.5%) of head nurses and 66.8%of nurses hadn't attended

training on infection control.

Figure (1) shows level of total knowledge for nursing staff (head nurses and nurses) about infection control pre, Immediate and 3 months post program. Pre- program few of nursing staff compared to most of them immediate and 3months post program were at good level of total knowledge about infection control.

Table (2) shows comparison between head nurses and nurses' knowledge levels about infection control items pre, immediate and 3 months post program. There was highly statistically significant improvement of head nurses and nurses' level of knowledge post program in all infection control items at($p < 0.001$).Statistically significant difference found between head nurses and nurses level of knowledge pre-program for items of health care associated infection, standard precautions and isolation precautions at $p \leq 0.05$. But post program no statistical

significant differences found between head nurses' and nurses' knowledge level.

Pre-program range 54.1%- 64.5%of head nurses' and range 77.1% -100% of nurses showed poor level for items of health care associated infection, standard precaution and isolation precaution which changed to be range90.3% -93.5% of head nurses and 85.1% -87.4% of nurses were at good level immediate post and 3 months post program respectively. Also preprogram 54.8% of head nurses had and 71.4% of nurses showed poor level of total knowledge about infection control principles and practices changed immediate post and 3 months post program to be none of head nurses and 7.4% and 8.0 of nurses showed poor level.

Figure (2) shows level of head nurses' total specific knowledge about infection control pre, Immediate and 3 months post program. Pre-program more than one quarter of head nurses compared to most of them immediate and 3months post program were at good level of total specific knowledge about infection control.

Table (3) shows head nurses' levels of total specific knowledge about infection control sub-scales pre, immediate and 3 months post program. There was statistically significant improvement of head nurses' level of knowledge in all items of infection control at ($p < 0.001$).Preprogram head nurses 35.5%, 25.8% had good level of knowledge about management and leadership skills, and surveillance and auditing, respectively. Also equal percent 22.6% of head nurses had good level of knowledge about role of head nurse on infection control, risk management, teaching and presentation skills.

Pre-program range of 71%-61.3% showed poor level of knowledge which changed immediate post program at good level for range 93.5%-87.1% and range 90.3%-83.9% at 3 months post program for all items of infection control specific knowledge including role of head nurse on infection control, management and leadership skills, risk management, Surveillance and auditing and teaching and presentation skills.

Table (4) shows level of head nurses' total role performance of infection control items pre, immediate, and 3 months post program. The table shows that there was highly statistically significant improvement of head nurses' levels of total role performance in all items on infection control post than preprogram ($p = <0.001$). Pre- program majority (90.3%) of head nurses had mild level of total performance on educational role, consultation role, research role and support team in surveillance which decreased to 3.2%atimmediateand 3 months post

program.

High percent (67.7%) of head nurses pre-program showed mild level of total performance on risk management which decreased to be 3.2% at both immediate and 3 months post program. More than half (58.1%, 54.8 %) of head nurses showed mild level of total performance on supervision role and administration role pre-program which decreased to 3.2% at immediate and 3months post program.

Figure (3) shows levels of nurses' compliance of total infection control practices pre, immediate, and 3 months post program. Pre-program, few nurses had compliance level of total infection control practices, which improved to majority post and 3 months post program.

Table (5) illustrates nurses' levels of total compliance about seven infection control practices sub-scales pre, immediate, and 3 months post program. There was highly statistically significant improvement of nurses' compliance to seven infection control practices sub-scales immediate and 3 months post program at ($p = < 0.001$).

Pre- program, nurses range (17.7%- 22.9%) showed compliance level about infection control practices of environmental cleaning and spills-management, waste disposable, respiratory hygiene and cough etiquette, hand hygiene, wearing protective equipment, aseptic techniques, and management of sharps and needle stick injuries, increased to be range (83.4% - 88.6%) immediate post program decreased to be range (77.7% - 84.0%)at 3 months post program.

Table (6) illustrates nurses' percent levels of total compliance about five infection control practices sub-scales pre, immediate, and 3 months post program. There was highly statistically significant improvement of nurses' compliance to five infection control practices sub-scales immediate and 3 months post program at ($p = < 0.001$).

Pre- program, nurses range (22.9% -15.4%) of nurses showed compliance level about infection control practices of handling and disposal of linen, cleaning, disinfection and sterilization, management of patient equipment and, human resources increased to be range (88.6% - 81.1%)immediate post program and decreased to be range (83.4% - 75.4%) at 3 months post program

All nurses showed partial compliance level about infection control practices of isolation precautions pre and post program because some items not applicable.

Figure (4) shows correlation between nurses' total knowledge and compliance about infection control practices pre, immediate,

and 3 months post program. There was highly statistically significant Positive correlation between nurses' total knowledge and compliance about infection control.

Figure (5) shows correlation between head nurse' specific knowledge and performance of their role on infection control pre, immediate, and 3 months post program. Statistically Positive correlation was detected between head nurse specific knowledge and performance of their role on infection control pre, immediate, and 3 months post program at ($p<0.001$).

Figure (6) shows correlation between head nurse role performance and nurse's compliance about infection control pre, immediate, and 3 months post program. There was statistically significant positive correlation between head nurses' role performance and nurse's compliance about infection control.

Table (1): Nursing staff characteristics (No=206)

Variables	Head nurse (n=31)		Nurses (n=175)		Total (N = 206)	
	N	%	N	%	N	%
Age (years)						
18 – 25	9	29.0	78	44.6	87	42.2
>25-30	18	58.1	40	22.9	58	28.2
>30-40	4	12.9	2	1.1	6	2.9
>40	0	0.0	55	31.4	55	26.7
Range	25.0 – 45.0		21.0 – 42.0		21.0 – 45.0	
Mean ± SD	33.58 ± 5.30		27.73 ± 4.44		28.61 ± 5.03	
Marital status						
- Single	5	16.1	32	18.3	37	18.0
- Married	24	77.4	131	74.9	155	75.2
- Widow	2	6.5	5	2.9	7	3.4
- Divorced	0	0.0	7	4.0	7	3.4
Education						
- Bachelor Degree	31	100.0	0	0.0	31	15.0
- Technical Degree	0	0.0	175	100.0	175	85.0
Position						
-Head nurse	31	100.0	0	0.0	175	85.0
-Nurse	0	0.0	175	100.0	31	15.0
Experience/ years						
- <5	3	9.7	41	23.4	44	21.4
- 5-10	12	38.7	48	27.4	60	29.1
- >10 -15	16	51.6	85	48.6	101	49.0
- >15	0	0.0	1	0.6	1	0.5
Range	2.0 – 20.0		2.0 – 30.0		2.0 – 3.0	
Mean ± SD	10.00 ± 4.39		8.70 ± 4.95		8.90 ± 4.88	
Department						
- Emergency	4	12.9	22	12.6	26	12.6
- Casualty	3	9.7	22	12.6	25	12.1
- Surgical	4	12.9	22	12.6	26	12.6
- Burn	4	12.9	22	12.6	26	12.6
- Medical	4	12.9	22	12.6	26	12.6
- Neurology	4	12.9	22	12.6	26	12.6
- Orthopedic	4	12.9	22	12.6	26	12.6
- Urology	4	12.9	21	12.0	25	12.1
Infection control training						
- No	20	64.5	117	66.8	137	66.5
- Yes	11	35.5	58	33.2	69	33.5

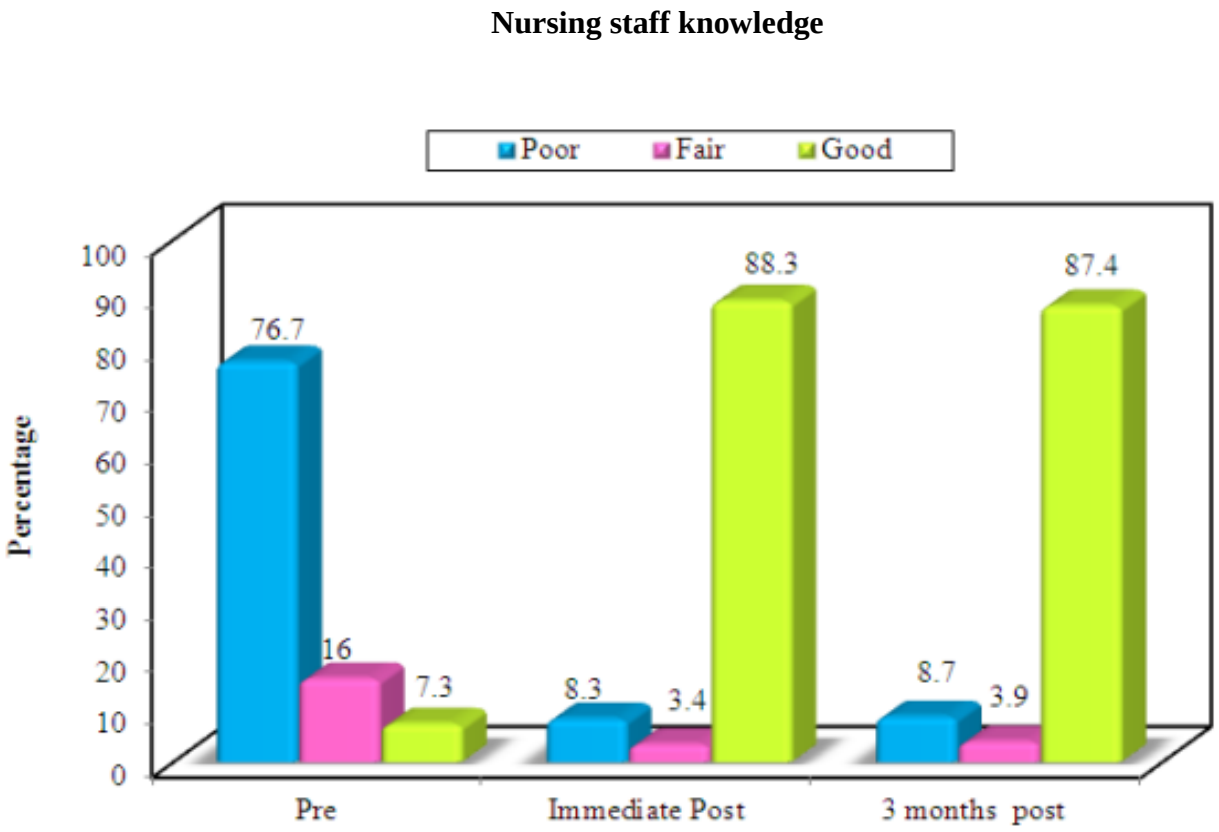

Figure (1): Levels of total knowledge for nursing staff about infection control pre, immediate and 3 months post program (N=206).

Table (2): Comparison between head nurses and nurses' knowledge levels about infection control items pre, immediate and 3 months post program (N=206) head nurses(31) and nurses (175).

Items	Levels	Pre						Immediate Post						3 months post						Differences P_2
		Poor		Fair		Good		Poor		Fair		Good		Poor		Fair		Good		
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
- Epidemiology of infection	Head nurses	18	58.1	9	29.0	4	12.9	1	3.2	3	9.7	27	87.1	1	3.2	3	9.7	27	87.1	<0.001***
	Nurses	127	72.6	25	14.3	23	13.1	15	8.6	6	3.4	154	88.4	15	8.6	7	4.0	153	87.4	<0.001***
-χ^2(p)		4.258(0.119)						2.568 (^{MC}p=0.245)						3.059 (^{MC}p=0.210)						
-Health care associated infection	Head nurses	18	58.1	9	29.0	4	12.9	1	3.2	2	6.5	28	90.3	1	3.2	2	6.5	28	90.3	<0.001***
	Nurses	138	78.9	32	18.3	5	2.9	14	8.0	5	2.9	156	89.1	17	9.7	5	2.9	153	87.4	<0.001***
-χ^2(p)		9.115*(0.010*)						1.854(^{MC}p=0.401)						2.320 (^{MC}p=0.297)						
-Infection control principles and practice	Head nurses	17	54.8	11	35.5	3	9.7	0	0.0	3	9.7	28	90.3	0	0.0	3	9.7	28	90.3	<0.001***
	Nurses	125	71.4	42	24.0	8	4.6	13	7.4	8	4.6	154	88.0	14	8.0	9	5.1	152	86.9	<0.001***
-χ^2(p)		3.687(0.158)						3.456 (^{MC}p=0.150)						3.511 (^{MC}p=0.159)						
-Standard precautions	Head nurses	17	54.8	8	25.8	6	19.4	1	3.2	1	3.2	29	93.5	1	3.2	1	3.2	29	93.5	<0.001***
	Nurses	135	77.1	26	14.9	14	8.0	15	8.6	3	1.7	157	89.7	19	10.9	6	3.4	150	85.7	<0.001***
-χ^2(p)		7.186*(0.028*)						1.480 (^{MC}p=0.426)						1.586 (^{MC}p=0.420)						
-Isolation precautions	Head nurses	20	64.5	6	19.4	5	16.1	2	6.5	1	3.2	28	90.3	2	6.5	1	3.2	28	90.3	<0.001***
	Nurses	175	100	0	0.0	0	0.0	22	12.6	1	0.6	152	86.9	21	12.0	5	2.9	149	85.1	<0.001***
χ^2(p)		42.249*(^{MC}p=<0.001*)						2.869 (0.205)						0.827 (^{MC}p=0.652)						

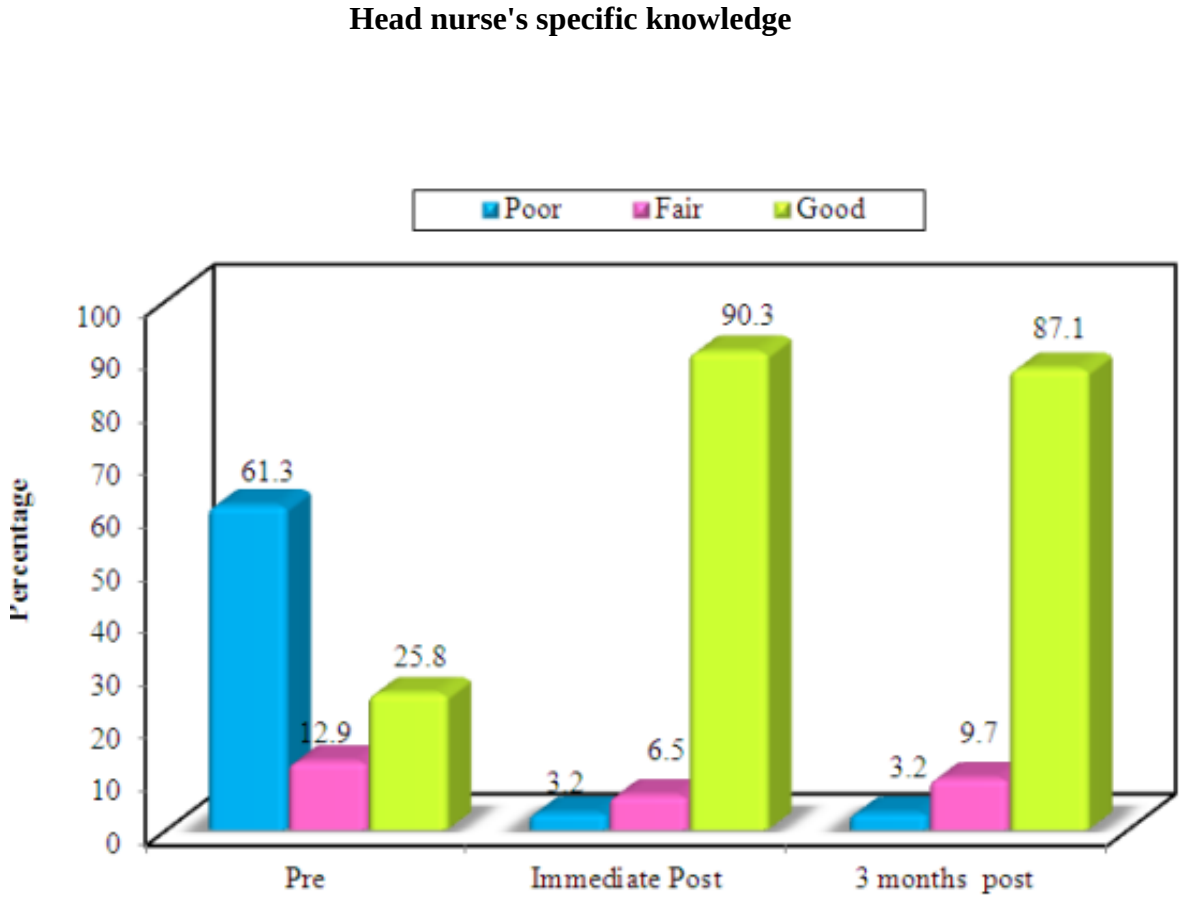

Figure (2): Level of head nurses' total specific knowledge about infection control pre, Immediate and 3 months post program, (N=31).

Table (3): Head nurses' levels of total specific knowledge about infection control pre, immediate and 3 months post program, (N=31).

Levels / Items	knowledge of head nurses (N=31)							
	Pre		Immediate Post		3 months post			
	N	%	N	%	N	%		
Role of head nurse on infection control								
- Poor	22	71.0	1	3.2	1	3.2		
- Fair	2	6.5	2	6.5	3	9.7	39.974*	<0.001***
- Good	7	22.6	28	90.3	27	87.1		
Management and leadership skills								
- Poor	14	45.2	1	3.2	1	3.2		
- Fair	6	19.4	2	6.5	2	6.5	31.355*	<0.001***
- Good	11	35.5	28	90.3	28	90.3		
Risk management								
- Poor	19	61.3	1	3.2	1	3.2		
- Fair	5	16.1	2	6.5	3	9.7	40.132*	<0.001***
- Good	7	22.6	28	90.3	27	87.1		
Surveillance and auditing								
- Poor	21	67.7	1	3.2	1	3.2		
- Fair	2	6.5	3	9.7	4	12.9	39.629*	<0.001***
-Good	8	25.8	27	87.1	26	83.9		
Teaching and presentation skills								
- Poor	19	61.3	1	3.2	1	3.2		
- Fair	5	16.1	1	3.2	3	9.7	43.571*	<0.001***
- Good	7	22.6	29	93.5	27	87.1		

Fr: Friedman test
*: Significant at $p \leq 0.05$
p: p value for comparing between the studied periods
***: very highly significant

Table (4):Level of head nurses' total role performance of infection control items pre, immediate, and 3 months post program, (N=31).

Total role performance	Head nurses performance						Fr	P
	Pre		Immediate Post		3 months post			
	n	%	n	%	N	%		
Educational role								
- Mild	28	90.3	1	3.2	1	3.2		
- Moderate	1	3.2	3	9.7	4	12.9	51.152*	<0.001***
- High	2	6.5	27	87.1	26	83.9		
Consultation role								
- Mild	28	90.3	1	3.2	1	3.2		
- Moderate	2	6.5	2	6.5	4	12.9	53.766*	<0.001***
- High	1	3.2	28	90.3	26	83.9		
Administration role								
- Mild	17	54.8	1	3.2	1	3.2		
- Moderate	6	19.4	1	3.2	1	3.2	42.087*	<0.001***
- High	8	25.8	29	93.5	29	93.5		
Research role								
- Mild	28	90.3	1	3.2	1	3.2		
- Moderate	1	3.2	3	9.7	5	16.1	50.667*	<0.001***
- High	2	6.5	27	87.1	25	80.6		
Supervision role								
- Mild	18	58.1	1	3.2	1	3.2		
- Moderate	5	16.1	1	3.2	1	3.2	42.087*	<0.001***
- High	8	25.8	29	93.5	29	93.5		
Support team in surveillance								
- Mild	28	90.3	1	3.2	1	3.2		
- Moderate	2	6.5	2	6.5	3	9.7	54.280*	<0.001***
- High	1	3.2	28	90.3	27	87.1		
Risk management								
- Mild	21	67.7	1	3.2	1	3.2		
- Moderate	4	12.9	2	6.5	3	9.7	44.333*	<0.001***
- High	6	19.4	28	90.3	27	87.1		

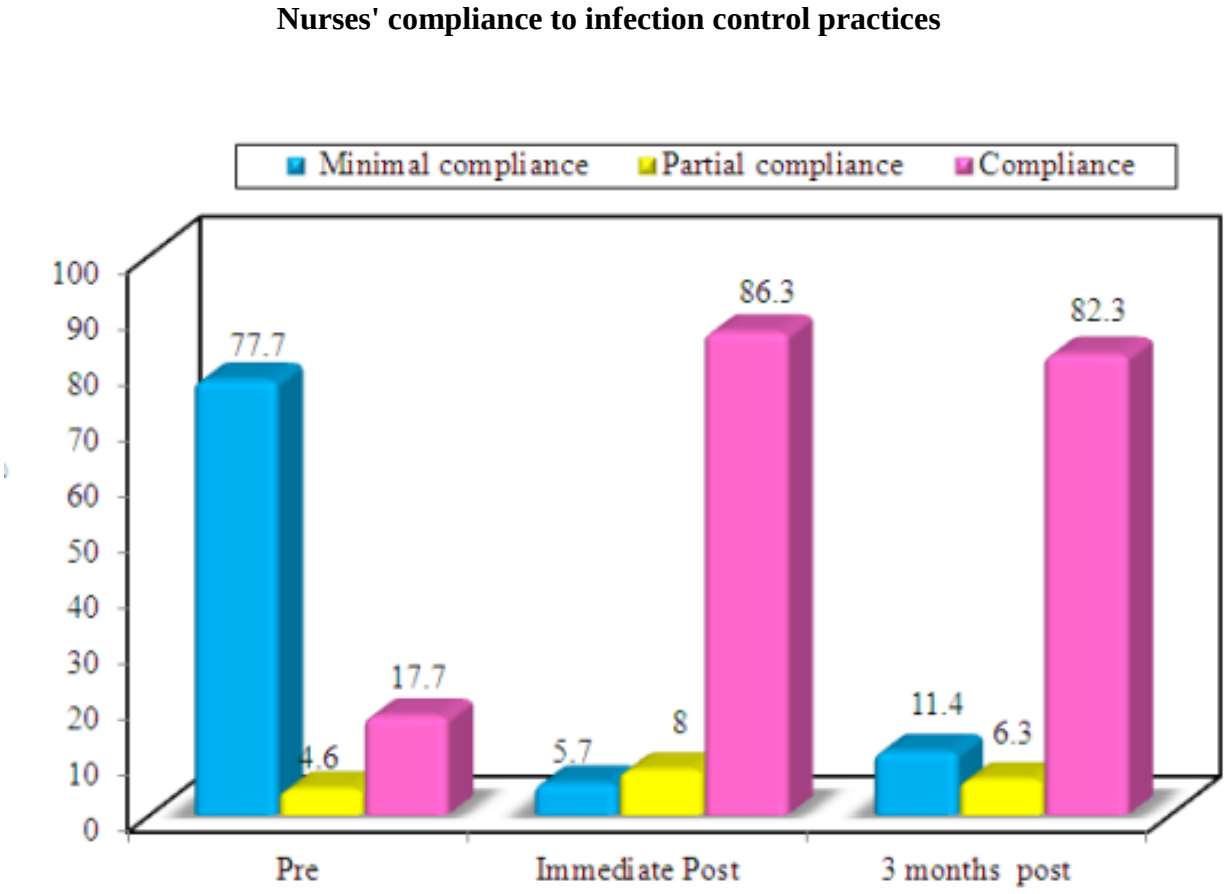

Figure (3): Levels of nurses' compliance of total infection control practices pre, immediate, and 3 months post program, (N=175).

