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Abstract

Background: Methicillin-Resistant Staphylococcus Aureas (MRSA) is largely a hospitalacquired infection that is capable of causing severe infections. Comprehensive MRSA control program is necessary to control MRSA. Aim of study: Was to evaluate the effectiveness of educational program regarding Methicillin Resistant Staphylococcus Aureus prevention on nurses' knowledge and practice. Research design: A quasi-experimental research design was utilized. Setting: this study was conducted at Mansoura Chest Disease Hospital and Benha University Hospital. Subject: A purposive sample of 80 nurses. Tools: Two tools were used. I: Structured Interview Questionnaire which consists of part 1; demographic characteristics, part 2; Nurses' Knowledge Regarding MRSA. II - Nurses' practice about MRSA and infection control guidelines observation checklist. Results: There were statistically significant differences between the preeducational program and immediate post-educational program regarding all items of nurses' knowledge. .2.5% of participants have a good level of practice pre-intervention while immediately post-educational program the practice level was good at 36.3%. Post 2 months of educational program (28.9%) had good practice level. Conclusion: The educational program was highly effective regarding MRSA prevention and control on nurses' knowledge and practice at both Mansoura Chest Disease Hospital and Benha university hospital. Recommendation: Continuous inservice training programs for the new nurses about MRSA prevention and control at regular intervals are needed.

Keywords: Educational Program, Knowledge, MRSA, Nurses, Practice.

Introduction

Methicillin-Resistant Staphylococcus aureus is a kind of Staphylococcus bacteria which is known with its resistant to betalactams antibiotics as amoxicillin, penicillin, and oxacillin. The resistance to similar antibiotics may develop making this pathogenic organism difficult to be treated (Kumar et al., 2020). Methicillin-resistant S. aureus is most frequently transmitted through the transiently contaminated HealthCare Professionals (HCPs) hands. As well, MRSA can be spread through indirect contact with

infected objects like towels, bed linens and blankets. MRSA can be colonized in the anterior nares, which considers the most common site in humans and act as a reservoir for MRSA transmission and subsequent MRSA infection risk factor (Yoo et al., 2018).

Considering the overwhelming MRSA infection effect, it is very crucial to control MRSA spread or transmission in hospital settings. Occurrence and spread of MRSA can be prevented by surveillance and screening of admitted patients, healthcare personnel

screening, isolation units, protective clothing (Maillard et al., 2020).

Nurses need to be knowledgeable of MRSA route of transmission, along with contact precautions because of MRSA rapid incidence and ever-mutating characteristics infection which makes it not easy to be detected and managed so nurses become able to protect patients, their care providers, and visitors (Khalil& Abdel-Fattah, 2019).

So, health care providers have a significant role in the prevention of MRSA transmission in numerous healthcare settings. The knowledge acquired by health care providers about MRSA has a great effect on their practice to regularly take preventive measures in the direction of reducing MRSA infection (Al-Shdaifat et al., 2017).

It is evidenced that the knowledge and practice of HCPs concerning MRSA affect their adherence to preventive practice guidelines such as standard precautions or contact precautions (**De Jonge et al., 2019**). So, our study was done to evaluate the effectiveness of educational program regarding MRSA prevention and control on nurses' knowledge and practice.

Significance of the study:

Methicillin-resistant Staphylococcus aureus rates among S. aureus clinical isolated which scored the highest in Egypt compared to other African countries and southern and eastern Mediterranean countries (**Falagas et al., 2013**).

In Egypt; a study at Fayoum University Hospital for detection of nasal carriage of MRSA among health care personnel found that 13.5% of HCPs colonized with MRSA (Hefzy et al., 2016). A similar study was done at Mansoura University Hospital highlighted that MRSA carriage is common among health care workers (Elshabrawy et al., 2017). It has been evidenced that nurses' knowledge and practices are limited. Therefore, the present study was aimed to evaluate the effectiveness of educational program regarding MRSA prevention and control on nurses' knowledge and practice.

Aim of the Study:

The study aimed to evaluate the effectiveness of educational program regarding Methicillin Resistant Staphylococcus Aureus prevention and control on nurses' knowledge and practice.

Research hypothesis:

HI: Mean post-test knowledge score of staff nurses who received educational program regarding Methicillin Resistant Staphylococcus Aureus prevention and control would be significantly higher than the mean pre-test knowledge score.