Table (5): Nurses levels of total compliance about seven infection control practices sub-scales pre, immediate, and 3 months post program, (N=175).

Total compliance to infection control practices	Nurses' compliance						Fr	P
	Pre		Immediate		3 months post			
	N	%	N	%	N	%		
1.Hand hygiene.								
- Minimal compliance	133	76.0	9	5.1	20	11.4	194.667*	<0.001***
- Partial compliance	7	4.0	13	7.4	11	6.3		
- compliance	35	20.0	153	87.4	144	82.3		
2.Respiratory hygiene and cough etiquette.								
- Minimal compliance	133	76.0	10	5.7	20	11.4	187.375*	<0.001***
- Partial compliance	7	4.0	15	8.6	11	6.3		
- compliance	35	20.0	150	85.7	144	82.3		
3.Wearing protective equipment.								
- Minimal compliance	136	77.7	11	6.3	21	12.0	203.394*	<0.001***
- Partial compliance	8	4.6	16	9.1	12	6.9		
- compliance	31	17.7	148	84.6	142	81.1		
4.Aseptic techniques								
- Minimal compliance	136	77.7	13	7.4	25	14.3	189.477*	<0.001***
- Partial compliance	8	4.6	16	9.1	13	7.4		
- compliance	31	17.7	146	83.4	137	78.3		
5.Management of sharps and needle stick injuries								
- Minimal compliance	136	77.7	12	6.9	25	14.3	190.588*	<0.001***
- Partial compliance	8	4.6	17	9.7	14	8.0		
- compliance	31	17.7	146	83.4	136	77.7		
6.Waste disposable.								
- Minimal compliance	122	69.7	8	4.6	19	10.9	181.703*	<0.001***
- Partial compliance	13	7.4	12	6.9	9	5.1		
- compliance	40	22.9	155	88.6	147	84.0		
7.Environmental cleaning and spills-management.								
- Minimal compliance	125	71.4	8	4.6	19	10.9	176.505*	<0.001***
- Partial compliance	10	5.7	12	6.9	10	5.7		
- compliance	40	22.9	155	88.6	146	83.4		

Table (6): Nurses levels of total compliance about five infection control practices sub-scales pre, immediate, and 3 months post program, (N=175).

Total compliance to infection control practices	Nurses' compliance						Fr	P
	Pre		Immediate		3 months post			
	N	%	N	%	N	%		
8.Handling and disposal of linen.								
- Minimal compliance	125	71.4	8	4.6	19	10.9	179.178*	<0.001***
- Partial compliance	10	5.7	12	6.9	11	6.3		
- Compliance	40	22.9	155	88.6	145	82.9		
9.Management of patient equipment								
- Minimal compliance	144	82.3	30	17.1	35	20.0	181.766*	<0.001***
- Partial compliance	0	0.0	0	0.0	0	0.0		
- Compliance	31	17.7	145	82.9	140	80.0		
10.Cleaning, disinfection and sterilization.								
- Minimal compliance	130	74.3	10	5.7	19	10.9	187.863*	<0.001***
- Partial compliance	10	5.7	14	8.0	10	5.7		
- Compliance	35	20.0	151	86.3	146	83.4		
11.Human resources.								
- Minimal compliance	140	80.0	14	8.0	26	14.9	194.993*	<0.001***
- Partial compliance	8	4.6	19	10.9	17	9.7		
- Compliance	27	15.4	142	81.1	132	75.4		
12.Isolation precautions								
- Minimal compliance	175	100.0	0	0.0	0	0.0	–	–
- Partial compliance	0	0.0	175	100.0	175	100.0		
- Compliance	0	0.0	0	0.0	0	0.0		

Nursing staff correlations

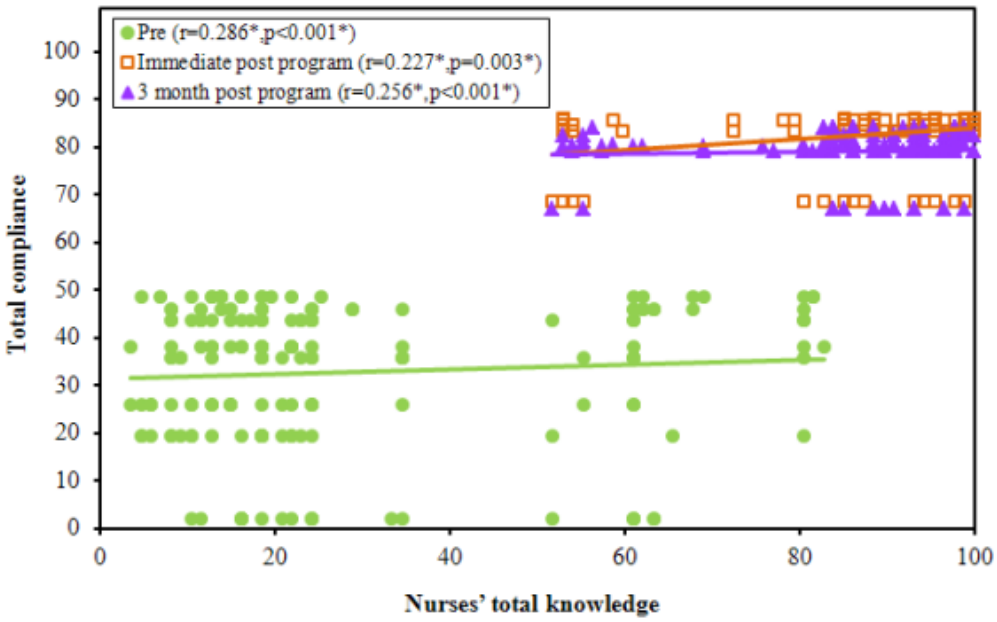

Figure (4): Correlation between nurses' total knowledge and compliance about infection control practices pre, immediate, and 3 months post program, (N=175).

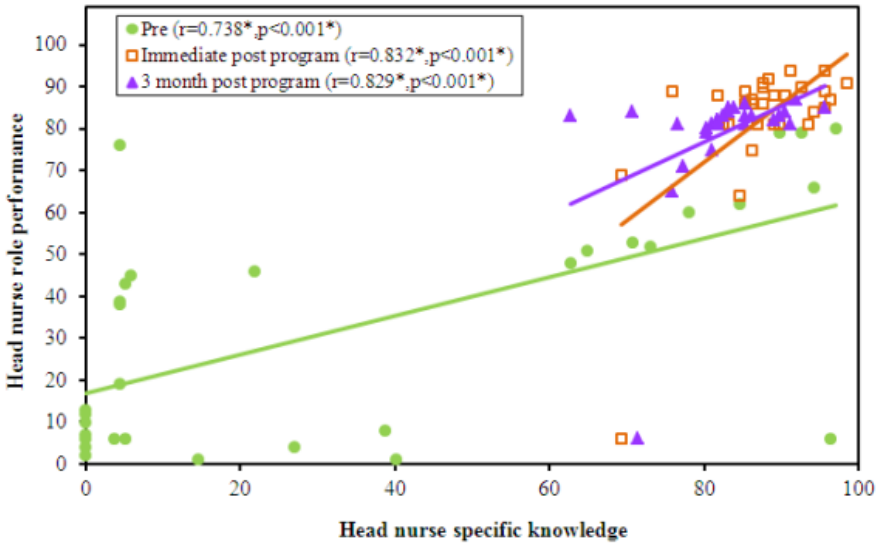

Figure (5):Correlation between head nurse specific knowledge and their role performance on infection control pre, immediate, and 3 months post program, (N=31).

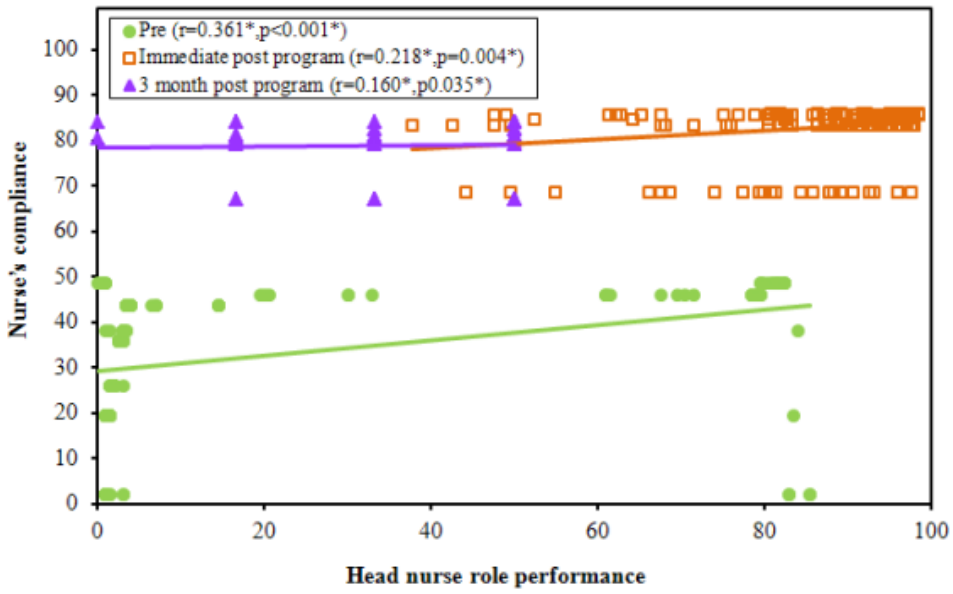

Figure (6): Correlation between head nurse role performance and nurse's compliance about infection control pre, immediate, and 3 months post program(N=206).

Discussion

revealed from the current study, nearly two thirds of the studied sample aged between 20 to 30 years

old. This finding is in concordance with that of (Johnson et al., 2013; Janjua et al., 2007; Reda et al., 2010)

emphasizing the need to protect this group of workers in the prime of their life from hospital infections.

The results of our study showed that approximately two thirds of the study group hadn't had pr

Finding of present study illustrated that pre-program, most of nursing staff showed poor level of total knowledge about infection control. The fact is that most of both head nurses and nurses showed poor level of knowledge about all items of infection control including epidemiology of infection, health care associated infection, infection control principles and practices, standard precautions and isolation precautions. Really this finding was due to lack of infection control training programs for nursing staff, as only one third of head nurses and nurses attended infection control training.

Abdallah (2019)[20] support present study finding and reported that most of nursing staff showed poor level of knowledge about infection control. Also, **El-Maghawry and El-Hawy (2019)**[21] find that by assessment of nurses' knowledge revealed that majority of nurses had inadequate knowledge before applying health education program. However,

Pre-program findings illustrated no significant differences found between head nurses and nurses' knowledge for epidemiology of infection and infection control principles and practices. Although all head nurses were bachelor degree and nurses were technical degree of education. Most probably they all lacking management educational program especially for infection control practices and they were overloaded by patient overcrowding, shortage of personal protective equipment and inadequate nursing staff training. Those nursing staff poor level of knowledge regarding epidemiology of infection and infection control principles and practices considered as a significant obstacle to complying with infection control measures, which is risky on patient's safety and quality of care.

Researcher found that nurses' knowledge was frequently low and claimed that it could be a potential risk factor for patient's safety. Those nursing staff not

aware that the process of infection begins when an infectious agent leaves its reservoir through a portal of exit, and is transmitted by a mode of transmission entering through a portal of entry to infect a susceptible host. Unfortunately, they also didn't aware that reporting any illness as a result of occupational exposure is one of nurse role in infection control. They need to recognize that infection control is very important to protect health care workers, patient and visitors. Prevention of infection require all health care workers to assume that everyone is potentially infected.

El-Yousef (2019)[22] support the present study finding and stated that nurses knowledge is very important in breaking the chain of infection. **Also fawzi et al (2019)**[23] support the present study finding and found that knowledge of nursing staff regarding epidemiology of infection aspects was inadequate.

Pre-program results illustrated that more than half of head nurses and majority of nurses showed poor level of total knowledge about infection control principles and practices. They didn't realize that infection control practices include standard and additional precautions, while successful infection control depends on appropriate training. Unfortunately, they lack basic information as hand and respiratory hygiene, cough etiquette and importance of wearing protective equipment. Beside, their deficient knowledge about aseptic technique, waste disposable and management of sharps and needle stick injuries. Even, they lake basic information as disinfecting and cleaning environment, spilling management, disposing linen, and sterilization of patient equipment.

Both **Suen et al (2019)**[24] and **Chughtai and Khan (2019)**[25] found that participant had poor knowledge about infection control measures. While **Son and Yoon (2018)**[26] not support present study and found high level of cough etiquette knowledge.

Deepika (2019)[27] stated that lack of knowledge about proper segregation and disposal of the health care waste may cause various threats and hazards. Beside**, Garus-Pakowska and Górajski (2019)**[28] found that majority of nurses had poor knowledge about safety device , universal precaution, recapping needle and use of sharps box.

Brooks et al (2019)[29] found lack of staff knowledge on sterile processing. But, **Sahiledengle (2018)**[30] reported (33.2%)

of participant were knowledgeable on instrument processing, reusable items must be disassembled safely and cleaned as soon as possible after use to prevent any contaminants from drying and processing of non-critical equipment.

Nursing staff of present study didn't realize standard isolation precautions including ring fencing, source and protective isolation, air borne and contact precautions. Those nursing staff needs to know standard isolation precautions and through their compliance to it, spread of infectious agents could be minimized in the hospital. The fact they are responsible to give care to patients, having great exposure to infectious agents and they may become source of infection transmission.

Indeed adherence to policies and standard isolation precautions decrease the chance of infection transmission. Isolation precautions have great importance because nowadays the infectious diseases like hepatitis B, hepatitis C and HIV and covid 19 are increasing. So nurse's knowledge, attitude and practice with the adherence of standard isolation precautions will decreases the hazard of hospital assimilated infection and ultimately decrease the morbidity and mortality rate. Hospital acquired infection is the major source of illness and death in hospitals due to un proper use of standard isolation safety measures[31].

The findings of this study showed that most nurses had a poor knowledge (43%), an average practice (42%), and a moderate attitude (37%) about HAI control. The results of this study are not consistent with the results of a study conducted by Yang Luo et al. in China on 1,444 nurses, in which they assessed the knowledge of nurses about standard precautions as average (Luo et al., 2010). In their study on the knowledge, attitude and practice of nurses in the context of HAI control, Ghadamgahi et al. concluded that most nurses do not have a good knowledge of HAI (Ghadmgahi et al., 2011). The results of this study are not consistent with the finding of the study by Gould et al. on 173 nurses working in three wards (ICU, Medical-surgical wards), in which they assessed the knowledge of nurses about standard precautions as low (Gould & Chamberlain, 1994). The results of a study by D'Alessandro et al. showed that 90.8% of students had a poor knowledge about infection control

(D'Alessandro et al., 2014). The results of another study by Sodhi et al. showed that more than 90% of ICU nurses had a very good knowledge of infection control (Sodhi et al., 2013). Chan's study also showed that 56% www.ccsenet.org/gjhs Global Journal of Health Science Vol. 8, No. 3; 2016 196 of nurses had a good knowledge about infection control and 79% of them had a good practice in relation to standard precautions for infection control (Chan et al., 2002). Allah-Bakhshian et al. assessed the knowledge, attitude and practice of ICU nurses working at training centers in Tabriz, Iran, about hospital infection control and concluded that the majority of nurses in this study had an average knowledge about HAI control (Allah-Bakhshian et al., 2010). It is important to note that the knowledge of nurses about HAI depends on many factors, including individual and educational characteristics, training courses, and managerial and motivational factors. In their study on the knowledge, attitude and practice of different groups of healthcare personnel about infection control, Suchitra et al. concluded that training has a positive impact on the improvement of knowledge, attitude and practice in healthcare personnel. They also suggested that the development of a continuous training program for all healthcare workers is necessary (Suchitra, 2007). Training courses have been shown to be effective in promoting the knowledge and practice of health care personnel in the UK (Elliott et al., 2005). Training and knowledge improvement are the most effective ways to fight HAI.

Obviously, continuous training and knowledge improvement besides the use of appropriate and effective methods of disinfection and sterilization will reduce the frequency of developing HAI (Askarian et al., 2004).

The results of a study by Nasirudeenet al. on the knowledge and practice of students in Singapore showed that 66.3% of them had a have good practice and 48.9% of them had a good knowledge about hand hygiene (Nasirudeen et al., 2012). It seems that since infection control topics are not included in academic nursing courses and since they are not dealt with in the work environment either, nurses have a poor knowledge in this area. Therefore, considering the guidelines on the treatment of hospital infection - that nurses should be trained and retrained at least twice a year (Bischoff et al., 2000)- differences in the results can be interpreted. There was a

significant relationship between knowledge and gender which is consistent with the results of the study (Ghadmgahi et al., 2011). The results of the present study showed that nurses have a poor practice in the prevention of HAIs (Akyol, 2007). Bischoff et al. claimed that under normal conditions, the frequency of hand washing by doctors and nurses was at an unacceptably low level. A study in India reported less than desirable levels of practice among healthcare personnel (Bischoff et al., 2000). Akyol (2007) noted that hand hygiene compliance by healthcare workers was at a poor level. This is not consistent with the results of the study by Allah-Bakhshian in which almost all participants (99.1%) had an average practice in relation to infection control (Allah-Bakhshian et al., 2010). A study in Jamaica showed that 85% of nurses, despite having the knowledge, did not observe all safety precautions when performing nursing procedures (Figueroa et al., 1997). Mahmoudi andHassani (2000) stated that the mere having of knowledge does not lead to good practice so attitudes should also change and belief structures should be reworked in a rigorous and scientific manner to achieve proper practice. There was a significant relationship between knowledge and practice in the present study. The study by Lou also reported a significant relationship between knowledge and practice(Luo et al., 2010). One of the limitations of this study is that the sample population does not represent all nurses in Iran.

5. Conclusion

According to the results, most nurses do not have a good knowledge and practice about infection control despite having an average efficacy. Therefore, it is necessary that Iran's Ministry of Health and Medical Education and the subsidiary universities do their best to inform the nurses and all the medical personnel about the prevention of HAIs according to world standards and tailored to each region's ecology by way of academic courses, posters, and conferences. It is also necessary to improve the knowledge of standard precautions, develop progr .

Discussion

The findings of this study showed that most nurses had a poor knowledge (43%), an average practice (42%), and a moderate attitude (37%) about HAI control. The results of this study are not consistent with the results of a study conducted by Yang Luo et al. in China on 1,444 nurses, in which they assessed the knowledge of

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and Medical Education and the subsidiary universities do their best to inform the nurses and all the medical personnel about the prevention of HAIs according to world standards and tailored to each region's ecology by way of academic courses, posters, and conferences. It is also necessary to improve the knowledge of standard precautions, develop progr.

Majority of present study head nurses have deficit of the specific knowledge of their role on infection control. They didn't realize that they should influence compliance with infection control precautions through acting as role model and consultant for nurses. They lack knowledge about their role to monitors nurses' performance adherence to infection control policies, to educate and supervise them. They need clear definition of their responsibilities, knowledge about surveillance, teaching activities, implementation of preventive measures and management support.

Ideally head nurses necessary to be knowledgeable about their role on infection control, management and leadership skills, risk management, surveillance and auditing, teaching and presentation skills. They are the constellation of key activities perceived as essential for the delivery of knowledgeable; competent legally and ethically based nursing care to patient in the ward. They play very important role in controlling hospital infectious and their specific knowledge is most important factor to perform their role. Head nurse play an important role in addressing the interpersonal skills of nurses and providing an ongoing education on collaboration in the practice setting.

Head nurses need to have knowledge about best course of action, leadership style for each situation and methods for maintaining healthy work environment depending on effective planning and organizing of work. **Millward (2018)**[32] support this study finding, and found gaps of head nurses' specific knowledge.

Head nurses role performance

Head nurses of present study showed mild level of performing their educational, consultation, research, surveillance, risk management, administration and supervision roles. These results can be explained by their excessive work load, organizational barriers, inadequate specific knowledge, and excessive administrative duties. Currently head nurses roles are becoming increasingly complex and challenging require strong leadership to

motivate staff to comply with infection control measures. Really those head nurses need periodical educational and training programs to carry out their responsibilities and professionally lead nursing staff to comply with measures of infection control in practices.

Millward (2018)[33] indicated that head nurses don't perform their role in infection control due to their knowledge deficiency and improper training for their role. **Mahdy and Mahfouz (2016)**[34] found that participants not attend educational programs relevant to professional interest and not improve self-professional knowledge and competence.

Results of pre-program revealed that head nurses didn't orient new member of staff to be aware with the standards infection control. Even they didn't create resource files, or give hands-out to guide them and not give any practical teaching. They neither act as role model in demonstration any of proper practice nor create learning environment to reinforce culture among nursing staff. Apparently, those head nurses failed to be an educator, while education is an expected core competency for them but they are not prepared for educator role. This gap leads to a narrow conceptualization of education, limited application of theory and not using attractive teaching method.

Theoretically head nurses as an educator provide information to assist in education of staff and act as a resource person for staff concerning infection control and should provide an effective learning environment. Really, the educational role of head nurse central to every effort to reduce the risk to patient's infection. They are most valuable for day to day educational activities, give advice, make day-to-day decisions and connect with staff in all areas where potential risks of infection exist. Ensuring the use of safe, effective and ethical infection prevention and control measures is an important component of educational role[35].

Meyers(2017)[36] supported the present study, and reported that infection prevention and control programs are charged with educating healthcare workers to prevent the spread of such microorganisms and infections. **Williams et al (2016)**[35] assert that the function of head nurse as teachers supporting the evidence practice as well as promoting collegiality and trust relationships with clinical staff.

Present study findings illustrated that pre-program more than half of head nurses

had mild level of risk management role performance for infection control. Infection control risks can stem from a variety of areas in a healthcare organization, and most can lead to significant patient or staff harm. Some common examples include lack of hand hygiene, unsafe injection practices, poor cleaning, and disinfection, sterilization of instruments and scopes and inadequate environmental cleaning.

Ideally head nurse should protect staff nurses and patient from risks by written action plans with time lines for risk situations, identify tasks and activities that put patient healthcare workers & visitors at risk and monitor effectiveness of reduced risk measures. Risk management is a structured method to identify, evaluate, avoid or reduce hazards in healthcare. It assists with prioritizing risks and is an essential part of the quality management programme[37].

Farokhzadian et al (2018)[38] supported present study result and found that poor working condition due to lake of nurse leader role in managing risk. **Also, Burns(2016)**[37] revealed that head nurses not identify tasks and activities that put patient healthcare workers & visitors at risk and not monitor the effectiveness of measures which place to reduce the risk.

Nurses compliance to infection control practices

Results revealed that majority of nurses showed minimal compliance level of total infection control practices pre- program. Actually those nurses lack knowledge about infection control principles and practices, beside the absent of head nurses supervision, management, leadership and teaching roles. Apparently both nurses and head nurses were in need for management educational training program to improve their knowledge, and to improve head nurses performance of roles as well as nurses' compliance to infection control practices.

Especially head nurses' supervision is concerned with high level of nurses' compliance to infection control practices. Indeed understanding basic principles and practice them consistently whenever it is essential is very important. Moreover, up-to-date knowledge and skill regarding infection control practices could also increase the confidence of nurses in complying with recommended guidelines.

Haile et al (2017)[39] and **Hassan et al (2017)**[40] supported present study finding

and reported that nurses have low level of compliance with infection control practices due to lack of knowledge and training.

The possible explanation for this finding could be the fact that training on current infection control practices could upgrade the knowledge and skill of nurses in that they would easily understand basic principles, recommendations, and standards of practice and implement them consistently whenever it is essential.

Analysis of results revealed that few nurses showed compliance level of total hand hygiene practice pre- program. The result showed minimal or partial compliance for practice in hand hygiene which might be due to carelessness or might be related to forgetfulness, ignorance of guidelines. Most probably their was insufficient time, high workload, or skin irritation by hand hygiene agents. Many nurses may felt that gloves hinder their skillful performance of duties especially in situation that calls for immediate intervention.

No doubt that those nurses have potential to spread microorganisms that may result in infection due to greatest potential contact with patient. The most important mechanism of spread of HAIs is via the contaminated hands of nurses. Those nurses should obliged to wash hands before and after touch of patient, before donning sterile gloves for any procedure, after removing gloves and after contact with body fluids or excretion. Also, they must keep finger nails clean, short and free from nails polish as well as before wash hands remove watch, rings and other jewelry.

Garcell et al (2019)[41] and **Tang et al (2019)**[42] Both studies revealed that washing hands compliance was lowest before touching a patient and before aseptic procedure. **Salem (2019)**[43] find that the majority of nurses had a poor practice of hand washing before and after procedure gloving. And stated that although, presence of accessible supplies the health care workers' adherence to hand washing is poor.

But, **Piai-Morais et al (2015)**[44] reported that majority of the participants reported they commonly do hand hygiene after the end of procedure . Also, **Majeed et al (2018)**[45] revealed that compliance to hand hygiene was highest after patient procedures , after touching the patient surrounding, after exposure to body fluids and before a clean/ aseptic procedure as well as before touching the patient.

Majority of nurses showed minimal compliance level to total respiratory hygiene and cough etiquette items pre-program. They not cover nose and mouth with a disposable tissue when sneezing or coughing, not wear mask for patient with symptoms of respiratory infection and not discard masks

and contaminated tissues in appropriate place. This result on hand with **Gemmae et al (2019)**[46], revealed that health care workers in emergency departments were viewed as not following protocol to compliance respiratory hygiene and cough etiquette because they thought risk was ever-present.

Also**, Yeboah(2019)**[47] found that high percent of nurses have suffered from pneumonia, tuberculosis and influenza following contact with patients without wearing mask and not apply protective measures. In contrast, **Chughtai et al (2016)**[48] found that use of masks amongst healthcare professional was77%.

Study findings illustrated that majority of nurses had minimal level of compliance to total practice of wearing protective equipment pre- program. The researcher observed that those nurses not select correct, not put on or remove safety personal protective equipment, not disposed decontaminated one but reuse it for another patient. Also, they not stored protective equipment in a clean/dry area and not keep all personal protective equipment located close to point of use.

Those nurses need to train to use personal protective equipment when caring for patients and to change it immediately after use and before contact with another patient. They have to pay attention that medical gloves must be discarded in proper place and after single patient use. While, head nurses responsible to assure the availability of such devices and that nurses were well trained to correctly put it on and remove. The use of personal protective equipment usually requires special expertise in selecting the appropriate equipment or clothing; select the proper size for each staff member and assuring proper fit.

Khalil et al (2019)[49] supported present study result and nurses had unsatisfactory practice regarding personal protective equipment and infection control measures. Finding is in the same line with **Haile et al (2017)**[39] and reported higher proportions of nursing staff were not always compliant with using of personal protective equipment due to lack of up- to date training on the principles of standard

precautions and lack of management support.

Conversely, **Soyam and Khaks (2017)**[50] not supported present study finding and revealed that practices of wearing personal protective equipment were better. They emphasized that provision of personal protective equipment was reported by significantly more nursing staff that have worked in the health sector for longer periods and were very aware of universal precautions compared with those who were somewhat or not aware.

Findings illustrated that majority of nurses had minimal level of compliance to total practice of aseptic techniques items pre-program. Apparently those nurses and patient are exposed to high risk biological hazards because they didn't use aseptic technique. Nurses need to know that aseptic technique is a key component of standard precautions which are intended to prevent or minimize the risk of introducing harmful infectious agents into sterile areas of the body, Really when nurses undertaking clinical procedures and without adequate training about aseptic technique they will harm patient, as well as and themselves. They need to know and understand application of the principles of aseptic techniques.

Chepkok J (2016)[51] found that few of the participants maintained the aseptic technique practice throughout the procedure while majority did not apply. Conversely, **Verma et al (2018)**[52] didn't support the present study finding and found that majority of nurse had good knowledge and practice regarding aseptic technique and stated that it is the key issue for better health.

Post program

Results of post program revealed statistical significant improvement in head nurses' knowledge and role performance as well as nurses' knowledge and compliance regarding infection control measures. Nursing staff improvement could be due to their calling needs for knowledge and training about infection control and effectiveness of the intervention program. Apparently head nurses and nurses become knowledgeable about principles of infection control for reducing morbidity and improving the quality of care. Also, their improvements reflect that head nurses' realized their role and responsibilities toward nurses' compliance for infection control practices.

El-Ashmawy (2017)[53] found significant improvement in the mean knowledge score and performance of nurses to infection

control practices immediately and three months post program implementation. Also, **Gaikwad U (2018)**[54] showed that educational intervention had a significant impact on the improvement in the knowledge of nursing staff. Beside, **Mu et al (2016)**[55] found significant improvement in compliance with hand hygiene after intervention.

Finding revealed that there were statistically significant positive correlation between nurses' total knowledge and compliance about infection control pre, immediate, and 3 months post program. This finding highlights their need of knowledge as pre requisite for practice improvement. Those nurses changed and understand that accurate information is essential to compliance practice of infection control. Educational programs should be organized according to the needs of nurses with continuous evaluation. **El-yosef et al (2019)**[22] supported the present finding and revealed that there was significant positive correlation between knowledge and performance of the nurses about infection control measures.

Statistically significant positive correlations found between head nurse' specific knowledge and their role performance pre, immediate, and 3 months post program. Educational program assist those head nurses on how to be at good level in performing their role, having ability in their profession, being independent, having control over their work, and be self-directing. As well as they possess good knowledge and effective skills to perform their roles effectively. **Millward (2018)**[35] reported that educational program prepared head nurses for their role, surveillance and reporting are robust, and patient safety is enhanced through prompt detection of infection risk and appropriate action.

Present study finding revealed that there were statistically significant positive correlation between head nurse role performance and nurse's compliance about infection control pre, immediate, and 3 months post program. Optimal patient care requires collaboration between head nurses and nurses. A lack of unity and unresolved tension among different types of nurses influences collaboration and has significant implications on practice and the organizations. Head nurse play an important role in addressing the skills of nurses and providing an ongoing education on collaboration in the practice setting.

Létourneau(2018)[56] supported the present study finding and revealed that

there were significant positive correlation between head nurse role performance and nurse's compliance to hand hygiene practice. **Also, Peter (2018)**[57] found that there is a link between head nurses role performance potential and nurses compliance to infection control measures to decrease health care-associated infections.

Apparently, implementation of current management training program was succeed as mean for improving nursing staff basic knowledge about infection control. Specially give head nurses specific knowledge essential to perform their different roles about infection control. Really it assists nurses to better compliance to infection control measures, protect themselves and patient and provide high quality care. Emergency hospital need to take serious actions to provide support and resources for nursing staff. Such as orientation, periodical educational training opportunities to prepare novice nurses and maintain head nurses roles to best nursing staff compliance with infection control practices.

reveled from the current study, nearly two thirds of the studied sample aged between 20 to 30 years old. This finding is in concordance with that of (Johnson et al., 2013; Janjua et al., 2007; Reda et al., 2010) emphasizing the need to protect this group of workers in the prime of their life from hospital infections.

The results of our study showed that approximately two thirds of the study group hadn't had pr

Conclusion

Nursing staff at Tanta Emergency hospital were at low level of knowledge on infection control pre-program. There was lacking of head nurses roles performance and nurses compliance to infection control practices. But implementation of well designated management program significantly improved nursing staff basic knowledge about infection control. As well as improved head nurses specific knowledge, responsibilities and roles performance. Adding that nurses' compliance to infection control practices significantly improved also. Apparently head nurses and nurses required to be enforced by orientation program pre-employment and periodic in-service training programs to develop head nurses skills for role performance and efficiently supervising nurses compliance to infection control practices.

Recommendations

-Attention to conducting regular workshop to enforce head nurses role performance on infection control.

-Advertise infection control guiding polices and standards at recognized place to be available to nursing staff.

-Activate the role of infection control committee in hospital.

- Prime importance emergency wards be equipped with needed supplies, protective equipment and experienced trained nurses on infection control practices.

Head Nurses

-Novice nurses should have pre-employment orientation program about infection control.

-Head nurses should attend periodic in-service training programs about their role in infection control.

-Head nurses should supervise and direct nurses to wear protective equipment for infection control.

-Make monthly statistics on surveillance of hazards at their units.

-Prime importance makes recognition for nurses whom have well compliance to infection control practices.

-Encourage culture of infection control compliance among nurses, patient and families.

Recommendations for further research:

More studies should be conducted to

-Analyze factors predisposing to lack of compliance with infection control practices at emergency hospital.

-Barriers of head nurses' role performance and solutions.

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Workplace Bullying and its effect on Staff Nurses' Work Engagement

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Abstract:

Back ground: Workplace bullying is a social and organizational problem within the health care, it has several adverse effects and closely associated with nurses' work engagement. **Aim**: The study aimed to assess the effect of workplace bullying on nurses' work engagement. **Research Design:** Descriptive correlational research design was used in the study. **Setting:** the study was conducted at EL-Menshawy Hospital, which affiliated to the Ministry of Health and Population. **The study subjects:** Consisted of a represented sample of staff nurses (n= 250). **Tools:** Data was collected by using two tools. 1) workplace bullying questionnaire; 2) nurses' work engagement questionnaire. **Results:** The result showed that majority of staff nurses had high level of bullying and more than two-fifths of the staff nurses had low level of work engagement. **Conclusion**: There was statistically significant correlation between nurses' bullying and their engagement. **Recommendation:** As bullying seems to be a serious problem among staff nurses at EL-Menshawy Hospital, Nurses at all levels, Nursing administrators need to develop policies to prevent bullying and setting up mechanisms that allow nurses who exposed to workplace bullying to report incidents of bullying.

Key words: engaged nurses', workplace bullying, work engagement**.**

Introduction

Nursing is the cornerstone of health care system that is currently attack by challenges, problems and opportunities. Twenty-four hours a day, seven days a week, whether in community health centers, hospitals or isolated nursing stations, nurses are often the first when there is a need of care [(1)]. To ensure quality and to promote a culture of safety, health care organizations must address the problem of behaviors that threaten the performance of the health care team [(2)]. Workplace bullying violates the ethical principle that is paramount to nursing – respect the worth, dignity and human rights of all individuals including colleagues. Hence, nurses are entitled to work in an environment that is free from bullying, harassment and threatening behaviors [(3)].

Negative workplace behavior such as bullying is a worldwide problem [(4)]. Workplace bullying is a complex phenomenon that can only be understood through looking at social, individual and organizational factors pointed out that the issue of workplace violence and bullying is something of which all organizations must be aware as it affects staff and in the case of nurses, it can also affect patients [(5)].

Bullying is behavior which generally persistent, systematic and ongoing" [(6)]. Bullying in the nursing workplace is a subset of workplace bullying, which existed in nursing for an extended period. Workplace bullying is repeated inappropriate behavior, direct or indirect, whether verbal, physical or otherwise, conducted by one or more persons against another or others, at the place of work, which could reasonably be regarded as undermining the staff nurses right to dignity at work [(7)].

Bullying refers to the relentless occurrence of negative acts and hostile behaviors aimed towards nurses. Bullying acts are comprised of several categories of bullying including personal attacks, erosion of professional competence and reputation, and attack through work roles and tasks. Personal attacks are bullying acts that characterize a nurse's experience of feeling ignored, insulted, blamed, and put down [(8)]. The erosion of professional competence and reputation is a bullying act characterized by public humiliation, downgrading of skills and abilities, and tactics to undermine career advancement of the individual. Attack through work roles and tasks is a bullying act that is

characterized by unfair work assignments, sabotage, withholding of information, denial of due process and use of earned benefits, and unfair economic restrictions[9].

Bullying has adverse consequences for the target. A target of bullying has lowers self-esteem and produce psychological problems such as fear, anxiety, helplessness, depression and post-traumatic stress disorder. Workplace bullying has also widespread negative effects on the organization as a whole. Which produce less organizational citizenship, reduces satisfaction and commitment, decreases productivity, decrease engagement, propensity to leave and turnover **[10]**. The interaction between staff nurses and their work environment determine their behavior. In accordance with this, the congruity of nurses and organizational values may encourage positive behavior in a work and organizational context. Thus, nurses may be willing to put in high levels of energy and be strongly involved in their work [11].

Engaged staff nurses are energized, dedicated, and motivated to persevere and complete their work. They enjoy challenges, exhibit mental resilience, and are engrossed in their work [12]. Engagement is a predictor of nurses' proactive behaviors, loyalty and performance, and financial returns. Further, more engagement contributes to a variety of benefits for both the staff nurses and the organizations in which they work[13].

Engagement has been defined as a persistent, pervasive and positive affective motivational state of fulfillment in professionals [14]. Work engagement is defined as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication and absorption. Vigor is characterized by high level of energy and mental resilience while working. Dedication refers to being strongly involved in one's work and experiencing a sense of significance and proud. Finally, absorption is characterized by being fully concentrated and happy engrossed in one's work" [14].

Work engagement concept involves a personal commitment to reaching goals, and engaged nurses put a personal energy and enthusiasm into their work. The focus and energy that is characteristic of work engagement allow nurses to bring their full potential into the work [15]. Work engagement is a very good predictor of important nurses, team, and organizational

outcomes. Because of their strong dedication to and focus on their work activities, engaged nurses show better in-role task performance and better financial results**.** Moreover, because of their openness to new experiences, engaged nurses have more creative ideas and are more likely to innovate and be entrepreneurial [(16)].

Significant of the study

Workplace bullying serves as an impediment or barrier to staff nurses work engagement. Therefore, workplace bullying is associated with low levels of work engagement [(17)]. So, with increasing the need to attract and retain engaged nurses, in recent years there has been need to focus on understanding factors that affect the well-being of nurses and their work behaviors such as engagement. One of the most important factors is workplace bullying [(18)]. So, this study was conducted to explore the effects of the workplace bullying on work engagement among staff nurses at El-Menshawy Hospital, hoping that findings of this study will help decision makers to plan for redesigning the work in such a way to minimize workplace bullying and its related consequence

Aim of the Study:

The aim of this study is to: Assess the workplace bullying and its effect on staff nurses' work engagement.

Research question

1.What are levels of staff nurses' perceived workplace bullying?

2.What are levels of staff nurses' work engagement?

3.What are the effects of the workplace bullying on staff nurses' work engagement?

2. Subjects and Methods

Research Design

A descriptive correlational study design was used to achieve the aim of the study.

Setting:

The study was conducted at all departments of EL-Menshawy General Hospital, which affiliated to the Ministry of Health and Population

Subjects:

The study subject was included a representative random sample from total (680) nurses' size. The subject was calculated to be 250 staff nurses at 95% confidence level and purposive 90% power of the study who working at previous mentioned setting at the time of data

collection and willing to participate in the study. The equation used is:

$$N = \frac{[u\sqrt{p1\,(1-p1)} + v\sqrt{p0\,(1-p0)}]^2}{(p1-p0)^2}$$

- U=1.28, v = 1.96

Tools of data collection:

To achieve the aim of this study, the following tools were used;

Tool (I): Workplace bullying structured questionnaire

It included two parts:

Part (I): Personal characteristics data of staff nurses' namely; age, sex, marital status, years of experience, work department, level of education, and previous attending training courses.

Part (II): Staff nurses' perceived workplace bullying. It was developed by **El-sayed, (2015) [117], Hutchinson, (2008) [118]** and modified by investigator based on related literature[42,61,66] to asses workplace bullying among staff nurses. It contained 114 items divided into five domains as follow;

1- Delineation of the bully (10 items).
2- Types of bullying included 35 items divided into five subscales.
   - Professional threat (7 items).
   - Personal threat (13 items).
   - Work isolation (4 items).
   - Work overload(4 items).
   - Work instability (7 items).
3- Organizational process toward workplace bullying (26 items).
4- Reporting of bullying (17 items).
5- Consequences of bullying included 25 items divided into two subscales.
   - Job consequences (15 items).
   - Bullying health problem (11 items).

Scoring system:

Staff nurses' responses for delineation of bully items was allotted a score of 1 for "yes" and 0 for "no". The workplace bullying five subscales was measured on a five-points Likert Scale ranging from (1) never, (2) rarely, (3) sometimes, (4) usually, and (5) always which concluded into three points namely never, sometimes and always. The total score were statistically calculated by summing scores of all categories where:

- High level of staff nurses' experience workplace bullying ≥75%
- Moderate level of staff nurses' experience workplace bullying 60-<75%
- Low level of staff nurses' experience workplace bullying <60%

Organizational system toward workplace bullying was measured on a five-points Likert Scale ranging from (1) strongly

disagree, (2) disagree, (3) not sure, (4) agree and (5) strongly agree which concluded into three scores namely agree, not sure and disagree. The total score were calculated by summing scores of all categories where:

- High level of staff nurses' perception regarding organizational process ≥75%
- Moderate level of staff nurses' perception regarding organizational process 60- < 75%
- Low level of staff nurses' perception regarding organizational process <60%

Response to report and consequences of bullying items were measured by one for "yes", zero for "no".

Tool (II): Utrecht work engagement questionnaire

This tool was modified by researcher based on Utrecht work engagement questionnaire by **Schaufeli, (2012)** [119] This tool was used to measure staff nurses' perception regarding work engagement. It consisted of 17 items divided into 3 subscales as follow;

1. Vigor included first 6 items.
2. Dedication included 5 items.
3. Absorption included 6 items.

Scoring system:

Staff nurses' responses for work engagement were measured on a five-points Likert Scale ranging from 5 to 1, where score (5) refers to Always, Score (4) refers to usually, Score (3) refers to sometimes, Score (2) refers to rarely, and Score (1) refers to never and were concluded into three points namely never, sometimes and always. The total scores were statistically calculated by summing scores of all categories and converted into percent score to assess the level of staff nurses' work engagement as follows:-

- High level of staff nurses' work engagement ≥75%.
- Moderate level of staff nurses' work engagement 60 - < 75%
- Low level of staff nurses' work engagement <60%.

Method:

1- Official permission was obtained from the director of Elmenshawy General Hospital to obtain the approval and assistance of general supervisor to collect the data.

2- **Ethical and legal consideration**:

- Approval of ethical committee at faculty of nursing was obtained
- The researcher introduced herself to the participant, staff nurses' informed consent for participation was obtained after explanation of the nature and the purpose of the study, confidentiality of

the information obtained from them and the right to withdrawal was kept.

- The right to terminate participation at any time will be accepted.

3- The study tools were modified by the researcher based on review of the related literatures.

4- The tools were translated into Arabic and reviewed by the supervisors and submitted to seven experts to check content validity and clarity of questionnaire. The experts were; one assistant professor of Nursing Administration and two lecturers of Nursing Administration. Also, two assistant professor of Psychiatric Mental Health Nursing and two assistant professor of Community Health Nursing, Faculty of Nursing, Tanta University.

- The experts' responses were represented in four points rating scale (4-1) ranging from 4= strongly relevant, 3= relevant, 2= little relevant, and 1=no relevant. Necessary modification were done including; clarification, omission of certain items and simplifying work related words and collecting subcategories of types of workplace bullying to one domain and adding organizational processes regarding bullying in workplace, reporting of bullying and consequences of bullying domains.

- The face validity value of tool **(1):** Workplace bullying types= 93.6%. **Tool (2)** Nurses' work engagement= 95.47%.

5- A pilot study was carried out on a sample of 10% of the subject (n=25) and they excluded from the main study sample during the actual collection of data. A pilot study was carried out after the experts' opinion and before starting the actual data collection. The pilot study was done to test clarity, sequence of items, applicability, relevance of the question, and to determine the needed time to complete the questionnaire. According feedback from pilot study, the tool was modified by the researcher. The estimated time needed to complete the questionnaire items from nursing staff was 20-30 minutes.

6- Reliability of tools was tested using Cronbach Alpha Coefficient test. Reliability of **tool (I)** Workplace bullying types was 0.956. and reliability of **tool (II)** Nurses' work engagement was 0.876.

7- Workplace bullying structured questionnaire and Utrecht work engagement scales was used to collected data from the identified subject.

8- **Data collection phase**: The data were collected from staff nurses by the researcher. The researcher met the respondents' nurses in small groups at their work settings and distributed the questionnaire. The subjects recorded the answers in the presence of the researcher to clarify and ascertain all questions were answered. The data was collected over period of three months started from January until March, 2019.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard deviation. Significance of the obtained results was judged at the 5% level. The used tests were 1) Student t-test for normally distributed quantitative variables, to compare between two studied groups; 2) F-test (ANOVA) for normally distributed quantitative variables, to compare between more than two groups; 3) Pearson coefficient to correlate between two normally distributed quantitative variables; 4) Cronbach's Alpha, reliability Statistics was assessed using Cronbach's Alpha test.

3. Results

Table (1): shows distribution of the nurses according to their personal characteristics. Staff nurses age were ranged between 22 to 55 years old with mean score age 30.02 ± 6.70 and nearly two-thirds (62.8%) of them were less than 30 years old. Regarding the years of experience, the years of experience ranged between 1-36 years with mean score9.18 ± 7.35 and more than two-fifths (43.2%) staff nurses had less than 5 years of experience. Majority (89.2%, 88.0%) of staff nurses were females and married, respectively.

Figure (1): shows that more than half (60.4%) of staff nurses were exposed to bullying in their work.

Figure (2): shows that around one-third (34.0%, 30.0%) of staff nurses were reported that the source of their bullying was head nurse, and patient relatives, respectively. Equal percent (11.2%) of them were reported that the source of their bullying were physician and colleague.

Figure (3) shows that majority of staff nurses had high level of overall workplace bullying types. While, minority of staff nurses reported that they had low level of overall workplace bullying types.

Figure (4): shows that majority of staff nurses had high level of overall professional threats. While, minority of staff nurses reported that they had low level of overall professional threats.

Figure (5): As evident from figure, majority of staff nurses had high level of overall personal threat. While, minority of them had low level of overall personal threat.

Figure (6): Show that nearly three-quarters of staff nurses had high level of overall work isolation. While, minority of them had low level of overall work isolation.