H2: Nurses' practice towards Methicillin Resistant Staphylococcus Aureus prevention and control after an educational program show an improvement than before.

Subjects and Method

Study design:

Quasi-experimental research design was utilized to conduct this study.

Setting:

This study was conducted at Mansoura Chest Disease Hospital and Benha University Hospital.

Subjects:

A purposive sample of 80 nurses affiliated to the previously mentioned settings who accept to participate were included in this study. Nurses' age ranged from 18 to 50 years. Newly employed who has experience less than 3 months were excluded.

Tools of data collection:

Study tools was developed by (**De Giusti et al., 2011; Evans et al., 2014**) and (**Malone, 2005**) and (**WHO, 2016**) and was adapted by the researcher.



Tool (I): Tool I - Structured Interview Questionnaire. Which consists of two parts: Part 1: Demographic characteristic;

This tool included (age, sex, and educational level, an area of work/department and years of experience.

Part 2: Nurses' Knowledge regarding MRSA Assessment Scale. This part aimed to assess the nurses' knowledge in relation to MRSA prevention and control. It consists of 21 true and false questions that will cover the following items; definition of MRSA, localization of infection, clinical signs and symptoms, transmission of infection, prevention of MRSA, susceptible population, and therapeutic aspects.

The scoring system of Nurses' Knowledge regarding MRSA Assessment Scale was done as the following: Each correct answer was scored one mark and each incorrect answer was scored a zero. The minimum score is zero and the maximum score is 21.

Tool (II): Nurses' practice about MRSA and infection control guidelines observation checklist:

This tool was adapted from (**Malone, 2005**) and (**WHO, 2016**) to assess the nurses' practice toward MRSA and adherence to infection control guidelines that cover different aspects of infection control model. The checklist was regarding universal precautions, linens precautions, and sharps precautions.

The scoring system of the nurses' practice checklist was done as the following: each step was done scored one and not done step scored zero.

The knowledge and practice scoring system were classified as the following:- Poor knowledge/ practice : less than 50%, Fair knowledge/ practice : 50-75 %. Good knowledge/ practice : more than 75%

(Andarieh, Abhari, Shabani&Mirabi, 2014; Flower & Balamurugan, 2013). Content validity:

Data collection tools (tool I and tool II) were tested for their content validity by a panel of five experts of Medical Surgical Nursing staff in the study field (Jury). They reviewed the tool for clarity, relevance, and applicability, and the necessary modifications were done in the editing of the questions.

Tool Reliability:

Reliability of data collection tools was tested by using special case of Cronbach's Alpha test Kuder-Richardson (KR-20) that measures the internal consistency of the tools. The reliability of the data collection tools (tool I and tool II) was 0.9167, 0.9485 respectively which indicates high reliability.

Ethical Considerations:

Eligible nurses were informed about the aim, procedure, benefits, and risks of the study. It was emphasized to the nurses that their participation in this investigation was voluntary and that they had the right to accept or refuse to participate without penalty. Participants were also notified that they had the right to withdraw from the study at any time and this would not affect their care.

Pilot Study:

Before performing the study, a pilot study conducted on 8 nurses representing about 10% of the total sample. According to the results of a pilot study, no modifications were made to the tools. Those who participated in the pilot study were excluded from the studied sample.

Fieldwork:

Once permission was granted to proceed with the study, the researcher started to prepare a schedule for collecting the data. The fieldwork was carried out over a sixmonth period that start from July 2020 and December 2020. The researcher went from 8 morning to 2 afternoon. This included the

assessment, planning, implementation, and evaluation phases.

Assessment phase: This phase entailed gathering pre-program data for baseline assessment. The investigator started by introducing himself to the nurses and give them a brief idea about the aim of the study. A verbal consent approval was obtained from each participant prior to his/her inclusion in the study. Clarification of the nature and purpose of the study was explained.

A pre-intervention test and observation checklist were done to determine the nurse's knowledge and practice. Each nurse was interviewed individually before applying the educational program. On the first day (pretest) 21-item knowledge questionnaire in the form of true/ false as well as 32 items of practice checklist were observed by the researcher. The time needed ranged from 25 to 35 minutes, according to the understanding and cooperation of the nurses.