Figure (7): shows that more than half of staff nurses had high level of overall work overload. While, minor percentage of them had low level of overall work overload.

Figure (8): shows that majority of staff nurses had high level of overall work instability, while minority of them had moderate level of overall work instability.

Figure (9): shows that three-quarter of staff nurses had low agreement level regarding overall organizational processes. While, minority of them reported high agreement level.

Table (2): shows distribution of the staff nurses' opinion regarding to reporting of bullying. More than half (53.6%, 52.8%) of staff nurses reported that they had an experience of bullying and saw bullying, respectively. More than two-fifths (42.8%, and 41.6%) of staff nurses rationalized non reporting bully exposure as their decided to move position instead, feared reprisal, and would have affected their career, respectively.

Table (3): shows distribution of staff nurses' opinion regarding to job consequences as a type of workplace bullying consequences. Majority (84.0%, and 80.4%) of staff nurses reported that they response to reporting bullying were they applied for worker compensation, and used their sick leave to cope, respectively. Around three-quarters (79.6%, 79.6%, 78.0%, 76.0%, 74.4%, and 73.2%) of staff nurses reported that they response to reporting bullying were they had reduced their hours of work, moved positions within the organization, they had been overlooked for promotion, no longer working in their chosen field, were told that were weak and not coping, and were

moved, not the bully, respectively**.**

Table (4): Presents distribution of staff nurses' opinion according to bullying health problems as a type of workplace consequences. Over three-quarters (75.2%) of bullied nurses' complained from fatigue and exhaustion, while, more than two-thirds (67.2%) complained from headaches. Also, more than half (60.8%, 55.2%, and 52.8%) of them complained of sleeplessness, anxiety, and depression, respectively. More than two-fifths (46.4%, 45.2%, and 42.4%) of staff nurses complained of hypertension, memory loss, and gastric upset, respectively**.**

Figure (10): shows that more than two-fifths of staff nurses had low level of overall work engagement characteristics. While, more than one-quarter of them had high or moderate level regarding overall work engagement characteristics.

Figure (11): represents that statistically negative significant correlation was found between staff nurses' overall workplace bullying and their work engagement (r=-0.368 and p=<0.001).

Table (1): Distribution of the nurses according to their personal characteristics data

Variables	No.	%
Age (years)		
- ≤30	157	62.8
- >30	93	37.2
- Min. – Max.	22.0 – 55.0	
- Mean ± SD.	30.02 ± 6.70	
- Rang	22-55	
Years of experience		
- ≤5	108	43.2
- 5 – 10	70	28.0
- >10	72	28.8
- Min. – Max.	1.0 – 36.0	
- Mean ± SD.	9.18 ± 7.35	
- Rang	1-36	
Sex		
- Male	27	10.8
- Female	223	89.2
Educational level		
- Diploma	70	28.0
- Technical Institute of nursing	89	35.6
- BSN	87	34.8
- Others	4	1.6
Marital status		
- Married	220	88.0
- Single	22	8.8
- Divorced	4	1.6
- Widow	4	1.6
Department		
- Medical	95	38.0
- Surgical	60	24.0
- ICU	73	29.2
- Outpatient	22	8.8
Previous attending training courses		
- Yes	87	34.8
- No	163	65.2
Type of attending training courses		
- training course related to ICU	42	16.8
- Emergency training course	25	10.0
-	20	8.0
-		
- Neonate training course		

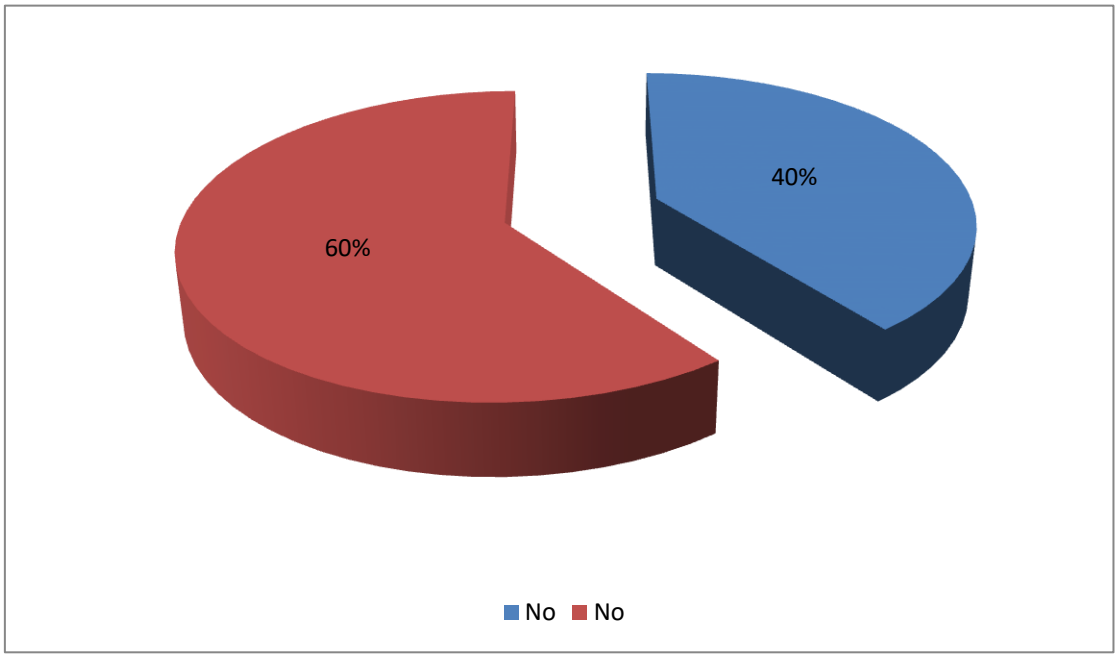

Figure (1): Distribution of the staff nurses' perception according to bully's definition

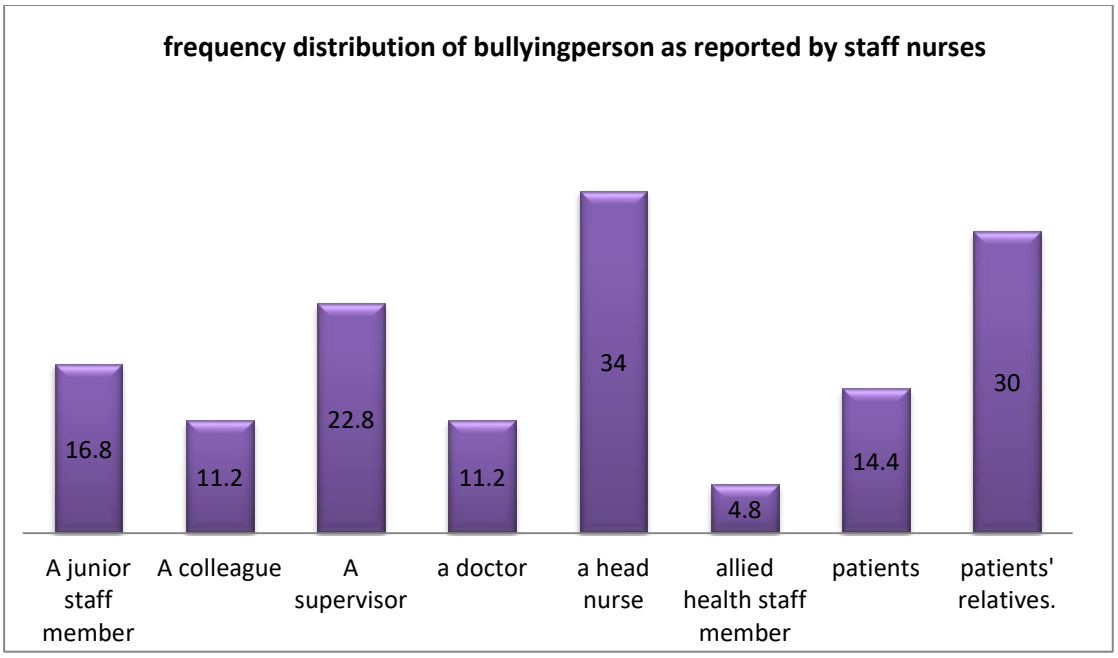

Figure (2): Frequency distribution of bullying person as reported by staff nurses

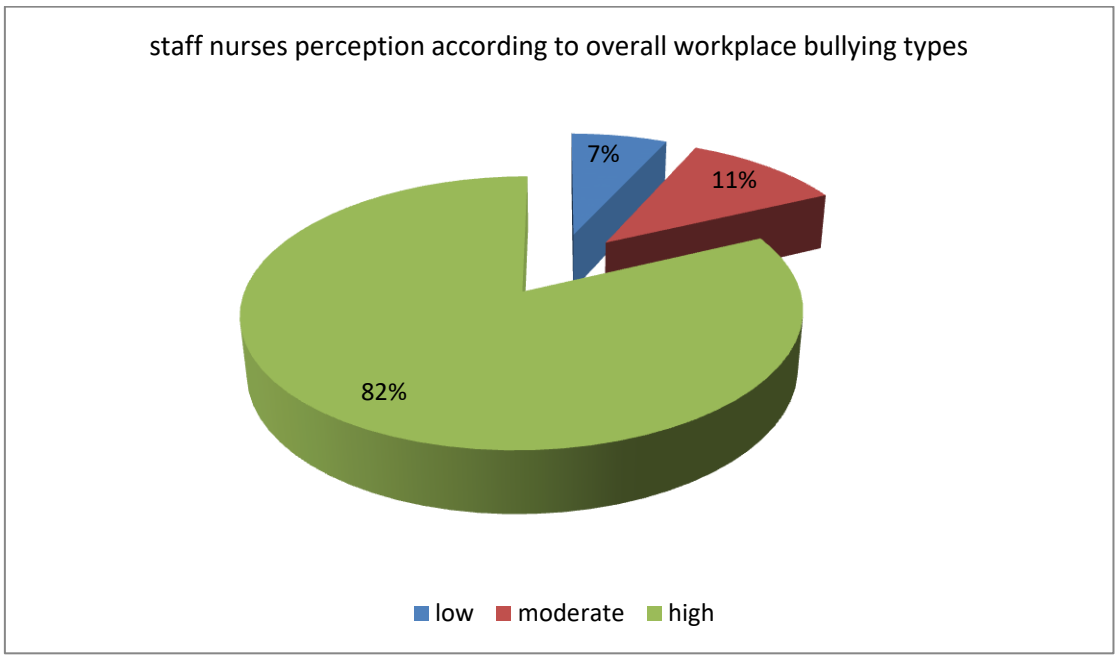

Figure (3): Levels of staff nurses according to overall workplace bullying types

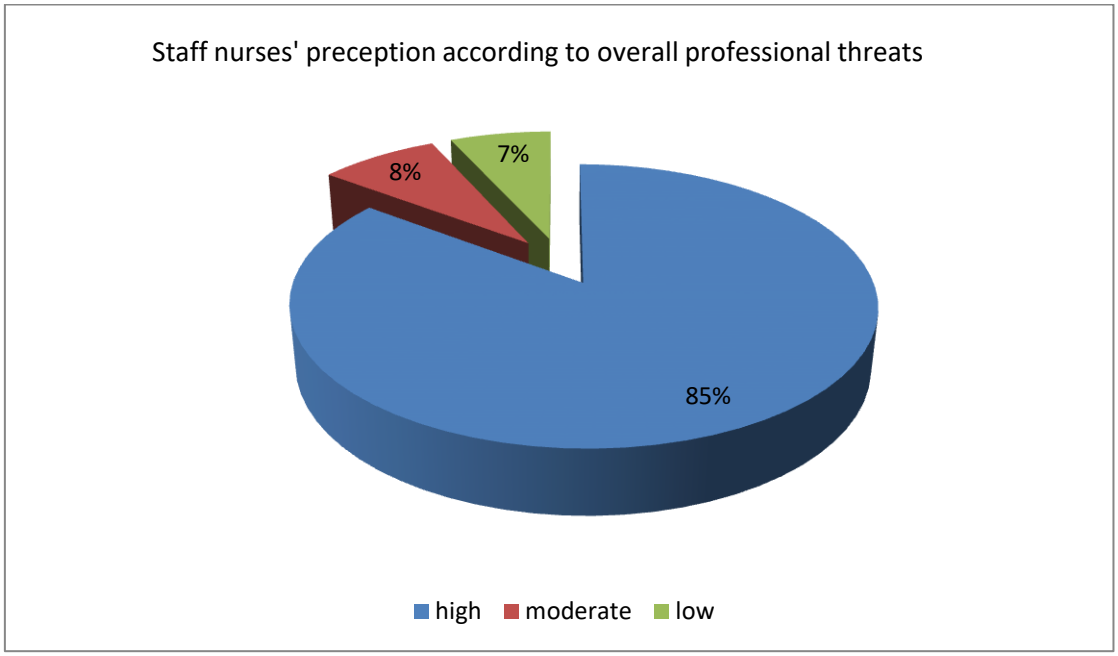

Figure (4): Levels of staff nurses according to overall professional threats

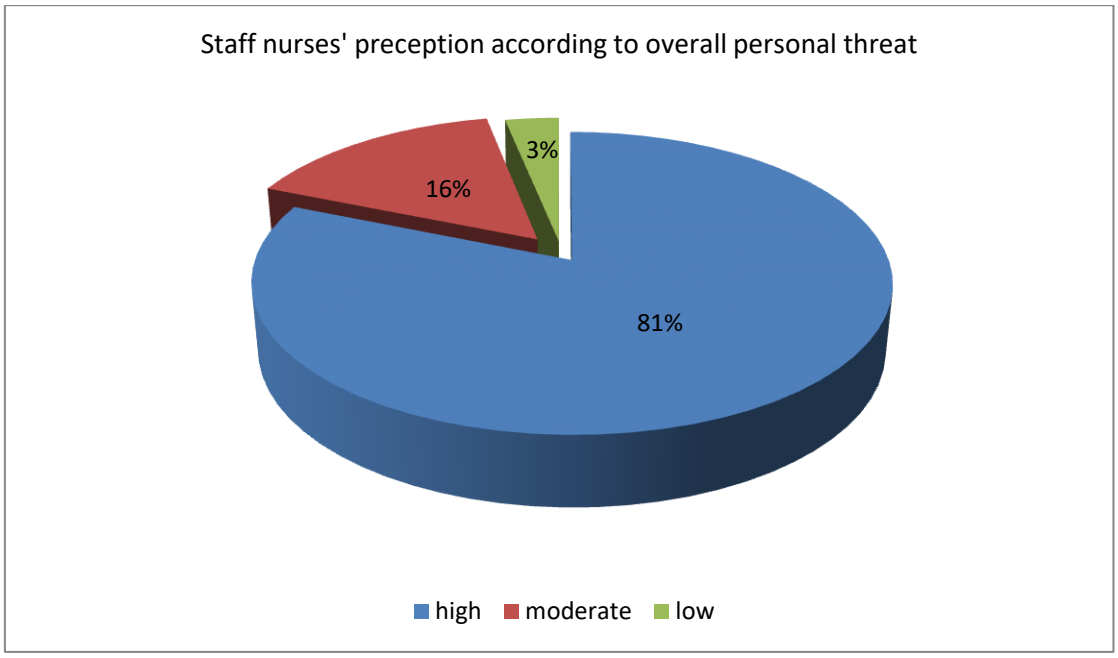

Figure (5): Levels of staff nurses according to personal threat

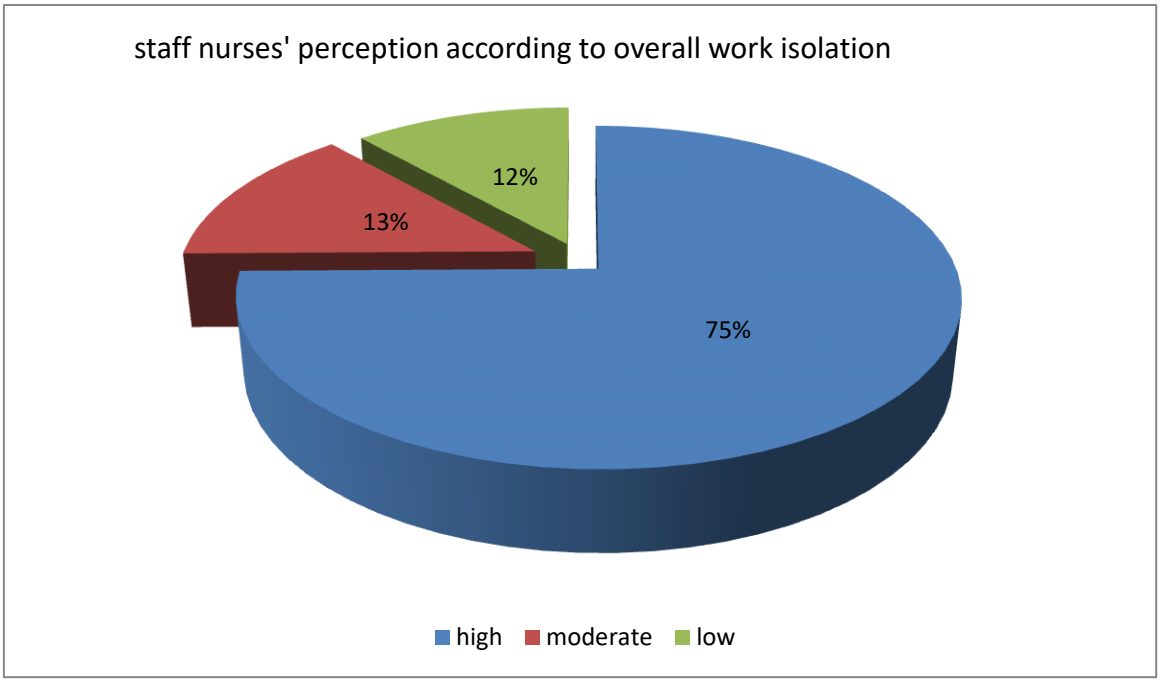

Figure (6): Levels of staff nurses according to overall work isolation

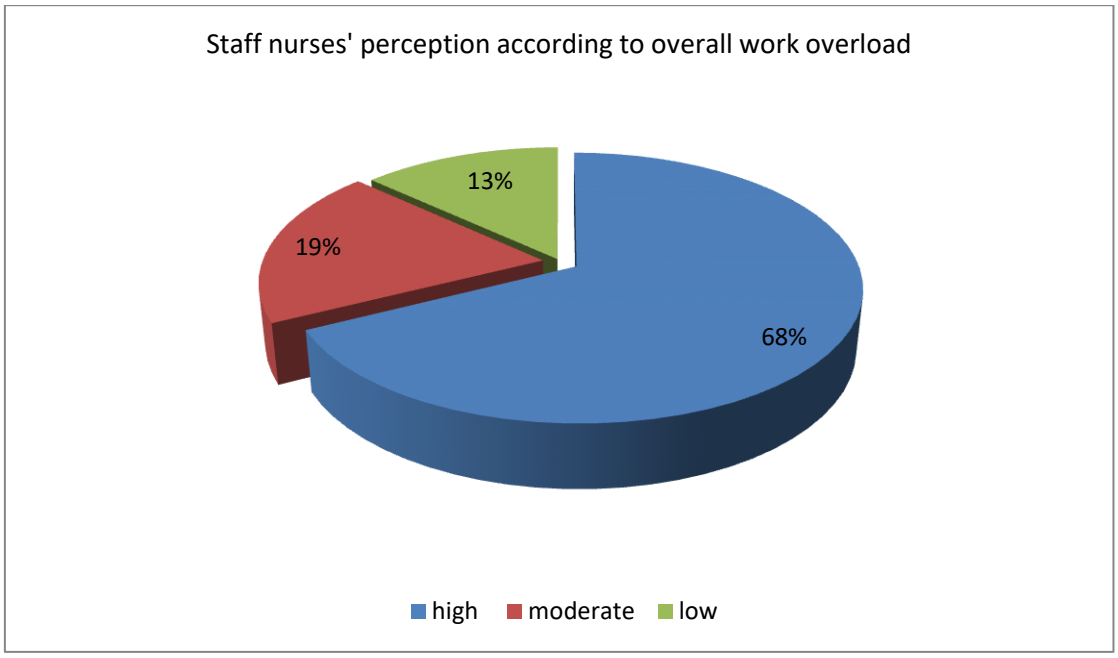

Figure (7): Levels of staff nurses according to overall work overload

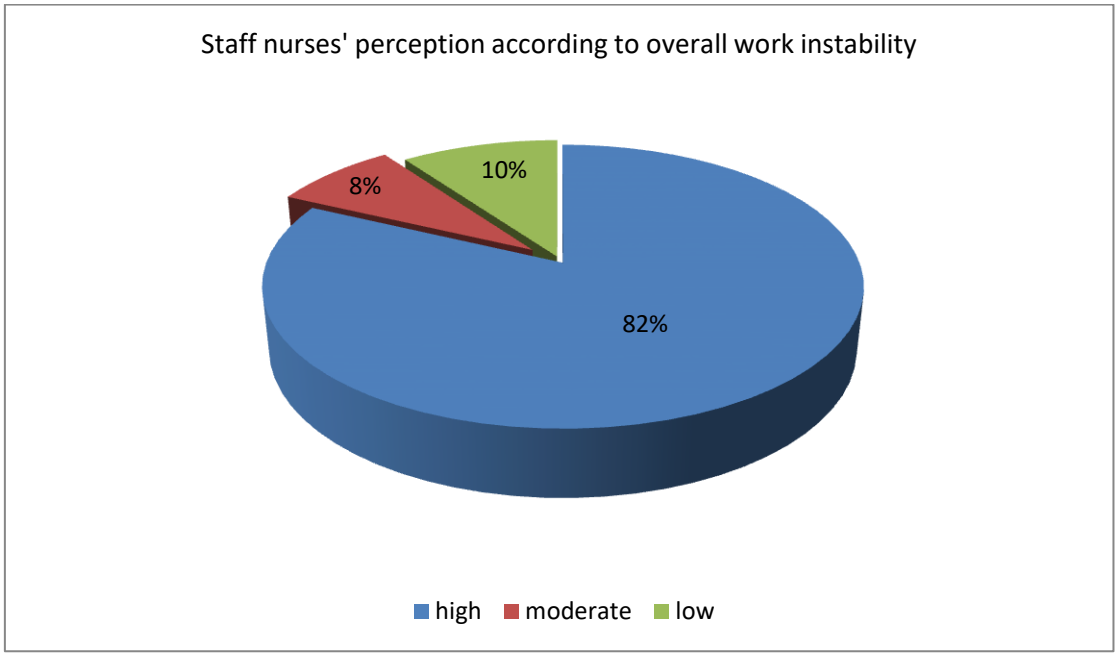

Figure (8): Levels of staff nurses according to overall work instability

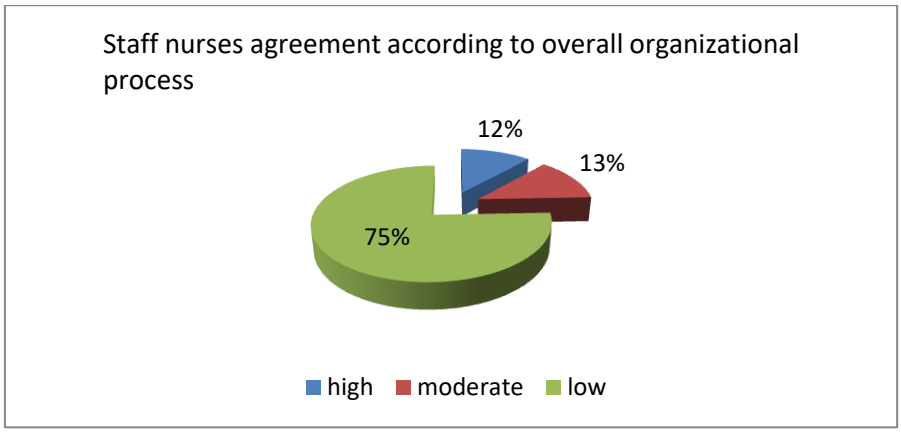

Figure (9): Levels of the staff nurses agreement according to overall organizational process

Table (2): Distribution of the staff nurses' opinion regarding to reporting of bullying

Reporting of bullying items	No.	%
-Reporting of bullying in case of experienced it		
No	116	46.4
Yes	134	53.6
-Reporting of bullying in case of witnessed it		
No	132	52.8
Yes	118	47.2
If yes: (n = 156)		
-The reasons for not reporting the bully		
- I did not know how to make a report	88	35.2
- I did not think it is serious enough	84	33.6
- I feared reprisal	104	41.6
- I decided to move position instead	107	42.8
- I did not think I could prove it	91	36.4
- I would be labeled a troublemaker	89	35.6
- Nothing would have been done	57	22.8
- The process is too complicated	97	38.8
- It would have affected my career	104	41.6
The person that you make the report to		
- Head nurse	77	30.8
- Supervisor	112	44.8
- Director	64	25.6
- Administrator	113	45.2

Table (3): Distribution of staff nurses' opinion regarding to job consequences as a type of workplace bullying consequences

Job consequences items	Nurses' response			
	Yes		No	
	No.	%	No.	%
- I reported bullying, am no longer bullied	161	64.4	89	35.6
- It was reported, but ignored	135	54.0	115	46.0
- It was investigated, but nothing change	165	66.0	85	34.0
- It was swept under the carpet	154	61.6	96	38.4
- I was told I was weak and not coping	186	74.4	64	25.6
- I was given counseling	131	52.4	119	47.6
- I was moved, not the bully	183	73.2	67	26.8
- I was asked to mediate with the bully	168	67.2	82	32.8
- I applied for workers compensation	210	84.0	40	16.0
- I have reduced my hours of work	199	79.6	51	20.4
- I was not longer working in my chosen field	190	76.0	60	24.0
- I resigned from the organization	167	66.8	83	33.2
- I have used my sick leave to cope	201	80.4	49	19.6
- I moved positions within the organization	199	79.6	51	20.4
- I have been overlooked for promotion	195	78.0	55	22.0

Table (4): Distribution of staff nurses' opinion according to bullying health problems as a type of workplace consequences

bullying health problems items	Nurses response			
	No		Yes	
	No.	%	No.	%
- Fatigue and exhaustion	62	24.8	188	75.2
- Hypertension	134	53.6	116	46.4
- Depression	118	47.2	132	52.8
- Memory loss	137	54.8	113	45.2
- Headaches	82	32.8	168	67.2
- Exacerbation of existing illness	170	68.0	80	32.0
- Anxiety	112	44.8	138	55.2
- Panic attacks	189	75.6	61	24.4
- Change in weight	157	62.8	93	37.2
- Sleeplessness	98	39.2	152	60.8
- Gastric upset	144	57.6	106	42.4

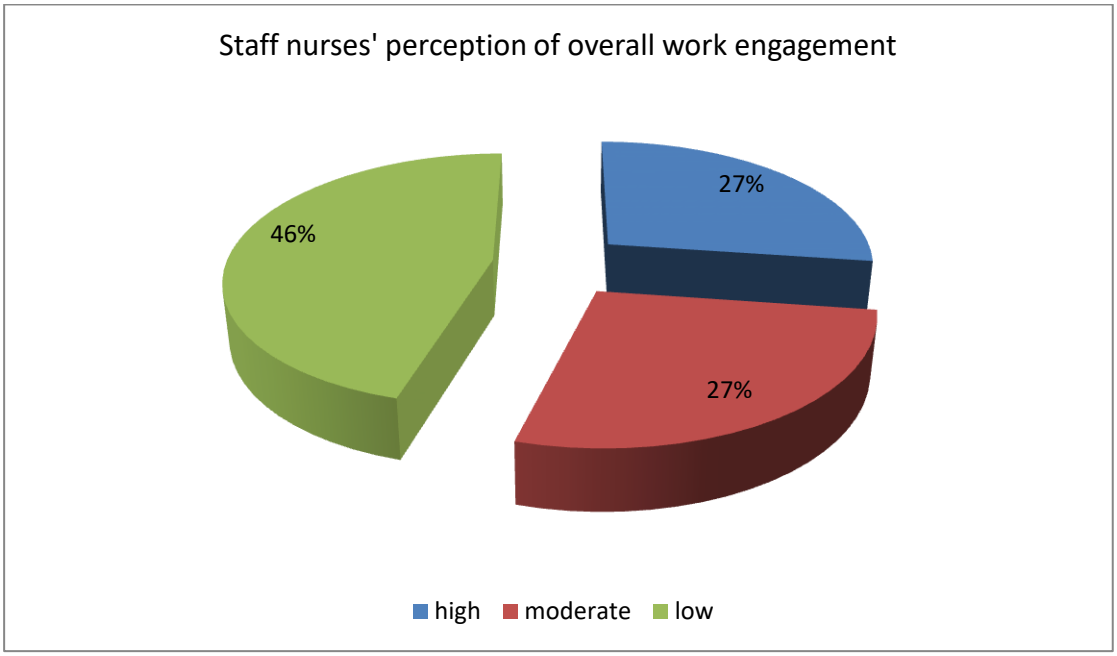

Figure (10): Levels of the staff nurses' perception of overall work engagement

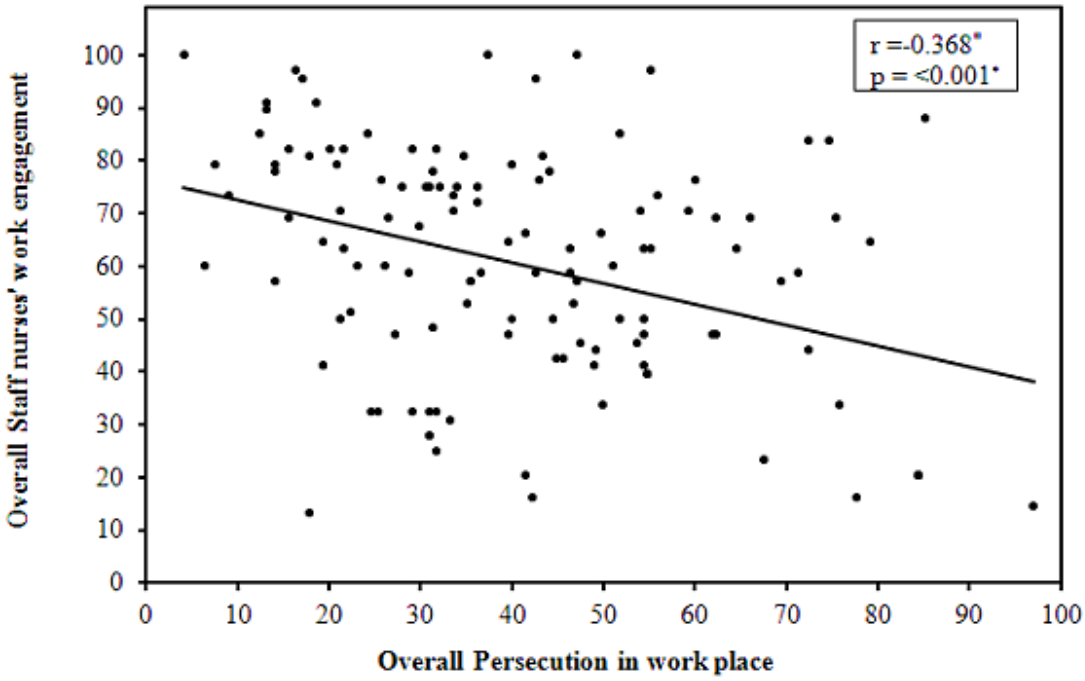

Figure (11): Correlation between workplace bullying with staff nurses' work engagement

Discussion

Today, there is an increasing evidence of nursing staff being exposed to violent behavior as workplace bullying. Bullying is a serious issue affecting the nursing profession, as bullying present in all work environments and nurses are on the frontline of the health care and have the closest contact with patients and their relatives. Workplace bullying has serious negative consequences that may extend beyond individual nurses to an entire health care organization, such as experiencing stress, frustration, physical and psychological disorders, poor engagement and leave a particular place of employment [4,10].

The result of the present study revealed that more than half of staff nurses experienced bullying at workplace which should be a cause for concern as it brings special attention to bullying the health care.

This result is congruent with **Trepanier et al., (2016)** [120]**,** and **Al-Wehedy et al., (2012)** [121] they reported that the majority of nurses were exposed to workplace bullying. Moreover, **Abbas et al., (2010)**[122] revealed that more than half of nurses' were exposed to violence during their work. In addition**, Kwok et al., (2006)** [123] reported that bullying had been experienced by nurses in a percent of 76%. On contrary this result is disagreed with **Karatza** (2016) [67] who showed that the majority of the respondents did not face bullying incidents at their workplace within a year**.** Also, **Budin et al., (2013)** [124], found that a majority of nurses perceived no exposure to bullying.

The present study revealed that the majority of staff nurses had high level of overall bullying. The result of the present study agreed with **Nwaneri et al., (2016)**[125] who found workplace bullying among nurses is reported to be high. Also, this finding is consistent with **Etienne, 2014**[126]**, Berry et al., 2012**[127]**,** found higher levels of bullying among samples of nurses who work in U.S. hospitals.

Regarding bully person, the present study revealed that more than one-third of staff nurses reported that bullying was related to head nurses. In the same line with the present result was **Bardakci, (2016)** [64] who reported that most of the bullying behaviors were perpetrated by head nurses. Also, **Trepanier et al., (2013),** [45] **Cevic-akyil et al., (2012)** [39], and **Efe and Ayaz's(2010)** [43] found that nurses are

subjected to bullying behaviors perpetrated by head nurses. While, this result disagreed with **Ebrahim, (2018)** [128] who reported that the source of bullying behavior was nurses and physician are the most frequent sources of bullying behaviors.

In relation to the professional threat as a type of bullying, the present study revealed that majority of staff nurses had high level of overall professional threats. This study finding may be due to the un ability of staff nurses to deal with bullies, increased workload, shortage of hospital staff, inability to take uninterrupted breaks, inadequate staffing ratios and limited supplies. This study result is disagreed with **Fountain (2016)** [115], who found that the majority of nurses perceived no exposure to erosion of professional competence and reputation.

Regarding to personal threat as a type of bullying, the present study revealed that majority of staff nurses had high level of overall personal threat. This result may be due to the most of the nurses felt that expression of such acts threatened their dignity so avoid working with the bully, overwhelming workloads, excessively long shifts, lots of responsibilities and too much burden on nurses. This finding is inconsistent with **Budin et al., (2013)** [124], who found lower levels of personal attacks of bullying among early career nurses.

Concerning work isolation as a type of bullying, the present study revealed that nearly three-quarters of staff nurses had high level of overall work isolation. This study result may be due to denial of due process and use of earned benefits, bad communication and unfair economic restrictions. This result agreed with **Berry et al., (2012)** [127] who found higher levels of attack through work roles and tasks among samples of nurses who work in U.S. hospitals

In relation to work overload as a type of bullying, the result of the present study revealed that more than half of staff nurses had high level of overall work overload. This study results may be due to the perpetrator is often senior position and the subsequent complaint may be seen as simply jealousy, resulting in repercussions and a certain amount of pressure, and unfair work assignment. The result of the present study disagreed with **Wilson et al., (2011)** [134] who reported that 30.5% of nurse participants in the study reported moderate or substantial exposure to work overload in the workplace.

Regarding to work instability as a type of bullying, the result of the present study showed that majority of staff nurses had high level of overall work instability. This study result may be due to those nurses still believed that bully had undervalued their efforts and participation, lack of appreciation and work opportunities and a misunderstanding of staff rights and responsibilities. The result of the present study was disagreed with **Mahmoud, (2019)** [132] who found that the participants had moderate level of work instability

In relation to organizational system with bullying treating, the result of the present study revealed that three-quarter of staff nurses had low agreement level regarding overall organizational processes. The result of the present study was contraindicated with **Mahmoud, (2019)** [132] who showed that more than half of the staff nurses strongly disagreed about bullies summoned them to meet without notice and intimidated. Also, nearly one third of them disagreed about the bullies make gang on them. Nearly half of them not sure about the records from meetings are falsified and using the restructure to force out those not supportive of bullies

In relation to reporting bullying by staff nurses, the result of the present study revealed that around half of staff nurses reported the bullying in case of experience it. This result was consistent with **Mahmoud, (2019)** [132] who revealed that more than half of the staff nurses reported the bullying. Opposite to the present finding **Bardakci, (2016)**[64] who reported that the nurses reacted to bullying behaviors mostly by keeping silent and sharing the issue with friends and family.

Regarding to the health problems of bullying on staff nurses, the results of the present study revealed that over three-quarters of the bullied nurses complained from fatigue and exhaustion. Also, more than half of them complained from headaches, sleeplessness, anxiety, and depression. The finding of the present study was congruent with **Ekici & Beder, (2014)** [61] who found that the nurses who were suffering from the effect of bullying, usually experience sever psychiatric, psychosomatic and psychosocial problems. **Stanley, (2014)** [135]**,** and **Dewet, (2010)**[136] found that the impact of workplace bullying participants is significant, 53% of them experienced physical and emotional

consequences including loss of sleep, loss of appetite, anxiety, depression and compromised self-confidence.

Concerning job consequences of bullying reporting, the result of the present study revealed that the majority of staff nurses reported the bullying, applied for worker compensation, used their sick leave to cope, reduced their hours of work, and moved positions within the organization. This result in the same line with **Nwaneri et al., (2016)** [125] who reported that more than half of staff nurses left their job within six months due to workplace bullying. Also, **Chesler, (2014)** [113] reported that the nurses changed jobs to avoid the bullies.

The result of the present study revealed that the majority of staff nurses had high level of workplace bullying and more than two-fifths of staff nurses had low level perception of overall work engagement. The result of present study was agreed with **Fountain (2016)** [115] who revealed that staff nurses, those nurses who work on medical/surgical units and those who work in non-acute hospital settings had lower levels of work engagement. Conversely, the result of present study was disagreed with, **Badran (2019)** [137] who revealed that less than two-thirds of the sample had moderate work engagement level.

The result of the present study revealed that, there was statistically negative significant correlation between nurses perceived bullying and their engagement. This result may be due to the nurses had poor of ability to deal with workplace bullying and the nurses are unable to function at their full capacity when bullying continue in the workplace. This result agreed with **Elena Fiabane, et al., (2014)** [154] who reported that the workplace bullying impairs the nurses' work engagement. Also, **Fountain (2016)** [115] reported that workplace bullying among nurses in the study was found to be significantly associated with lower levels of work engagement.

Conclusion:

The study result concluded that, majority of staff nurses had high level of workplace bullying. Specifically, the highest mean scores was related to professional threat, followed by work overload and the lowest mean scores was related to work instability and more than half of staff nurses reported the bullying, around one-third of staff nurses' were reported that the source of their bullying were head nurse. In addition,

more than two-fifths of the staff nurses had low level of work engagement and dedication was perceived by staff nurse as being the highest mean score. There was statistically significant correlation between nurses' bullying and their work engagement. These findings answer all research questions.

Recommendation:

Nursing level

- Nurses at all levels, including administrators and staff nurses, need to be informed to report bullying.
- Conduct training program for staff nurses about bullying and different strategies to deal with it, including verbal, nonverbal and writing down techniques.
- **Organizational level**
- Nursing administrators need to develop policies to prevent bullying and anti-bullying reporting tools and mechanisms that allow nurses' who exposed to workplace bullying to report incidents of bullying .

Educational level

-Nursing administration curriculum need to include topics about bullying behaviors .

Further researches

-Need to be conducted to identify the effective strategies to eliminate bullying behaviors .

-Assess the impact of workplace bullying on the organizational outcomes and patient outcomes.

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Effect of Educational Program about Authentic Leadership and Mindfulness Factors on Head Nurses Practice Self – Evaluation

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Abstract

Authentic leadership is an emerging perspective in the field of leadership focuses on leaders values and beliefs . Components of authentic leadership were self- awareness, balanced processing, relational transparency, and an internalized moral perspective. Mindfulness perspective permits head nurses to be fully present, aware of themselves and their impact on other people, and aware of their reactions in stressful situations. Mindfulness include five factors; observing, describing, acting with awareness, non-judging of inner experiences and non-reactivity to inner experiences. Authentic leadership and their mindfulness if combined together create head nurses that have clearer, extra focused thinking, and growth mindset that help subordinates improve and grow . So , **the aim of present study** is to determine the effect of educational program about authentic leadership and mindfulness factors on head nurses practice self – evaluation. Study was conducted at two hospitals affiliated to Ministry of Health namely Elmenshawy General Hospital and Kafer El sheikh General Hospital. All (70) head nurses working at different clinical departments. **Three tools** were used including head nurses self-evaluation for authentic leadership, head nurses self-evaluation for mindfulness factors and structured questionnaire to assess head nurse knowledge. **The result** of present study revealed that preprogram half (50%) of head nurses had high level of total authentic leadership, improved statistically significant immediate post program to be (65.7%). Preprogram low percent 8.6% of head nurse had high level of total mindfulness level improved to be 98.6% immediately post program. Preprogram no one had good level of total knowledge, changed to be all and 98.6% of head nurses got good level respectively. Immediate and three months post program. **Recommendation** : Authentic leadership and mindfulness educational training programs should be provided periodically for head nurses to keep them updating their essentials knowledge and practis regarding authentic leadership and mindfulness

Key words: head nurses , authentic leadership , mindfulness practice

Introduction

Leaders of today are expected to value the human resources of their organizations and provide an environment that promotes individual contributions to the organization's work(1). A head nurses should be skillful at coordinating human and material resources to meet goals and objectives of the organization(2). To do their duties ,they must promote a growth of mindset, adhere to a code of ethics, being open, transparent and honest in their interactions, genuine and instill a work culture of personal growth, clarity , accountability, and innovation (3).

Authentic leadership is an approach to leadership that emphasizes building the leader's legitimacy through honest relationships with followers which value their input and are built on an ethical foundation(4). It starts with the head nurses' awareness that allows them to build positive relationships and inspire and encourage employees in the right ways (5). The authentic head nurses include four dimensions of self-awareness, balanced processing, relational transparency, and an internalized moral perspective . It suggest genuinely desire to understand their own leadership in order to serve others more effectively(6).

Self-awareness is critical for head nurse to grow as a leader, and strengthen other components of authentic leadership(7). Self-awareness is the ability to recognize and acknowledge head nurse strengths and weaknesses(4). Balanced processing is the capacity of head nurse to openly discuss and evaluate information and consider others' opinions before choosing a course of actions(8). Relational transparency is being open and honest in sharing of information about one's thoughts and feelings without hidden agendas (9). Also, head nurses express and exhibit true self to subordinates in expressing of their genuine beliefs and feelings(10).

Mindfulness enables head nurses to step back and contemplate situations objectively before taking action in nonjudgmental way consequently, the experience of moment is unfolding (12). Mindfulness include five factors; observe is the first factor measures noticing sensory experience directly, without labeling it, reacting to it or judging it(13). Describing is labelling internal experiences with words(14).

Acting with awareness which involves

focusing on one activities at a given moment as opposed to behaving mechanically while attention is focused elsewhere(15). Nonjudging of inner experience refers to taking a nonevaluative stance toward thoughts and feelings[16]. Non reactivity to inner experience it is a head nurses ability to stay calm and remain objective when they face situations or thoughts they might disturb their emotional stability[17].

Head nurses self evaluation serve as evaluation function in training programs , through which head nurses evaluate the effectiveness of their practice and determine improvements in self knowledge , aid in developing self awareness and cause a desirable behavior change [11] . Self-evaluation helps head nurses to reflect on their strengths and weaknesses as well as provide directions for improvements. The concept of authentic leadership style and mindfulness practice has strong impact on head nurses self evaluation. The present study aims to determine the effect of this educational program about authentic leadership and mindfulness factors on head nurses practice self – evaluation at Elmenshawy General Hospital and Kafer El sheikh General Hospital.

Aim of the study

The aim of this study was to determine the effect of educational program about authentic leadership and mindfulness factors on head nurses practice self – evaluation.

Research hypothesis

Head nurses authentic leadership and mindfulness practice self evaluation will be improved after program.

Subjects and Method

Study design

Quasi experimental research design was used to achieve the aim of present study. Such design fits the nature of the problem under investigation

Setting

The study was conducted at two hospitals affiliated to Ministry of Health namely El menshawy General Hospital and Kafer El Sheikh General Hospital.

Subject

The study subjects consisted of all (70) head nurses working at different clinical departments , including emergency ,internal medicine , surgery , pediatric, obstetric , orthopedic, urology , intensive care units, and operating room. Head nurses included in the study from

Elmenshawy General hospital were 30 and from Kafer Elsheikh general hospital were 40 .

Tools

To achieve the aim of present study the data was collected using the following tools:

Tool I : Head nurses Self-Evaluation for Authentic Leadership

This tool developed by Northouse (2010) [11] , and was modified by researcher to assess head nurses authentic leadership practice, it included two parts:

Part (1): Subject characteristics such as hospital name, gender, age , marital status, level of education , years of experience.

Part (2): Head nurses Self-Evaluation for Authentic Leadership included four subscales as follows:-

- Self-awareness subscale
- Internalized moral perspective subscale .
- Balanced processing subscale
- Relational transparency subscale
- **Scoring system**

The responses for questions was measured by 5 points Likert Scale ranging from strongly agree (5) to strongly disagree (1).

-Levels of authentic leadership presented as follows:

- High level of authentic leadership >64-80% = 52 - 64 score
- Moderate level of authentic leadership >48-64% = 39 - 51 score
- Low level of authentic leadership >32-48 % = 26 - 38 score

Tool II: Head nurses self Evaluation for Mindfulness factors

This tool developed by Baer et al (2006) [9] , used by Williams et al (2014) [12], Crane et al (2016)[13] and was modified by researcher **to assess head nurses mindfulness practice.** Included five subscales as follows:-

- Observing factor
- Describing factor
- Acting with awareness factor
- Non-judging of inner experience factor
- Non-reactivity to inner experience factor
- **Scoring system**

Responses for questions was measured by 5 points

Levels of mindfulness represented as follows :

High level of mindfulness >64-80 %

Moderate level of mindfulness >48-64 %
Low level of mindfulness
Scores inthe upper high ranges indicated stronger mindfulness, whereas scores in the lower ranges indicated weaker mindfulness.