Planning phase: based on the assessment phase data analysis results and the relevant literature about nurses' knowledge and practice regarding MRSA the researcher developed the educational program and session's content to meet the needs of nurses. Identified needs, requirements and deficiencies were translated into aims and objectives of the educational program and set in the form of an illustrative colored Arabic booklet to be distributed to each nurse. The educational program comprised two main parts: Theory and practical components (4 theoretical sessions and 4 practical sessions).

The theoretical session included information about hospital-acquired infection, MRSA infection, and methods of transmission of MRSA infection. Ways of MRSA prevention and therapeutic aspects for MRSA infection, the chain of infection. Universal precautions, linens precautions, and sharps precautions.

The practical session included hand washing, rubbing, and how to demonstrate hand washing and hand rubbing demonstrate donning and removing of gloves, donning and removing of gowning, mask, and goggles. demonstrate how to clean spills of blood and other body fluids.

Implementation phase: The program was implemented in the study setting in the form of eight sessions. Participants of the study (80 nurses) were divided into 13 groups, each group consisted of 4 - 7 nurses according to work load and time. The whole program was implemented in six months for 420 minutes which were divided into two parts: theoretical and practical. First, 180 minutes were specified for the theoretical part. Each group took 4 sessions in two weeks as their theoretical part. Each session lasted for about 45 minutes. Second, 240 minutes were specified for the practical part of the program. The practical part was implemented for all groups. Each group practiced the program for 4 sessions. Each session lasted for about 60 minutes in two weeks

Evaluation phase: An immediate posttest was carried out after providing the needed interventions. Each participant was evaluated using tool I and II to determine the improvement of nurse's knowledge about MRSA and actual practice that applying the infection control measures. Two months later each nurse was evaluated using tool I and II (follow up test). The effectiveness of the health education program was determined by comparing the study nurses' ability to recall explained knowledge and practice.

Statistical Analysis:

The collected data were organized and coded using IBM-SPSS software (IBM Corp. Released 2017 IBM SPSS Statistics for



Windows, Version 25.0. Armonk, NY: IBM Corp.). Qualitative data were expressed as frequency and percentage. Chi-Square test was used.

Quantitative data were initially tested for normality using Kolmogorov-Smirnov and Shapiro-Wilk's test with data being normally distributed if p>0.050. Quantitative data were expressed as mean \pm standard deviation (SD) if normally distributed or median and interquartile range (IQR) if not.

Results

Table (1)illustratesthe frequency distribution of the studied participants according to their demographic data. It's shown that (47.5%) of them aged between (30)to 35) years old, 86.3% were females As regarding their level of education, 52.5% had a Bachelor's degree, and (53.8%) of these nurses had 5 to 10 years of experience. Also, (51.3%) of the participant nurses in both hospitals knew that the hospital had a written guideline for standard precautions, but (93.8%) didn't know the number of MRSA infection cases among health care workers in the hospital.

Table (2) shows a comparison of nurses' knowledge items along the three periods of the study. It can be shown that regarding the definition and identification, there were statistically significant differences between the pre-educational program and immediate post-educational program, and between the immediate and post 2 months of the educational program.

There were statistically significant differences between the pre-educational program and immediate post-educational program regarding all items of nurses' knowledge. Also, there were statistically significant differences in the pre-educational program and 2-months post-educational program regarding all items of the knowledge except in the Definition and identification item. Finally, statistically significant differences in the immediate post-educational program and post 2 months regarding all items of the nurses 'knowledge except in the standard precautions item. With the highest means \pm SD were found in the immediate post-educational program period.

Table (3) illustrates a comparison between total nurses' knowledge grades along the three periods. With high statistically significant differences between all periods of the study ($P = 0.000^*$), and the highest mean SD was immediate-post educational program period (16.65 ± 3.745).

Figure (1) illustrates a comparison between total practice grades along the three periods. (2.5%) of participants have good level of practice pre-intervention while immediately post-educational program the practice level was good (36.3%). Post 2 months of educational program (28.9%) had good practice level.

Table (4) determines a comparison between means of nurses' practice pre, Immediate, and post 2 months regarding universal precaution. Strong statistically significant differences were found between the pre-educational program and immediate post-educational program and between the pre-educational program and post 2 months $(p=0.000^*, 0.001^*)$.