Tool (III): Structured questionnaire to assess head nurse knowledge

This tool was developed by the researcher guided by Baer et al (2006) [9] , Walumba et al. (2008)[4] , Lesia Yasinski (2014) [14], and recent literatures to assess head nurses knowledge regarding authentic leadership and mindfulness factors . It consisted of 61 questions in the form of true and false. **Questions were classified into 6 categories as follows:**

1. Authentic leadership basic concepts and its components include 10 question
2. Personal and hospital strategies ,benefits of leading authentically include 10 question .
3. Concepts , components , and strategies to cultivate mindfulness practice include 10 question .
4. Mindfulness factors and techniques include 11 question.
5. Mindfulness at work and practice that make a better leaders
6. The examples of clinical situations to train head nurses on authentic leadership and mindfulness factors include 10 question.

Scoring system

Each item of knowledge test was taken score of (1) for correct answer and (0) for wrong answer.

Levels of head nurses knowledge presented as follows :

- Good level knowledge = > 75 % = 46 - 61 score
- Faire level knowledge = 60-75 % = 37 - 45 score
- Poor level knowledge = < 60 % = 0 - 44 score

Method

1. An official permission to carry out the study were obtained from Faculty of Nursing Tanta University authorities to responsible authorities at El menshawy General Hospital and Kafer El Sheikh General Hospital to give approval and assistance for data collection.
2. The purpose of the study was explained and made clear to the administrators of both hospitals to gain their cooperation.

3. Ethical consideration: Head nurses consent to participate in the study was obtained they were informed about the privacy of information obtained from them , nature of the study , their rights to withdraw and the confidentiality of their names.
4. After reviewing of the related literature and different studies in this field, the study tools were developed by the researcher based on recommended and relevant literature.
5. Tools I, II and III were presented to a jury of 5 experts in nursing administration to check content validity of their items .The five experts were three assistant professor from nursing service administration, and one assistant professor from psychiatric department at Faculty of Nursing Tanta University . Beside one professor in nursing service administration from Zakazek University.
6. The expert's responses were represented in four points rating score ranging (4-1); 4= strongly relevant , 3=relevant ,2= little relevant and 1= not relevant.
7. Necessary modifications were done as clarification, omission of certain questions and adding others and simplifying work related words. The content validity was 96.25% for authentic leadership and 97.7% for mindfulness factors.
8. A pilot study was conducted on 10% of head nurses randomly selected from the two hospitals to test the tools clarity and applicability ,then needed correction was done. The estimated time needed by head nurse to fill the scale was 20-30 minutes for each sheet. Reliability of tools was tested using Cronbach's Alpha and coefficient test. Its value 0.732 for authentic leadership practice , 0.958 for mindfulness factors and 0.854 for knowledge.
9. Data collection :the researcher distributed the assessment sheets to head nurses in each hospital to assess authentic leadership and mindfulness practices ,then sheet collected personally by the researcher after completion .The appropriate time for data collection differ according to the type of work load of each department.
10. Practice self evaluation tool I, II and knowledge questionnaire

tool III were used before , after, and 3 months after program implementation.

11. The data collection started from 14/11/2017 and lasted 10 month and ended at 15 /8/2018.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 20 SPSS).

Results

Table (1) shows head nurses' characteristics, age, marital status, qualification, attendance of authentic or mindfulness programs, years of experience, and work departments. The age of head nurses ranged from 27 – 45 years with mean age 32.51□□□□□, and 54.3 % of head nurses aged ≤ 30 years. Majority (95.8% ,97.2%) of head nurses were respectively female and married. Head nurses 90.0% having bachelor degree and not attended previous program on authentic leadership and mindfulness. Head nurses experience ranged from 1-17 years; with mean 5.04□□□□□□ years, and 44.3% were working at medical department.

Figure (1) Shows levels of head nurses total authentic leadership pre, immediate, and 3 months post program. Preprogram minority of head nurses had high level of total authentic leadership , increased respectively to be nearly half and one-third at immediate and three months post program.

Table (2) shows levels of head nurses authentic leadership dimensions pre, immediate and 3 months post program . There were statistically significant improvement of all levels of head nurses authentic leadership . Pre program 48.6% , 47.2% of head nurses showed moderate and low level of self awareness respectively , changed to 52.9% ,45.7% moderate and high level immediate, and 62.9 % , 34.3% at 3 months post program respectively.

Balanced processing dimension showed that only 2.8% of head nurses were at high level increased to 55.7% at immediate, and 24.3% three months post program. Relational transparency dimension showed that no head nurse was at high level preprogram changed to 48.6% immediate

, and decreased to 14.3% three months

post program respectively. Head nurses 41.5% showed moderate level of internalized moral perspective pre program changed to be 55.7% immediate , and 78.6% three months post program.

Figure (2) shows levels of head nurses total mindfulness, pre, immediate, and 3 months post program. Preprogram minority of head nurses showed high level of total mindfulness, changed to be majority immediate, and three months post program.

Table (3) shows levels of head nurse total mindfulness factors pre, immediate and 3 months post program. There was statistically significant improvement of all levels of head nurses mindfulness factors at ($P<0.05$). Head nurses 12.9% had high level of observing factor preprogram, changed to 95.7% at immediate, and 90.0% three months post program. Describing factor showed that head nurses 24.3% got low level preprogram changed to be none of them had low level at both immediate and 3 months post program.

Acting with awareness factor showed that 22.9% of head nurses had low level preprogram changed to none was at low level at immediate, and only 1.4% three months post program. Non-judging of inner experience factor showed that only 7.1% of head nurses had high level preprogram, increased to 91.4% at immediate, and 57.1% three months post program. Non-reactivity to inner experience factor showed that 50.0% of head nurses had low level preprogram and none of them had low level immediate , and only 11.4% three months post program.

Figure (3) shows levels of head nurse's total knowledge, pre, immediate, and 3 months post program. Preprogram non of head nurses showed good level of total knowledge, changed to majority showed good level immediate and three months post program.

Table (4) shows levels of head nurse total knowledge items pre, immediate and 3 months post program. There were statistically significant improvement of head nurses knowledge of all items at ($P<0.05$). The head nurses basic concepts showed that pre program 2.8 % had good level of total knowledge items which changed to be 100.0% , 91.4 % at immediate and 3 months post program respectively. Also strategies

and benefits revealed that 22.8 % of head nurses had good level of knowledge preprogram , while high percent 100.0%%,

82.8 % % showed good level of total knowledge immediate and 3 months post program respectively. Regarding cultivating mindfulness practice showed that pre program low percent 2.8% of head nurses had good level of knowledge improved to 100.0 % immediate, and 75.7 % at 3 months post program.

Factors and techniques revealed that pre program only 1.4 % of head nurses were at good level of total knowledge , compared to

100.0 % , 72.8% at immediate and 3 months post program respectively. As regards to practices make a better leaders demonstrated that pre program 15.7 % of head nurses had good level of knowledge, increased to be 100.0 % and 82.9 % at immediate and 3 months post program respectively. While training clinical situations displayed that pre program 18.6 % of head nurses had good level of knowledge , changed to be 100.0 % and 80.0 % at immediate and 3 months post program respectively.

Table (5) shows correlation between head nurses characteristics and the total mindfulness factors score pre, immediate, and 3 months post program in both hospitals. Negative highly significant correlation was detected between department and mindfulness factors at pre , immediate and three months post program in both hospitals at ($P < 0.01$).

Figure (4) shows correlation between head nurses mindfulness and knowledge in Elmenshawy General Hospital.pre, immediate, and 3 months post program. Positive non-significant correlation was detected between head nurses knowledge and mindfulness pre, immediate and 3 months post the program.

Table (1): Head nurses characteristics N=70.

Characteristics	Total N=70		El menshawy N=30		Kafer Elsheikh N=40	
	N	%	N	%	N	%
Age (in years):						
-≤30 years	32	45.7	9	30.0	23	57.5
->30 years	38	54.3	21	70.0	17	42.5
Range	**27 – 45**		**30 – 45**		**27 – 40**	
Mean± SD	**32.51±3.65**		**34.13±3.98**		**31.30±2.88**	
Gender:						
-Male	3	4.2	0	0.0	3	7.5
-Female	67	95.8	30	100.0	37	92.5
Marital status						
-Married	68	97.2	30	100.0	38	95.0
-Widowed	1	1.4	0	0.0	1	2.5
-Divorced	1	1.4	0	0.0	1	2.5
Qualification						
-Baccalaureate degree	63	90.0	26	13.3	37	92.5
-Master degree	7	10.0	4	86.7	3	7.5
Previous authentic leadership training						
-No	70	100.0	30	100.0	40	100.0
-Yes	0	0.0	0	0.0	0	0.0
Previous mindfulness training						
-No	70	100.0	30	100.0	40	100.0
-Yes	0	0.0	0	0.0	0	0.0
Years of experience						
-≤5 years	47	67.1	19	63.3	28	70.0
->5 years	23	32.9	11	36.7	12	30.0
Range	**1 – 17**		**1 – 15**		**1 – 17**	
Mean ± SD	**5.04±3.895**		**5.07±3.88**		**5.02±4.04**	
Department						
-Medical	31	44.3	13	43.3	18	45.0
-Pediatric	21	30.0	9	30.0	12	30.0
-Surgery	11	15.7	5	16.7	6	15.0
-Infection and quality	7	10.0	3	10.0	4	10.0

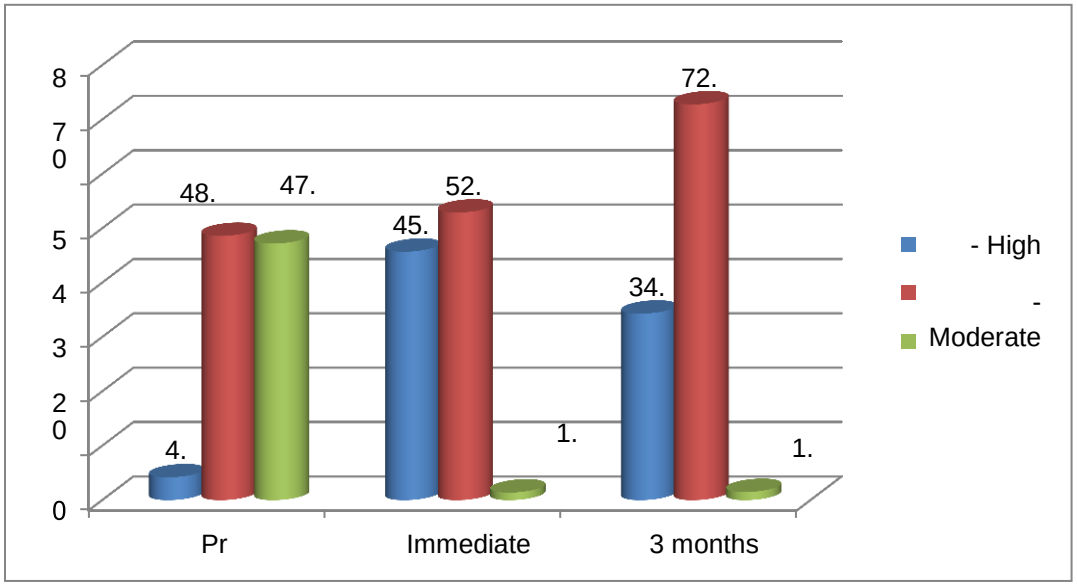

Figure (1) : Levels of head nurses total authentic leadership pre, immediate, and 3 months post program

Table (2) : Levels of head nurses authentic leadership dimensions pre, immediate and 3 months post program N =70.

Dimensions	Pre		Immediate		3 months post		χ^2 P
	N	%	N	%	N	%	
Self-awareness							
-High	3	4.2	32	45.7	24	34.3	
-Moderate	34	48.6	37	52.9	44	62.9	**79.354**
-Low	33	47.2	1	1.4	2	2.8	**0.000***
Balanced processing							
-High	2	2.8	39	55.7	17	24.3	
-Moderate	30	42.9	30	42.9	51	72.9	**108.798**
-Low	38	54.3	1	1.4	2	2.8	**0.000***
Relational transparency							
-High	0	0.0	34	48.6	10	14.3	
-Moderate	19	27.1	35	50.0	48	68.6	**118.767**
-Low	51	72.9	1	1.4	12	17.1	**0.000***
Internalized moral							
-High	3	4.2	30	42.9	12	17.2	
-Moderate	29	41.5	39	55.7	55	78.6	**95.447**
-Low	38	54.3	1	1.4	3	4.2	**0.000***

*** Statistically significant difference at (P<0.05)**

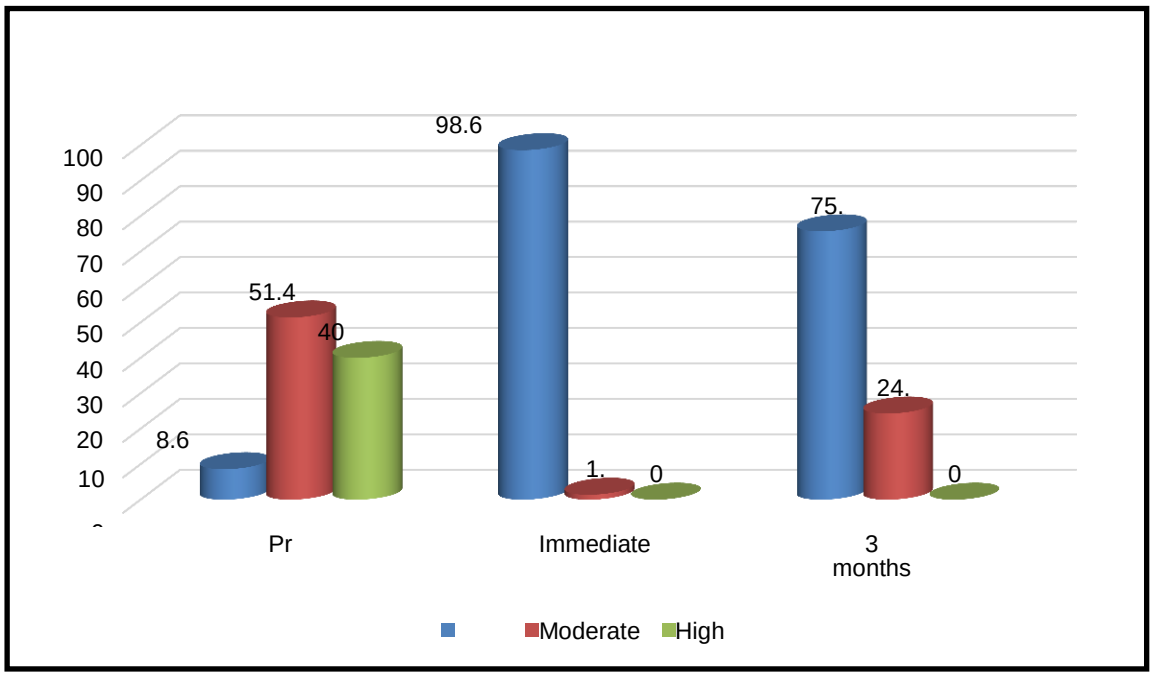

Figure (2) : Level of head nurses total mindfulness, pre, immediate, and 3 months post program.

Table (3) : Levels of head nurse total mindfulness factors pre, immediate and 3 months post program N=70.

Factors	Pre		Immediate		3 months post		χ^2 P
	N	%	N	%	N	%	
Observing							
-High	9	12.9	67	95.7	63	90.0	
-Moderate	35	50.0	3	4.3	4	5.7	**134.443**
-Low	26	37.1	0	0.0	3	4.3	**0.000***
Describing							
-High	12	17.1	67	95.7	57	81.4	
-Moderate	41	58.6	3	4.3	13	18.6	**112.710**
-Low	17	24.3	0	0.0	0	0.0	**0.000***
Awareness							
-High	17	24.3	67	95.7	52	74.3	
-Moderate	37	52.8	3	4.3	17	24.3	**88.134**
-Low	16	22.9	0	0.0	1	1.4	**0.000***
Non-judging							
-High	5	7.1	64	91.4	40	57.1	
-Moderate	33	47.1	6	8.6	17	24.3	**102.742**
-Low	32	45.8	0	0.0	13	18.6	**0.000***
Non-reactivity							
-High	6	8.6	62	88.6	49	70.0	
-Moderate	29	41.4	8	11.4	13	18.6	**105.422**
-Low	35	50.0	0	0.0	8	11.4	**0.000***

***Statistically significant difference at (P<0.05)**

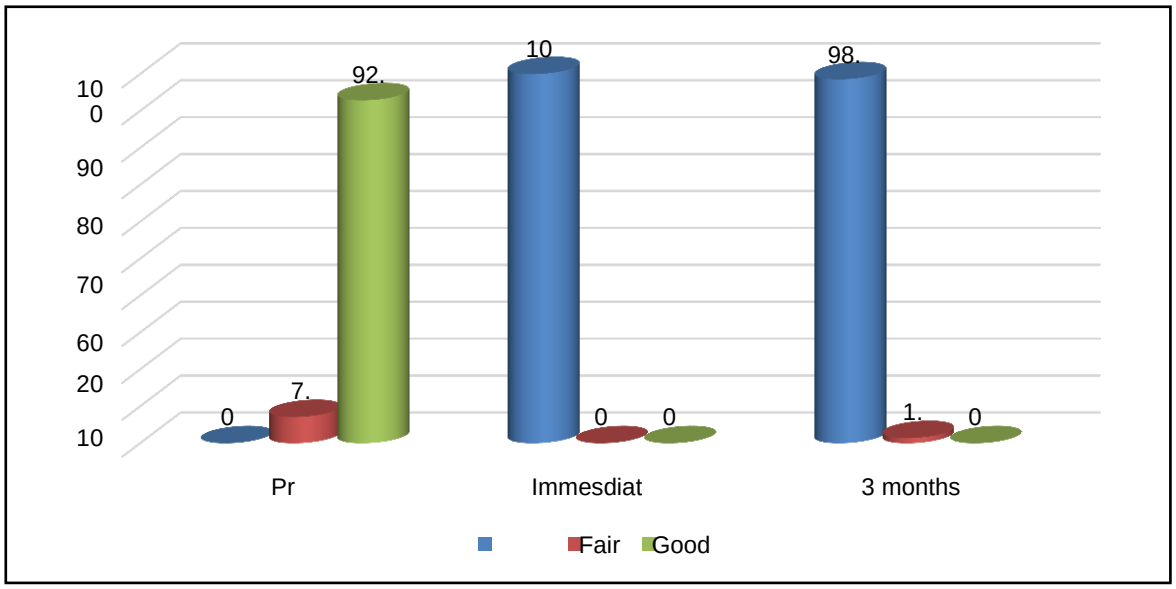

Figure (3) :Levels of head nurse's total knowledge, pre, immediate, and 3 months post program.

Table (4): levels of head nurses total knowledge items pre, immediate and 3 months post program in both hospitals N=70.

Level of items	Head nurses						χ^2 P
	Pre		Immediate		3 months post		
	N	%	N	%	N	%	
Basic concepts							
-Good	2	2.8	70	100.0	64	91.4	
-Fair	16	22.8	0	0.0	6	8.6	**184.34**
-Poor	52	74.4	0	0.0	0	0.0	**0.000***
Strategies and benefits							
-Good	16	22.8	70	100.0	56	82.8	
-Fair	33	47.2	0	0.0	12	17.2	**162.61**
-Poor	21	30.0	0	0.0	0	0.0	**0.000***
Cultivate mindfulness practice							
-Good	2	2.8	70	100.0	53	75.7	
-Fair	7	10.0	0	0.0	16	22.9	**194.99**
-Poor	61	87.2	0	0.0	1	1.4	**0.000***
Factors and techniques							
-Good	1	1.4	70	100.0	51	72.8	
-Fair	14	20.0	0	0.0	16	22.9	**176.60**
-Poor	55	78.6	0	0.0	3	4.3	**0.000***
Practices make a better leaders							
-Good	11	15.7	70	100.0	58	82.9	
-Fair	10	14.3	0	0.0	11	15.7	
-poor	49	70.0	0	0.0	1	1.4	**130.669** **0.000***
Training clinical situations							
-Good	13	18.6	70	100.0	56	80.0	
-Fair	20	28.5	0	0.0	14	20.0	**152.82**
-Poor	37	52.9	0	0.0	0	0.0	**0.000***

Table (5): Correlation between head nurses characteristics and total mindfulness factors score pre, immediate, and 3 months post Program N=70.

Characteristics	factors					
	Pre		Immediate		3 months post	
	r	P	r	P	r	P
Age in years	-0.066	0.586	0.021	0.864	-0.150	0.216
Marital status -Married -divorced -widowed	0.014	0.906	-0.106	0.382	0.162	0.181
Qualification -Baccalaureate degree -Master degree	-0.058	0.636	-0.214	0.075	0.026	0.833
Attend previous training Program	0.134	0.270	0.219	0.068	-0.011	0.931
Years of experience in years	-0.058	0.635	0.222	0.065	-0.086	0.479
Department -Medical -Pediatric -Surgery -Infection and quality	-0.395	0.001**	-0.318	0.007**	-0.057	0.642

*** Statistically significant difference at (P<0.05)**

**** Highly significant at (P < 0.01**

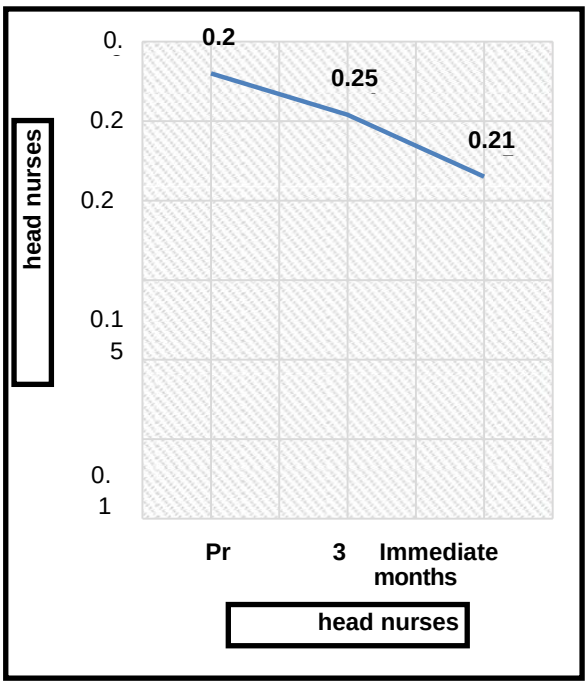

Figure (4) :Correlation between head nurses mindfulness and knowledge in Kaferelshiekh General hospital

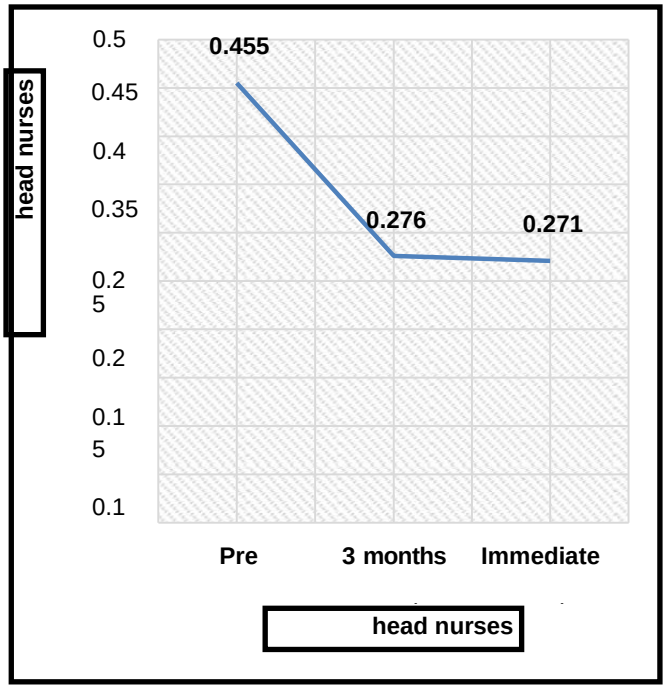

Figure (5): Correlation between head nurses mindfulness andknowledge in Elmenshawy General Hospital.

Discussion

Assessment of the present study head nurses authentic leadershippractice level revealed that preprogram, half of them showed low practice level of total authentic leadership as they did not attend previous training program about authentic leadership .But the resting of head nurses were at moderate and high level indicating that they had internal motivation and readiness to become authentic leaders in their practice. This could be due to being exposed to a diversity of life experiences , being affiliated to have a master's in nursing science , or already hold a master's in nursing science.

Ideally, authentic leadership is an emerging style and need appropriate strategies to facilitate its practice through training program . Being authentic head nurse is hard work and takes years of experience in leadership roles. Training program will shorten the period of head nurses developing authentic leadership by connecting them with truth, creative ideas, journey of self-discovery and sharing experiences. Besides, learning them to lead themselves before leading others as well as significant of honest relationships to their souls and to other personnel.

Findings of study are consistent with results reported by **Baron (2012)**[18] study about developing authentic leadership through experiential training: an empirical study , the participants scored lower on self-assessed authentic leadership at the start of the training program.**Bussinet al (2016)**[19]study about fast trackingauthentic leadership development by means of a program, indicated that before the start of the program, there was limited awareness of the notion of authentic leadership.

But after implementation of the program, the current results displayed that head nurses reported statistically significant improvement of authentic leadership mean score immediate and three months post program as compared to preprogram. This finding may be due to head nurses had understanding of basic authentic leadership role and demonstrated genuine and honest desire to serve self and others more effectively. Apparently those head nurses attendance of the present study program foster their development through improvement of self- awareness, internalized moral perspective, balanced processing of information, and relational transparency

In fact, the present authentic leadership training program maximized the chances

of generating lasting impacts on those head nurses by giving them the opportunity to open discussion, considering and valuing different viewpoints,genuinely explore life history, sharing stories with others and learning from those shared by others. The enhancement in those head nurses' knowledge score also may be due to their active involvement and interest in the program sessions and frequent review of their knowledge. Other explanation of the improving knowledge in the present study that the researcher introduced examples from web sites, videos, simulation and let the head nurses make applications from work situations .

Current result displayed that head nurses reported statistically significant improvement of total practice of mindfulness and each of observing , describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience factors immediate and three months post program than pre program. Present study mindfulness training program improved those head nurses knowledge and provide them with practical methods for enhancing attention and awareness about mindfulness techniques such as breathing and meditation. Actually , they trained for making pausing and paying attention to notice beauty in environment , transportation , office , and home. Yet, most of those head nurses became ambitious and have desire to develop themselves than pre program by learning and acquiring new applicable knowledge. Most probably by practicing mindfulness they reduced their stress ,enhanced their awareness as well as being resilient, innovative and effective leaders.

Really, head nurses training for mindfulness practice and meditation technique improved their ability to focus and concentrate on any task at hand and improved their functioning with subordinates and patients , as well as had positive effect on their physical and mental workability.**Ponsoda et al. (2017)**[20]study about the effect of an out-of- school mindfulness program on adolescents' stress reduction and emotional wellbeing, participants reported increase in observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience. **Baron et al. (2018)**[21]study about mindfulness and leadership flexibility, suggested that by developing

mindfulness program, managers might be better able to adapt their leadership style. While **Mellor et al**. **(2016)**[22] study about mindfulness training and employee well being, found significant increases in self-reported mindfulness skillsafter a mindfulness training program as well as provided evidence that mindfulness skills can be developed through training.**Baron (2012)**[18]showed that the participants scored lower on self-assessed mindfulness at the start of the training program.**Lan et al .(2014)**[23]study about the effects of mindfulness training program on reducing stress and promoting well being among nurses in critical care units, participants reported significant improvement in the level of mindfulness after completing the program.

Findings of present study showed that there are statistically significant improvement of levels of head nurses total knowledge regarding authentic leadership and mindfulness post program implementation in both hospitals. The fact is that the training program about authentic and mindful factors provided head nurses with a full opportunity to share creative ideas and learn from their life stories, practice of being fully present in the moment, thus articulate benefits of authentic mindfulness for them. Also ,mindful leadership knowledge enabled head nurses to lead with presence, clarity, can stay calm in a crisis, be resilient in the face of challenge, make intentional decisions in order to achieve the goals of their hospitals. This facilitated by the ability of the head nurses to gain knowledge easily because they are very ambitious and they are interested in the research topics. Moreover, the majority of head nurses were in young age which showed more readiness and more capacity for learning as well as having easy knowledge retention.

Also, the acquisition of knowledge is facilitated by new and existing subjects that are both accessible and usable. Learning is enhanced through peer supported interactions and collaboration. Over that , training committee in both hospitals offers complete cooperation and all facilities for researcher such as training room, data show tools and collect head nurses in training room to keep abreast of leadership development and knowledge. All of these facilities contributed to head nurses acquisition of knowledge to become more easily. Also, discussing the topic of the research program openly with

the researcher and other peers in training room by using all methods of technology like data show , videos and mail maximized and contributed to transfer and apply authentic leadership and mindfulness knowledge on the earth.

Mindfulness and authentic leadership training is helpful for head nurses seeking new forms of personal development and connection with the world around them. However, a slight decline occurred in head nurses' knowledge about authentic leadership and mindfulness practice post three months of program implementation. The decline of head nurses ' knowledge about authentic leadership and mindfulness practice at three month post program implementation could be explained by gradual decrease in the head nurses knowledge over time due to many causes such as; increasing work overload, workplace conflict, over that there is no practical application of authentic leadership and mindfulness practice either formal or informal. Knowledge that not utilized in regular practice is expected to be decreased, diminished or even lost with the passage of the time.

Moreover, there is a direct relation between memory loss and length of time that lapses post program implementation. The findings are parallel with **Louis (2016)**[24] study about authentic leadership and mindfulness development through action learning , indicated that self- reports of authentic leadership and mindfulness increased significantly after leadership development program.**Ragab et al .(2013)**[25] study about effect of designed training program on nurse's performance regarding care of patient with blood borne viral hepatitis at Assiut University Hospital, reportedthat a highly significant differences between nurse's knowledge (pre versus immediately post, and immediately post versus 3 months) . Also, **Hesser et al (2017)**[26] study about the mediating effect of mindful non-reactivity, found increasing in participants mindful non-reactivity post program.

Conclusion

Head nurses at the two hospitals; Elmenshawy General Hospital and Kafer El sheikh General Hospital were lacking practice regarding the emerging style of authentic leadership and mindfulness factors.Implementation of successful educational program on authentic leadership and mindfulness factors led to significant improvement

in all study subject head nurses knowledge and practice at all departments in both hospitals. Three months later their knowledge and practices were slightly declined , indicating their needfor follow up training, and periodical supportive intervention to sustain their authentic leadership and mindfulness knowledge and practices.

Recommendations

Recommendations are suggested:

- -Authentic leadership ,mindfulness practice training courses should be considered a prerequisite for head nurses to occupy their position.
- Head nurses should attend workshops on dimensions of authentic leadership and mindfulness factors and how become effective leaders by augmentation of them.
- Authentic leadership and mindfulness educational training programs should be provided periodically to update head nurses essentials knowledge regarding authentic leadership and mindfulness.
- Hospitals should offer periodical mindfulness program to increase head nurses observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience to reduce work stress and turn over.
- Head nurses should train to be more realistic in their judgments and decisions about themselves and their work in the present moment by blocking past and future thoughtsto gain subordinates trust and respect .
- Head nurses should be activated to share their ideas,feelings, information and listening to feedbackto enhance work relationship .
- Head nurses attention to trainto act consciously rather than react passively to take well-planned actions to manage work distinction.
- Head nurses should engage in mindfulness reflection practices as breathing and meditation techniques to have awareness of personal limitations .
- Great attention for head nurse leader to be mindful observer to grantthe power of being objective about their thoughts.

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Effect of Home-based-Nursing Intervention on Knowledge, Daily Living Activities and pain for Patients after Coronary Artery Bypass Graft

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Abstract:

Background: The advantages of nursing support for cardiac rehabilitation patients can improve the health outcomes and reduce the risk of a new cardiac event through education, support, supervision, and reinforcement .The aim of this study was to assess the effectiveness of home-based-nursing intervention on knowledge, daily living activities and pain for patients after coronary artery bypass graft. Study Design: A quasi experimental research design was utilized. Study Setting: The study was conducted in the out- patient clinics of Mahalla Cardiac Center, Mahalla city, Al-Gharbia Governorate, Egypt. Study Sample: A purposive sample of 140 post- coronary artery graft surgery patients was included. The total sample was divided randomly into two groups study group (70 patients) and control group (70 patients). Study Tools: 1) A structured interviewing questionnaire including; 1) the socio- demographic data of studied patients. 2) Medical data including patient information about present and past history .3) Knowledge assessment data. 4) Barthel Index Scale of measuring activities of daily living (BIS). Study Results: After implementing the Home Based Nursing Intervention, there was high statistical significance improvement in study groups' total knowledge compared to controls. Pain level had significantly improved, as well as daily living activities among study group than control group. Conclusion: Home based nursing intervention was effective in improving patient's knowledge, level of pain and daily living activities after coronary artery bypass graft. Also, it played an important role in improving those patients through tailoring health education about healthy life styles for complete recovery and preventing complications. Recommendations: Nurses have to povide awareness program for educating patients about Home based nursing intervention to prevent complication and attaining complete recovery after coronary artery bypass graft (CABG) surgery.

Keywords: Home Based Nursing Intervention, Coronary Artery by pass Graft, Knowledge, Daily Living Activities and Pain.

INTRODUCTION

Coronary artery disease (CAD) is the most common form of heart diseases. It is estimated that nearly one half of all middle-aged men and one third of middle-aged women in the United States will develop some form of the disease. CAD is the number one killer in the developed world, with over 7.4 million deaths attributed to CAD in 2012 [(1).]

According to the latest world health organization data published in 2017, coronary artery disease is as a leading cause of death and disability in all around the world. Coronary heart disease death in Egypt accounts for126, 312 or 24.58% of total deaths. The age adjusted death rate is 216.82 per 100.000 of population. Egypt ranks number18 in the world (WHO, 2017) [(2)]. Since the mean prevalence of CAD is estimated to be 6.9% in men and 6.0% in women, it is important for nurses to become familiar with the various types of coronary artery conditions and the methods for assessing, preventing, and managing these disorders medically and surgically (Direk and Şenol Çelik , 2012) [(3)]

Worldwide, each year more than 300,000 patients is undergo (CAPG) surgery. Approximately one-fifth of them will have recurrence of coronary heart disease symptoms within the first 5 years. This risk increases with age and is higher among women. Up to 30% will have angina in the first postoperative year, increased risk for myocardial infarction, and greater need for re-operation [(4)]

The prevalence of risk factors for cardiovascular disease was relatively high among both Saudi and Egyptian medical students, particularly a sedentary life style, obesity, and abdominal obesity. Smoking was practiced by 29.7% of both populations. A significantly higher prevalence of obesity and a reported family history of premature coronary artery disease (CHD) were observed among the Saudi students and a significantly higher prevalence of hypertension was found among male Egyptian students as compared with male Saudi students. A relatively high proportion of both populations (23.9% of Saudi students and 16.7% of the Egyptian students) was at an increased risk of developing fatal cardiovascular disease within 10 years (Heron ,2011) [(5)]

CABG is indicated for patients with more than two arterial constrictions, with weakened left ventricles, or with diabetes. There are other therapies for patients whose medical treatment does not improve

the symptoms of their coronary artery disease but who are not good candidates for either PCI or CABG. The alternatives include laser trans myocardial revascularization (using a carbon dioxide laser), enhanced external counter pulsation to reduce the frequency of angina, and spinal cord stimulation to relieve the pain of angina (Bhimji, 2013 and McLaughlin, 2014). [6,7]

A sedentary lifestyle is a risk factor for CAD. Patients with a sedentary lifestyle are also more likely to also be overweight or obese, which contributes to the risk developing CAD. Patient goals for physical activity should begin with 10 to 15 minutes a day and gradually work up to a goal of 30 minutes a day of moderate to vigorous exercise. The more vigorous the activity, the greater the benefits. The level of activity should be based on the patient's baseline condition and other comorbid diseases. Patients should always work with their healthcare provider prior to starting an exercise program [7]

Home based nursing guidelines after coronary artery by bass graft surgery promotes cardiac rehabilitation and that are focused on risk factor modifications, adequate exercise training, and coping strategies are effective measures to reduce recurrent events. For most patients, heart surgery is a life-saving procedure but also a major source of emotional stress and financial burden (Heran, 2011*)*. [8].Knowledge is an important method for all patients with cardiac diseases, to improve his health status and prevent of complication and classified into actual knowledge positive or definite, personal knowledge based on one's own observation, and constructive knowledge based on other circumstances (Temple, 2010). [9]

The Activities of Daily Living (ADLs) are defined as" set of activities necessary for normal self-care. For those patients with cardiac disease .The activities include movement in bed, transfers, locomotion, dressing, personal hygiene, and feeding pattern. Health care providers are under constant pressure to discharge patients quickly, but it is essential that nurses engage early in adequate, individualized, and in-depth discharge planning, that increasing the odds for successful recovery [10]

Cardiac rehabilitation is continuing to evolve to meet a variety of age groups and needs. Advanced age is associated with a higher prevalence of CAD as well as increased morbidity and mortality. Cardiac

rehabilitation programs designed to meet the needs of older patients (> 65 years of age) should include strength, balance, coordination, and flexibility. Evidence-based programs show that elderly patients can realize positive benefits from an exercise-based cardiac rehabilitation program to increase functional capacity, glucose control, quality of life, enhanced ability to perform ADLs, and reduced incidence of hospitalization (Menezes et al., 2014). [11]

AIM OF THE STUDY

The aim of this study was to assess the effectiveness of home -based-nursing intervention on knowledge, daily living activities and pain for patients after coronary artery bypass graft surgery.

RESEARCH HYPOTHESES:

1. Patients who receive home based nursing intervention after coronary artery bypass graft will have improved knowledge score compared to control group.

2. Patients who receive home based nursing intervention after coronary artery bypass will have better daily living activities score compared to control group.

3. Patients who receive home based nursing intervention after coronary artery bypass will have lower pain score compared to control group.

Material and methods

Design :- A quasi experimental research design (case& control was utilized.

Setting :- This study was conducted in the out- patient clinics of Mahalla Cardiac Center, Mahalla city, Al-Gharbia Governorate, Egypt.

Subjects

- A purposive sample of 140 post-coronary artery graft surgery patients was recruited. The total sample size was divided into two groups according to age, and education. A study group composed of 70 patients who received home based nursing intervention (HBNI) while control group composed of 70 patients who received the routine follow up care.

Inclusion criteria:

- Patient immediately discharged from the hospital after coronary artery bypass grafting (CABG).
- Both sex
- Age more than 30 years.

Exclusion criteria:

-Patient with other cardiac surgery such as valve replacement or congenital heart diseases.

Sample Size:

The following power analysis equation was used to indicate the study sample size. Prior data indicated that the prevalence of knowledge among control group is 30 %. If the true knowledge rate for intervention subjects is 60 %, we will need to study 70 experimental subjects and 70 control subject to be able to reject the null hypothesis that the knowledge rate for experimental and control subjects are equal with probability power 0.9. The Type 1 error probability associated with this test of this null hypothesis is 0.05.The researcher used an uncorrected chi- squared statistic to evaluate this null hypothesis.

Tools

Data was collected through using the following tools:

1- A structured interviewing questionnaire developed by the researcher depending on a review of related literature, which include the following:

A- Socio- demographic data which included name, age, sex, marital status occupation, address, level of education and monthly income….

B-Medical data which included patient information about present and past history as frequency of hospital admission and regular follow up of surgery from patients/ or ICU report.

C-Knowledge assessment: which included information about nature of the operation, treatment regimen, warning signs after operation, complications.

Scoring system of knowledge:

The questionnaire contained items related to CABG patients' demographic criteria, as well as four patients' knowledge assessment subscales each was two points Liker Scale (0 – 2) as (0) for wrong answer and (I) correct but not complete, and (2) for correct and complete answer.

The knowledge about factors that lead to CAD, as well as post-operative complications was evaluated giving a score of 0-12. The total score of each patient was categorized into "poor knowledge" when he/she achieved less than or equal ≤ 50% of the total score, and "good knowledge" was considered when the patient achieved more than 50% of the total score. Accordingly, patients who had from 0-6 points of the total score, were considered as having "poor knowledge", and those who had 7-12 points were considered as having "good knowledge".

The knowledge total score was evaluated giving a score of 0-44. The total score of each patient was categorized into

"poor knowledge" when he/she achieved less than or equal ≤ 50% of the total score, and "good knowledge" was considered when the patient achieved more than 50% of the total score. Accordingly, patients who had from 0-22 points of the total score, were considered as having "poor knowledge", and those who had 23 - 44 points were considered as having" good knowledge".

2- Barthel Index Scale for measuring Activities of Daily Living (BIS) that was developed by Barthel Collin et al., (1988) to measures a person's daily functioning specifically the activities of daily living and mobility [12].

3-Visual analogue Scale (VAS) that was developed by Wewers & Lowe, (1990) to measure the intensity of pain [13].

Reliability of the tools:

Test-retest reliability was applied using a group of 10 patients who were not included in the study. The tool was presented to them twice- two weeks apart. The tool proved to be strongly reliable (r = 0.8222).When used to measure improvement after the HBNI, changes of more than two points in the total score reflect a probable genuine change, and change on one item from fully dependent to independent is also likely to be reliable.

Validity of the tools:

The scale was tested for its content validity by group of five experts in the community nursing, medical surgical medicine and nursing and psychiatric nursing, to ascertain relevance and completeness.The relevancy, clarity, fluency, and simplicity of each component in the questionnaire were examined by the expert.

Pilot Study:

A pilot study was carried out on 10 subjects to assess the clarity, feasibility, applicability of the study tools, and time needed to fill the tool. The necessary modification was done as revealed from the pilot study. The sample of pilot study was excluded from the total sample to assure the stability of the results.

2.6 Ethical Consideration:

For ethical reasons the protocol was approved by the ethical & scientific research committee of the "Faculty of Nursing, Menoufia University". An official permission was taken from the directors of out- patient clinic. Before data collection, each subjects was informed about the aim of the study and its importance. They were given an opportunity to refuse to participate. Also they were assured that the

information would remain confidential and used for the research purpose only.

Methods

- Duration of study: data was collected at the beginning of September, 2017 to the end of Feb, 2018.
- An interview was done with the participants at the outpatient clinic to explain the purpose of the study and its importance to guarantee their cooperation and commitment.
- The study intervention's components runs according to the American Heart Association, (2016).
- A base line assessment was done for all participants immediately at discharging from the hospital and then study group were followed at home by phone, and control group were followed using their scheduled follow up hospital's list.

-Participants in the study group received the (HBNI) at the out-patient clinic of Mahala Cardiac Center, and followed up through their homes, while the control group received the routine hospital care and guidelines. The study group was divided to groups of 5 each to receive the designed educational session conducted at the outpatient clinic at their scheduled appointments with their doctor. Then they were followed by telephone if they miss a follow up schedule with their surgeon's for confirmation of commitment to the study and the healthy content of the sessions.

- The intervention included five educational sessions and awareness about medication regimen, therapeutic diet, sleep hygiene, walking, physical activity, pain management.

-The intervention started immediately with the study group after discharge from the outpatient Cardiac Center clinic and continued for the first five weeks.

- Assessment of knowledge, daily living activities and level of pain and its characteristics for studied patients were done, then compere (After one month from the intervention) the study group with control group. Assessment of pain using VAS scale to measure pain intensity and assessment of ADLs was done using the BIS scale.

-Interventional sessions were conducted in the form of presentation educational sessions contents using data show in the out- patient department. It is a highly structured method by which the community nurse verbally and visually transmits information directly to the

study group of coronary artery bypass graft.

Statistical analysis:

Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using student t- test for comparison between two means .Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square ($\chi 2$) test.

RESULTS

Table (1) it revealed that there was no statistical significance differences between study group and control in all socio-demographic characteristics of the studied patients at the beginning of the study.

Table (2) it clarified that there was no statistical significance differences between study group and control in all medical and family history.

Table (3) it highlighted a high statistical significant effect of home based nursing intervention on the four knowledge aspects among the study group compared to control group. The table revealed a high statistical significant improvement ($p< 0.000$) in the different subscales of knowledge.

Figure (1) it showed the effect of the home based nursing intervention on patient's knowledge. The graph clarified that almost three fourth percent (74.3%) of the study group of patients had good knowledge score compared to 37.1% of the control group.

Table (4) it highlighted the efficacy of home -based-nursing intervention on the four knowledge subscales as well as the total knowledge scores among study and control patients groups .The table revealed a highly significant improvement ($p<0.000$) in the different aspects of knowledge aspects. and 74.3% for total knowledge. While The good knowledge responses among control group ranged from 17.1% for wound & skin care to 48.6% for post-operative complications

Figure (2) it clarified that only 1.6% of the study group became moderately independent after the home–based nursing intervention on total score of daily living activities compared to 88.6%e of the control group.

Table (5) it revealed that there was high statistical significance decrease on pain among the study group than the control group after implementing the home based nursing intervention.