Table (5) shows a comparison between means of pre-educational program, immediate post-educational program and post 2 months precaution linens, precaution regarding sharps, and precaution spills. It can be found that high statistically significant differences were found between all periods of the study regarding all items except regarding precaution sharps in the pre-educational program and post 2 months.

Item	Number (80)	Percentage %							
Age group									
>20	3	3.8							
20≤25	11	13.8							
25≤30	23	28.8							
30≤35	38	47.5							
35≤40	4	5.0							
45≤50	1	1.3							
Mean & Standard Deviation	Mean 29.23	$SD \pm 4.74143$							
	Sex								
Male	11	13.8							
Female	69	86.3							
	Level of education								
Diplome	24	30.0							
Bachelors	42	52.5							
postgraduate studies	14	17.5							
years of experience									
<5 years	20	25.0							
5-<10	43	53.8							
10 -<15	12	15.0							
15 -<20	5	6.3							
	Name of hospital								
Mansoura Chest Disease	54	67.5							
Hospital									
Benha University Hospital	26	32.5							
Previ	ous MRSA training course	s							
No	70	87.5							
Yes	10	12.5							
The hospital has w	ritten guideline for standa	rd precautions							
No	39	48.8							
Yes	41	51.3							
Knowing MRSA infection	cases among health care w	orkers in the hospital							
No	75	93.8							
Yes	5	6.3							

 Table (1): Frequency Distribution of the Studied Participants according to their Demographic

 Data:

Items	Pre- educati progra	ional m	Immediate -post educational program	Post 2 months of the Educational program	P ¹	\mathbf{P}^2	P ³
Definition	Mean	2.08	2.61	2.22	t= 4.781	t= 1.381	t= -3.998
	±SD	±.925	±.646	±.826	p 0.000*	p.171	p 0.000*
Method of	Mean	2.29	3.80	3.32	t= 6.302	t= 4.761	t= -2.038
transmission	±SD	± 1.352	±1.444	± 1.481	p 0.000*	p 0.000*	p 0.045*
Standard	Mean	2.49	3.60	3.14	t= 4.525	t= 3.039	t= -1.954
Precautions	±SD	± 1.484	±1.383	±1.503	p 0.000*	p 0.003*	p 0.054
Treatment	Mean	3.45	6.64	5.53	t= 10.903	t= 5.948	t= -4.497
	±SD	±2.227	±1.625	±2.266	p 0.000*	p 0.000*	p 0.000*

Table (2): Comparison between the Nurses'	Knowledge Items	along the	Three Periods	of the
Study				

 P^1 = Pre-intervention and immediate post- educational program.

 p^2 = Pre- educational program and post 2 months.

 p^3 = Immediate post- educational program and post 2 months.

*= Significant differences at p<0.05.

Table (3): Comparison between Total Nurses' Knowledge Grades along the Three Periods (N = 80).

Knowledge Total Score												
Frequency and	Pre-e	ducati rogran	onal 1	Immediate post- educational program			Post 2 months of Educational program			P ¹	\mathbf{P}^2	P ³
percentage	Good	Fair	Poo r	Good	Fair	Poor	Good	Fair	Poor	t =	t =	t = -
No.	8	19	53	54	21	5	20	44	12	9.84 7	7.4 58	4.55 1
%	10	23.8	66.3	67.5	26.3	6.3	26.3	57.9	15.8	P = 0.00	P = 0.0	P =
Mean ± SD	10.30 =	± 3.609		16.65 =	± 3.745		14.21 =	± 3.653		0*	00*	0.00 0*

 P^1 = Pre-intervention and immediate post- educational program.

 p^2 = Pre- educational program and post 2 months.

 p^3 = Immediate post- educational program and post 2 months.

*= Significant differences at p<0.05.





Figure (1): Comparison between Total Practice Grades along the Three Periods (N = 80).

	• 0	0	0					
Items	Pre-educational program		Immediate post educational program	Post 2 months of Educational program	P ¹	P ²	P ³	
Hand washing	Mean	3.91	5.06	5.09	t= 6.664	t= 6.347	Not	
	±SD	±1.255	±1.461	± 1.480	p 0.000*	p 0.000*	applicable	
Gloving	Mean 0.64 ±SD ±0.484		0.79	0.80	t= 3.734	t= 3.563	Not applicable	
			±0.412	± 0.401	p 0.000*	p 0.001*		
Gowning	Mean 0.35		0.61	0.62	t= 5.303	t= 5.175	Not	
	±SD ±0.480		± 0.490	± 0.489	p 0.000*	p 0.000*	applicable	
Goggles	Mean 0.50		0.64	0.62	t= 3.549	t= 3.563	Not	
	±SD	±0.503	± 0.484	± 0.489	p 0.001*	p 0.001*	applicable	
Personal hygiene	Mean 3.49		4.49	4.45	t= 7.257	t= 6.769	t= 1.756	
	±SD	±0.981	±1.432	±1.455	p 0.000*	p 0.000*	p 0.083	

Table (4): Comparison between Means of Nurses' Practice Pre, Immediate, and Post 2 months
of Educational program Regarding Universal Precaution.

 P^1 = Pre-intervention and immediate post- educational program.

 p^2 = Pre- educational program and post 2 months.

 p^3 = Immediate post- educational program and post 2 months.

*= Significant differences at p<0.05.

Items	Pre-educational Program		Immediate post Educational Program	Post 2 months of Educational Program	P ¹	P ²	P ³
Precaution Linens	Mean	2.06	2.89	2.47	t= 7.091	t= 3.174	t= 3.540
-	±SD	±1.035	±1.031	±1.227	p= 0.000*	p 0.002	p 0.001
Precaution Sharps	Mean	2.38	2.61	2.32	t= 3.982	t=0.445	t= 3.296
-	±SD	±0.718	±0.606	±0.912	- p 0.000*	p 0.658	p 0.001
Precaution Spills	Mean	2.43	3.11	2.86	t= 7.357	t= 3.305	t= 3.420
-	±SD	±0.911	±0.811	± 0.989	- p 0.000*	p 0.001	p 0.001

Table (5): Comparison between Means of Pre-Educational program, Immediate Post-Educational program and Post 2 Months Regarding Precaution Linens, Precaution Sharps, and Precaution Spills.

 P^1 = Pre-educational program and immediate post-educational program.

 p^2 = Pre-educational program and post 2 months.

 p^3 = Immediate post-educational program and post 2 months.

*= Significant differences at p<0.05.

Discussion

Methicillin Resistant Staphylococcus Aureus is major nosocomial pathogen that causes health care associated infection and community associated infection worldwide. It is a leading cause of life-threatening problem such as pneumonia, blood stream infection, surgical site infection, endocarditis and bone and joint infection (Luzum, Sebolt, & Chopra, 2020). If not treated quickly, MRSA can cause sepsis and death. MRSA infections cause significant morbidity, increase length of stay in ICU, higher costs of treatment and higher mortality rates (Cheung et al., 2021).

Nurses are among the healthcare professionals who spend the most time on patient care and contact. Being known as the defender of patients, nurses have a unique position of developing the patient care standards and creating a change (**Nilsen et al.**, **2020**). They should be aware that nosocomial infections are preventable, have up-to-date information about universal preventions that are accepted in the entire world concerning the prevention and control of infections and provide the most efficient care for patients in line with this information (Lin et al., 2019).

The study covers two main area firstly include demographic data of the study sample and secondly, nurses' knowledge and practice about MRSA. The current study revealed that the mean post-test knowledge score of staff nurses who received educational program regarding Methicillin Resistant Staphylococcus Aureus prevention and control was significantly higher than the mean pre-test knowledge score. Additionally, the nurses' practice towards Methicillin Resistant Staphylococcus Aureus prevention and control after an educational program showed greater improvement than before the program.

Beginning with the socio-demographic characteristics of the studied nurses, nearly half of them (47.5%) aged between 30 to 35 years old, this can be explained as the traditional working styles and job descriptions that necessitate the young nurses to directly deal

with patients, and after getting older, they would be responsible for managerial duties. Additionally, the majority of the studied nurses were female (86.3%), this could be interpreted in the light of the fact that the majority of nurses in Egypt are female and their numbers are still greater than male in nursing fields until ten years ago. Also, the act of nursing itself is naturally a feminine activity and that female have historically represented dominance in this profession.