Table (1): Distribution of the studied patients after coronary artery bypass operation according to the socio -demographic characteristics (N = 140)

Socio -demographic characteristics	Groups		Test of Sig.	P- value
	Study Group(70) N0. %	Control Group (70) N0. %		
Age groups				
30 - 50 Years	44 62.9 %	36 51.4%	X^2=0.9	P=0.3 NS
51 – 70 Years	26 37.1%	34 48.6%		
X ±SD	43.7±4.3	45.6± 8.4	t= 1.1	P=0.8 NS
Sex				
Male	37 52.8%	39 55.7%	X^2=0.12	P=0.73 NS
Female	33 47.2%	31 44.3%		
Marital status				P=1.0 NS
Married	34 48.6%	34 48.6%	X2=0.0	
Unmarried	36 51.4%	36 51.4%		
Education				
Illiterate	16 22.9	20 28.6		
Elementary & intermediate education	32 45.7	28 40	X^2=0.11	P=0.73 NS
University	22 31.4	22 31.4		
Occupation				
Farmer, landowner& pension.	20 28.6	14 20		
Housewife	6 8.6	16 22.4	X^2=1.3	P=0.4 NS
Employee &worker	6 8.6	20 28.6		
Free business	38 54.2	20 28.6		

Family income				
Salary-pension	20 28.6	25 42.9		
Agricultural income	18 27.3	36 51.4	X^2=1.2	P=0.51 NS
Relatives help & others	32 45.7	4 5.7		
Residence				
Urban	48 68.6	44 62.9	X^2=0.3	P=0.6 NS
Rural	22 31.4	26 37.1		
Total	70 100	70 100		

Table 2: Medical and family history of coronary heart disease (study group& control (N=140)

Medical and family history Variables	Groups		Test of Sig.	P- value
	Study Group N0. %	Control N0. %		
Number of hospital stay :				
1 – 2	**48 68.6**	**42 60**	**X^2=0.61**	**P=0.4 NS**
3 -4	**22 31.4**	**28 40**		
Number of follow up per month after open heart surgery :				**P=1.0 NS.**
1 -2	**62 88.6**	**62 88.6**	**X^2=0.0**	
3 – 4	**8 11.4**	**8 11.4**		
Family history of coronary heart diseases			**X2=2.4**	**P=0.12 NS**
Yes	**16 22.8**	**28 40**		
No	**54 77.2**	**42 60**		
Total	**70 100%**	**70 100%**		

Table 3 : Study group and control responses to knowledge aspects, and total knowledge assessment questionnaire (N=140).

Knowledge aspects	Study group			Control			Test of sig.	P- value
	Poor Knowledge N0. (%)	Good knowledge N0. (%)	Mean score± SD	Poor Knowledge N0. (%)	Good knowledge N0. (%)	Mean score± SD		
CABG nature	1 1.4%	69 98.6	7.2± 1.2	42 60%	28 40%	4.0±1.5	X^2=31.7 t=10.4	0.000 HS 0.000HS
Factors lead to CAD	2 2.9%	68 97.1%	8.2±1.3	40 57.1	30 42.9%	6.1±0.9	X^2=48.7 t=8.5	0.000HS 0.000HS
Wound & skin care after surgery	4 5.7%	66 94.3	6.9±1.4	58 82.9%	12 17.1%	4.8±1.3	X^2=112.5 t=14.6	0.000HS 0.000HS
post- operative complications	12 17.1%	58 82.9%	8.6±2.5	36 51.4%	34 48.6%	5.2±1.2	X^2=53.2 t=9.5	0.000HS 0.000HS
Total knowledge	18 25.7%	52 74.3%	33.2±2.6	44 62.9%	26 37.1%	28.5±2.7	X^2=19.6 t=6.6	0.000HS 0.000HS

Figure 1: Effect of home-based nursing intervention on total score knowledge groups of studied patients

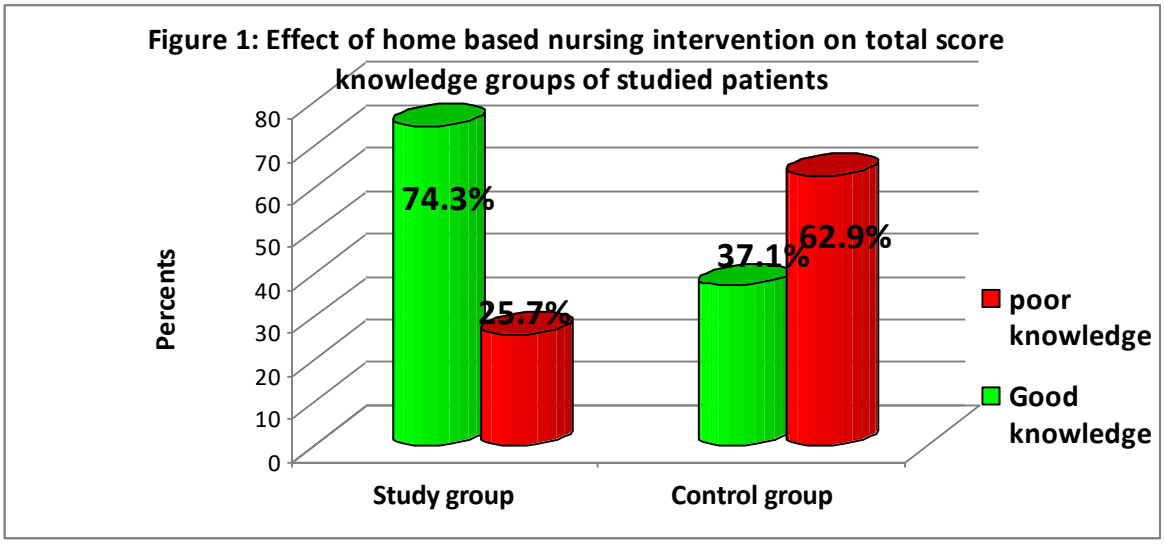

Table (4): Distribution of the studied patients groups according to their Barthel index scale (BIS) to measure activities of daily living (N = 140)

The patients 'LDAs	Completely dependent (0)		Need help (5)		Completely Independent (10)		Test of sig. P value
	No	%	No	%	No	%	
Feeding							
Study group	14	20	31	44.3	25	35.7	X2=37.5, P=0.000 HS
Control	40	57.1	30	42.9	0	0	
Having a shower							X2=64.8, P=0.000 HS
Study group	12	17.1	14	20	44	62.9	
Control	40	57.1	30	42.9	0	0	
Patient general appearance							X2=14.8, P=0.000 HS
Study group	0	0	11	15.7	59	84.3	
Control	0	0	32	45.7	38	54.3	
Patient' wearing							X2=74.4, P=0.000 HS
Study group	0	0	6	8.6	64	91.4	
Control	26	37.1	30	42.9	14	20	
Patient defecation							X2=72.6, P=0.000 HS
Study group	1	1.5	5	7.1	64	91.4	
Control	18	25.7	38	54.3	14	20	
Patient urination							X2=45.6, P=0.000 HS
Study group	5	7.1	18	25.7	47	67.2	
Control	14	20	48	68.6	8	11.4	
Patient use bathroom							
Study group	1	1.4	7	10	62	88.6	X2=43.5, P=0.000 HS
Control	8	11.4	38	54.3	24	34.3	
Patient movement from bed to wheelchair and back							
Study group	0	0	9	12.9	61	87.1	X2=11.8, P=0.000 HS
Control	56	80	14	20	0	0	
Stepping the ladder(stairs)							
Study group	2	2.8	13	16.6	55	78.6	X2=21.3, P=0.000 HS
Control	20	28.6	10	14.3	40	57.1	
Movement at surface level							
Study group	0	0	15	21.4	55	78.6	LR=118.2, P=0.000 HS
Control	8	11.4	62	88.6	0	0	

Figure 2: Effect of home based nursing intervention on living of daily activities (LDAs) categories

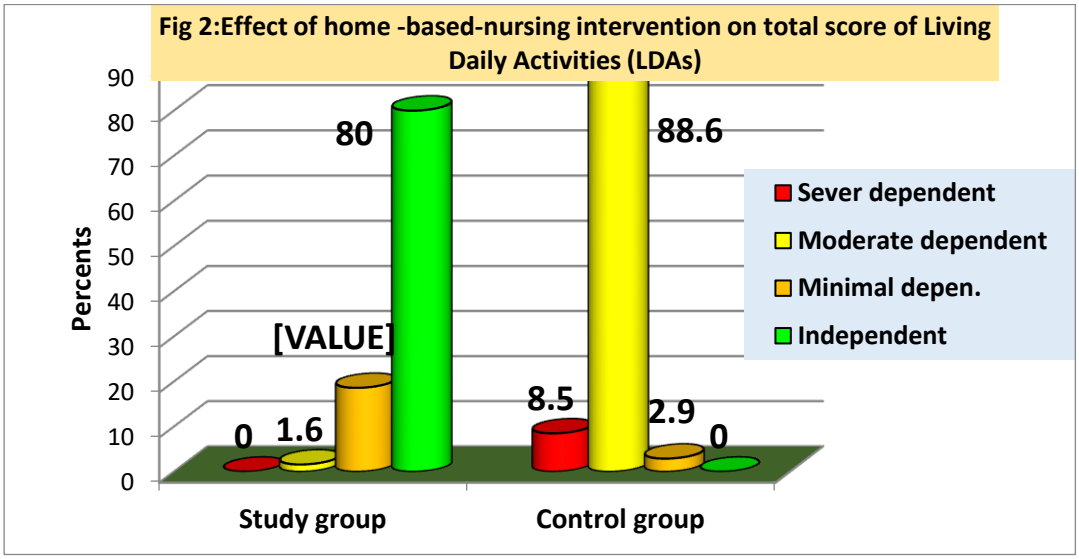

Table (5): Effect of home-based nursing intervention on pain after CABG among studied patient's groups (N= 140)

Visual Analog Scale		Groups		Test of Sig.	P- value
		Study Gr. N0. %	Control N0. %		
Analog visual scale	0 - 3 mild pain	32 45.7	4 5.7	X2=21.8	P=0.000 HS
	4 - 6 moderate pain	26 37.1	25 35.7		
	7-10 severe pain	12 17.2	41 58.6		
Mean ± SD		2.9± 1.1	8.3±1.7	t=14.2	P=0.000 HS
Description of pain	numbness	22 31.4	26 37.1	X2=2.6	P=0.3 NS
	muscle strain	20 28.6	12 17.1		
	burning	28 40.0	32 45.7		

Cont. table 5

Visual Analog scale		Groups: Study Gr. N0.	Study Gr. %	Control N0.	Control %	Test of sig.	P- value
Site of pain	in the chest	44	62.9	18	25.7	LR=28.5	P=0.000 HS
	in the knee	10	14.3	34	48.6		
	the back	10	14.3	16	22.9		
	the shoulder	6	8.6	2	2.9		
Pain increase with	Walk & movement	8	11.4	26	37.1	X2=36.5	P=0.000 HS
	Hard work	48	68.6	14	20		
	Using stairs	12	17.1	18	25.7		
	Others	2	2.9	12	17.1		
Pain decrease with	Warm compresses	26	37.1	22	31.4	LR=15.7	P=0.001 Sig.
	Period of rest	12	17.1	32	45.7		
	Simple exercise	30	42.9	14	20		
	Use analgesics	2	2.9	2	2.9		

DISCUSSION

Nurses playing a vital role in treatment as they are close to the patients and their families during all process of the disease. Nurses can meet the rehabilitative care needs of patients through education, support, supervision and reinforcement. Regarding to previous study, nursing education in cardiac rehabilitation can improve health outcomes and reduce the risk of a new cardiac event. A health educational program organized by nurses for patients after a cardiac event or surgery improves patients' knowledge of their illness and awareness of behavioral changes to prevent a new event or readmission to hospital (Wang et al., 2012). (14).

The aim of the current study was to determine the effect of home based nursing intervention on knowledge, daily living activity and pain on patient after coronary artery bypass graft surgery.

Regarding to age, the present study revealed that almost two thirds of the study group of patient with coronary artery bypass graft were between 31-50 years. This finding was congruent with the finding of Kerola, Kauppi, et al, (2012) (12). who studied. "How early in the course of rheumatoid arthritis does the excess cardiovascular risk appear?" ,.

Also, the rates are higher among men than women of a given age. This finding could be due to the level of health awareness and knowledge given to them that make them realize early the risk factors and performing continuous checkup and adopting a healthy lifestyles.

According to the present study findings, patient knowledge about risk factors has improved significantly after implementing the home based nursing intervention which raised their awareness about high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, depression, and excessive alcohol as risk factors that can lead to CAD. This finding proved the first hypothesis which stated that patients who will receive the home based nursing intervention after coronary artery bypass graft will have improved knowledge score compared to control group(14)..

In the present study, the majority of the study group were smokers and reported having many disease which are considered as risk factors for CAD. This finding was in agreement with Moran et al., (2014) (15) who studied "The global burden of

ischemic heart disease in 1990 and 2010: the Global Burden of Disease 2010 study", and reported that Coronary artery disease had a number of well determined risk factors. These include high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, depression, family history, and excessive alcohol. Also, Dai et al., (2016) (16). who studied and claimed that smoking and obesity were associated with about 36% and 20% of CAD cases. Smoking just one cigarette per day doubles the risk of CAD.

Regarding to psychological stress in the present study, most of the patients reported that it played an important role in causing the disease from their perception. This finding was in agreement with previous study conducted by Charlson, Moran, Freedman et al., (2013) (17). who studied" Genetics of coronary artery disease and myocardial infarction", and reported that stress appears to play a role in the occurrence of CAD cases.

Likewise, a study conducted by Kerola , (2012) (18) who studied "How early in the course of rheumatoid arthritis does the excess cardiovascular risk appear?". and found that women who were free of stress from work, showed an increase in the diameter of their blood vessels, leading to decreased progression of atherosclerosis. In contrast, women who had high levels of work-related stress experienced a decrease in the diameter of their blood vessels and significantly increased disease progression. Also, people having type A behavior pattern - group of personality characteristics including time urgency, competitiveness, hostility, and impatience - is linked to an increased risk of coronary disease.

In addition, the study revealed that there was high statistical significance improvement in knowledge among study group than control groups about factors that lead to coronary artery disease after implementing the (HBNI), where about three fourth of the study group of patient with CABAG had good knowledge compared to about one third of the control group. This differences could be due to the success of the HBNI than the routine hospital rehabilitation program.

The level of knowledge among the study group on wound and self-care before attending the HBNP after coronary artery bypass grafting was unsatisfactory. However, the results showed high statistical significant improvement in self and wound care among the study group

than the control group after attending the HBNI. This findings may contribute to the success of the HBNI where the study group were lacking the knowledge but once their awareness was raised they became more knowledgeable about the importance of self and wound care.

The current findings was supported by Graham etal., (2011) (11). who conducted a study in "Prevention of coronary artery disease"and found that up to 90% of cardiovascular disease may be preventable if established risk factors was avoided. Prevention involves adequate physical exercise, decreasing obesity, treating high blood pressure, eating a healthy diet, decreasing cholesterol levels, and stopping smoking. Medications and exercise are roughly equally effective. High levels of physical activity reduce the risk of coronary artery disease by about 25%.This identify a need for health education on postoperative self-care among the study group of patients with coronary artery bypass grafting. The health education on self-care after the coronary artery bypass grafting should be conducted by nurses on discharge and followed at home(12). .

Diet high in fruits and vegetables decreases the risk of cardiovascular diseases and death. Vegetarians have a lower risk of heart disease, possibly due to their greater consumption of fruits and vegetables. Evidence also suggests that the Mediterranean diet and a high fiber diet lower the risk of heart diseases.

On the other hand, Laz & Berenson, (2015) (13) reported that although consulting a registered dietician is preferred regarding appropriate portion sizes and total calorie recommendations, improving nutrition knowledge may be beneficial regarding healthy and harmful foods. Community health nurse who conduct the discharge plan will provide a realistic ways to change bad eating habit. This means that a negative relationship exists between nutrition knowledge and physical activity, and body mass index (BMI), implying that those with lower knowledge scores will have higher BMI values. Furthermore, increases in knowledge regarding nutrition may promote healthy weight loss behavior. This finding supports the second hypothesis which stated that "Patients who will receive home based nursing intervention after coronary artery by bass will have better daily living activities score compared to control group" (14).

In the present study secondary prevention was preventing further squeal of already

established disease. Lifestyle changes that have shown to be effective to this goal include :Weight control, smoking cessation, avoiding the consumption of trans-fats (in partially hydrogenated oils),decreasing psychosocial stress, exercise, like walking, jogging, or swimming, can reduce the risk of mortality from coronary artery disease(15,16). . Aerobic exercise can help decrease blood pressure and the amount of blood cholesterol (LDL) over time. This finding is in agreement with the study conducted by Zhao, (2017) (17). , about "Coronary Artery Bypass Grafting With and Without Manipulation of the Ascending Aorta which concluded that increased HDL cholesterol was considered as "good Cholesterol" reduces the risk of mortality from MI. In the present study, aerobic exercise after CABG will reduce the blood level of nor epinephrine which limits vasoconstriction of the arterioles and decreases the peripheral resistance to BP, hence causing reductions in BP. Another possible reason for the reductions in SBP in this study could be that regular exercise also lowers HR due to activation of the parasympathetic division of the autonomic nervous system, which in turn allows the ventricles more time to fill with blood, ensuring adequate oxygen and nutrient delivery.

The present study revealed that cholesterol level in body was an important risk factor in occurrence of the disease. The findings showed that the majority of study group (91.4%) reported high cholesterol level as a factor contributing to the disease. Likewise, previous study conducted by Seiler et al., (2013) (18). about Nano particles containing the pro-resolving peptide Ac2-26 protect against advanced atherosclerosis in hypercholesterolemic revealed that Cholesterol was an important factor involved in the pathogenesis of coronary artery disease. High levels of low-density lipoproteins (LDL) are implicated in coronary artery disease whereas high-density lipoproteins (HDL) are thought to have a protective role since they were involved in transportation of cholesterol away from the peripheral tissues.

Likewise, the finding of the study revealed that there was high statistical significance improvement among case than control patient about their knowledge related to prevention of post -operative complication after CABG. This finding supported the hypothesis that the "HBNI was effective in increasing patient knowledge and reduces

the occurrence of complications and have aid positive recovery effect".

The effect of home based nursing intervention on pain : The American Occupational therapy Association for Study of Pain (2015) (19). defined pain as an undesirable sensory and emotional experience that is connected with actual or potential tissue damage, or characterized in terms of such damage. Pain can be categorized based on its duration into acute or chronic pain (WHO, 2012) (20). Pain had also been reported to be one of the main sources of concern for cardiac surgery patients, and post-operative pain was still a significant clinical problem although there is major advances in pain management and treatment.

Pain syndromes that occur after cardiac surgery can be numerous and of visceral, musculoskeletal, or neurogenic origin. The findings of the current study showed that there was high statistical significance decrease on pain after CABG between the study and control group after implementing the home based nursing intervention.

The results of the current study illustrated that the reported level of pain after surgery decreased the quality of life for patients and affects their comfort level. This finding is congruent with the finding of Chou, (2016) (20). in Canada, who studied . Patient satisfaction with their pain management and comfort level after open heart surgery. and found that the incidence of chronic pain following cardiac surgery varies between 21% and 55%. This finding confirm the third hypothesis which stated that "Patients who will receive home based nursing intervention after coronary artery by bass will have lower pain score compared to control group "The results of the current study revealed that there was high statistical significance improvement among case than control patient after CABG in the Barthel index scale (BIS) which measures activities of daily living after applying the home based nursing intervention. The results revealed that there was high statistical significance decrease on level, duration and type of pain after CABG between study and control groups which positively affect their quality of life. This finding is congruent with the reported findings of a study conducted by Murphy, (2015) (21). .

The VAS measurements have been included in the literature review as a method of describing patient experience of pain management, with low pain scores indicating more positive quality of life.

Activities of daily living: The current study illustrated that there was high statistical significance improvement among the study group than the control group after applying the home -based-nursing intervention on total score of Daily living Activities (DLAs). The finding of the present study was similar to that reported by Madssen et al., (2014) (17). who studied" Peak oxygen uptake after cardiac rehabilitation: a randomized controlled trial of a 12-month maintenance program versus usual care" and found that the mean scores of the variables were significantly higher in the intervention group following the intervention. This finding might contribute to the modifications of life style to a healthy one and reduced the dependency on others to care for him/her self.

Likewise, poor sleep quality was common among patients after coronary artery bypass graft surgery (CABG). Also, in a previous stud by Simeith et al., (2015) (18). about "Six-year follow-up of a randomized controlled trial examining hospital versus home-based exercise training after coronary artery bypass graft surgery'' showed that psychological sleep management training, combining relaxation techniques, sleep hygiene, and cognitive techniques, could improve the SQ and in turn the total quality of life of patients.

These findings indicated that the quantity of exercise performed by the participants in the present study have been in line with the current recommended frequencies and intensities to reach and maintain optimal health. While the key objective of CR was to develop and improve QoL, post-operative pain levels and ADLs were significant indicators for evaluating the changes in physical and psychological well- being of cardiac patients.

Correspondingly, bodily pain, general health and vitality were also found to improve significantly. As a result of CABG surgery, some of the most important adverse consequences include forced inactivity, pain in the chest and vein harvest site and reduction of QoL, which may all contribute to severe stress and depression. Similarly, another study conducted on CABG patients by Nazari et al., (2012) (19). to assess the effect of rehabilitation on strength and balance, yielded significant results in the "chair stand and up-and-go tests". From the aforementioned study, it was evident that neuromotor training was imperative for increasing independence, confidence and reassurance.

These findings showed that the routine care provided by the routine cardiac rehabilitation clinic had slight positive impact on the control group compared to the effect of the HBNI. It included exercise training, life style modifications, medication adherence, and pain, sleep and dietary modifications improve the patient's quality of life and reduce the anxiety after CABG. According to the results of a study conducted by Jiang et al.(2013) (21). .a nurse educational program can significantly improve the health behaviors and cardiac physiological risk parameters in coronary heart disease patients (Jiang and Wong, 2013) (22). . Also, Safabakhsh et al,.(2016) (18). who conducted that "The Effect of Health Promoting Programs on Patient's Life Style After Coronary Artery Bypass Graft–Hospitalized in Shiraz Hospitals." Conducted a study with 80 patients who underwent CABG surgery and reported that the education provided in the health-promotion program after the operation recommending positive changes in lifestyle reduce the risk factors of CAD and that the patients became more conscious about healthy behaviors. Observed that training and counseling for CAD patients increased the level of physical activity and diabetes compliance, patients must adapt to incorporating healthy lifestyle behaviors in areas such as nutrition habits, exercise, and social and work life (Safabakhsh , 2016) (18). .The HBNI provided at discharge in the current study following open heart surgery was successful and increased the knowledge of patients, reduced pain, improved activities of daily living, sleep quality which in turn improve patients quality of life and was beneficial as it eliminates or reduces physical and emotional problems of the patient(23-26).

Conclusion

In the light of the present study, it can be concluded that:

The results of this study showed the effectiveness of the Home Based Nursing Intervention on improving patient knowledge, level of pain and quality of life. It indicated that such programs helped patients maintain a healthy lifestyle by controlling the risk factors. The results revealed that smoking, blood pressure control, frequency of physical activity, exercise, dietary behavior, activities of daily living and dependency level were modified in the study group with high statistical significant improvement in all aspect of the study. Improving cases awareness and the therapeutic lifestyle

change effectively improve postoperative recovery and prognosis.

RECOMMENDATION

Based on the findings of the study, the following important recommendations are proposed:

Regarding to the study finding nursing education in cardiac rehabilitation can improve health outcomes and reduce the risk of a new cardiac event. Also, due to the importance and effectiveness of postoperative rehabilitation interventions, the following are recommended:

1. It is a matter of great importance for nurses to meet the rehabilitative care needs of patients through education, support, supervision and reinforcement.
2. There is a need to include multidisciplinary team including surgeons, dietitian and nurse to take active part in such intervention.
3. The rehabilitation program has to start at the preoperative phase of patient care.

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