That's in agreement with the finding of the Egyptian study by Abusaad and Etawy (2015), they revealed that the majority of nursing staff were female, and more than half of them aged between 25-35 years old. Also, this finding was congruent with a study by Ragheb and Metwally, (2016) who revealed that three quarter of their studied nurses aged less than 35 years. On the other hand, Abukhader, and Abukhader, (2020) found that the majority 53.8% of the studied samples were male.

Egyptian nurses are divided into two categories: bachelor nurses and technical nurses (**Bello et al., 2017**). In the present study, more than half of nurses (52.5%) had a bachelor's degree with 5 to 10 years of experience (53.8%). The bachelor nurses were appointed in the medical and surgical departments. As they need active persons with critical thinking, able to learn more skills and have physical fitness, so this will be reflected on the patients' care.

Similarly, most of the respondents enrolled in the study by **Alrabadi et al.**, (2020) had a bachelor of nursing qualification. Otherwise, the academic qualification of nurses was equally distributed between diploma and undergraduate nurses in the study by **Samundeeswari and Muthamilselvi**, (2018).

Also, more than half of the participant nurses in both hospitals (51.3%) knew that the hospital had a written guideline for standard precautions, but the majority of them didn't know the number of MRSA infection cases among health care workers in the hospital. This may be due to lack of in-service orientation or training programs about MRSA despite they are very important to improve the nurses' performance.

As regarding nurses' knowledge regarding MRSA, the study showed that more than twothirds of studied nurses (66.3) had poor overall knowledge levels regarding MRSA before implementing the educational program. This level improved immediately after the program and became good, but turned back to be fair in the post 2 months test.

Particularly, the poor knowledge level may be due to the poor supervision of the head nurses, lack of motivation, increased nurses' workload which made the delay of nurses' abilities and motivates them to improve and update their knowledge. When educational program was provided, this level enhanced as they remembered the items just after sessions, but became fair in more than half of them after two months due to the inadequate training in this and absence of regular aspect, group discussions or meetings to refresh their knowledge.

Likewise, the comparison of pre-test knowledge scores and post-test knowledge scores of the studied nurses by **Kumawat**, (2019) showed that the overall improvement mean was highly significant in knowledge of staff nurses after the structured teaching program, as that mean was 17.18 in the pre-test and 27.98 in the post-test.

Our finding also goes in the same line with the study by **Herimat**, (2016) who studied knowledge levels regarding MRSA among health care workers (HCW). They reported unsatisfactory mean of knowledge scores before their program and better results after implementation. They referred that to the inadequate training courses and orientation programs about MRSA. As well as, an Indian study by **Daniel and Mir (2017)** reported deficiencies in the overall knowledge score among their staff nurses.

Similarly, this finding in consistent with **Jayamaha and Nagahawatte**, (2015) who revealed that the overall knowledge related to MRSA of most nurses were not satisfactory and there were knowledge gaps in the majority of the nurses.

In contrast with the current study finding, both **Kamunge et al.**, (2015) and **Suss**, (2017) in their studies reported high knowledge levels among their studied nurses before implementing the educational programs. In points, it can be said that the educational program provided may have accounted for the increased knowledge levels, updated these nurses' information, and put them on the correct way to provide the proper updated patient care.

In the present study, the researcher depended on the **World Health Organization** guideline, **2016** to assess the nurses' level of practice. The guideline developers decided that healthcare associated infections' surveillance with timely feedback of results should be performed to guide infection prevention and control interventions. There are differences in the practice of hand washing among various HCWs while on duty even with guidelines by the WHO.

When comparing the nurses' practice in this study, statistically significant differences were found between all periods of the study, and the highest mean SD was in the immediate-post intervention period. This may be because of the lack of continuous supervision and evaluation of nurses' practices, increased workloads which prevent them from searching for updates in practice, also defect in posters available on infection control guideline, or insufficient time to make the procedure correctly such as hand washing. Significant increase in the practice of all items of the universal precautions in the post 2 months test except in the goggles, and personal hygiene, as they were higher in the immediate post intervention test. This points out that the implementation of the educational program was very effective in enhancing nurses' practice regarding the universal, linens, sharps, and spills precautions.

As stated by McFee, (2020), the increased adherence to standard precautions (hand hygiene and contact precautions) are broadly recognized to be the most important factors in decreasing the spread of nosocomial infections in health care facilities according to the center of disease control and prevention. This illustrates that the educational program had a good effect on nurses' practice, this goes on the same line with an Egyptian study by Fawzi et al., (2019), in Meniet El-Nasr Central Hospital, as they found that the majority of nurses had inadequate practice level in most areas of nosocomial infection, and recommended that a training course program is essential to increase nurses' knowledge and practice towards infection nosocomial control measures regularly.

An Egyptian study by **Moqbel**, **Shebl**, **& Soliman**, (2015) revealed that all items of practice regarding universal precaution, precaution practice were statistically significant different before and immediately after applying their educational program and after three months of intervention, but no significant difference was found between the two tests.

Conclusively, that safe patients' care can be achieved through preventing hospital acquired infections (HAIs) which can be achieved through implementation of evidence-based practice guidelines. Moreover, the prevention of infection is a major concern of all health workers. Up to date knowledge and nursing skills can play important roles in infection control.



Conclusion

- The mean post-test knowledge score of staff nurses who received educational program regarding Methicillin Resistant Staphylococcus Aureus prevention and control was significantly higher than the mean pre-test knowledge score. Additionally, the nurses' practice towards Methicillin Resistant Staphylococcus Aureus prevention and control after an educational program showed greater improvement than before the program.
- This means that the educational program was highly effective regarding MRSA prevention and control on nurses' knowledge and practice at both Mansoura Chest Disease Hospital and Benha university hospital.

Recommendations

- 1. Continuous in-service training programs for the new nurses about MRSA control and at regular intervals.
- 2. Continuous evaluation of nurses' knowledge and practice is essential to identify nurses' needs.
- 3.Further studies should be conducted to explore the effect of health education program on different types of hospital-acquired infection.

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تأثير برنامج تعليمي عن الوقاية والتحكم في البكتريا المقاومة للمثيسيلين على معلومات وممارسات الممرضات

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البكتريا المقاومة للمضادات الحيوية (مرسا) هي عدوى مكتسبة من المستشفى قادرة على التسبب في التهابات شديدة. تعد المعلومات التي يتم اكتسابها وتقديمها لمقدمى الرعاية في مجال الرعاية الصحية حول هذه البكتريا ذات أهمية قصوي على ممارستهم لاتخاذ تدابير واجراءات وقائية مستمرة من أجل تقليل البكتريا المقاومة للمثيسلين المرتبطة بالرعاية الصحية. لذا هدفت هذه الدراسه لتقييم تأثير برنامج تعليمى عن البكتريا المقاومة المثيسيللين على معلومات وممارسات التمريض. وقد أجريت هذه الدراسة في مستشفى الأمراض الصدرية التابعة لوزارة الصحة ومستشفي جامعة بنها. تم تطبيق هذه الدراسة علي (٨٠) من التمريض. حيث كشفت النتائج عن وجود فروق ذات دلالة إحصائية بين فترة ما قبل البرنامج التعليمي وفترات ما بعد البرنامج التعليمي مباشرة فيما يتعلق بمعلومات التمريض. توجد فروق ذات دلالة إحصائية قوية بين ما قبل البرنامج ومباشرة بعد البرنامج التعليمى وبعد شهرين فيما يتعلق بممارسة التمريض. كما اوصت الدراسة بعرورات ما بعد البرنامج التعليمي تعليمية المرضات البرنامة المريض. توجد فروق ذات دلالة إحصائية قوية بين ما قبل البرنامج ومباشرة بعد البرنامج التعليمى وبعد شهرين فيما يتعلق بممارسة التمريض. كما اوصت الدراسة بعنورارة بعد تنفيذ برامج تعليمية المرضات للريادة معلوماته ومارساتهم فيمارسة التمريض. كما وصت الدراسة بعنورارة بعد تنفيذ برامج التعليمي ويعد شهرين فيما يتعلق بمارسة التمريض. كما وصت الدراسة بعنوران ما بعد المرساخ بعد البرنامج التعليمى وبعد شهرين فيما يتعلق بمارسة التمريض. كما وصت الدراسة بعنوران ما بعد المريسين بعليم

