

## Nurses' knowledge, Performance and Attitude regarding Respiratory Instrument Processing in Mansoura Hospitals



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### 1.ABSTRACT

Disinfection and sterilization are the basic components of hospital infection control activities. Every day several invasive procedures are being performed in different health facilities. Improper sterilization or disinfection of devices is associated with increasing risk of nosocomial infection. Nurses play a critical role in reprocessing respiratory equipment by adhering to infection prevention and control measures. This study aimed to assess nurses' knowledge, performance, and attitude regarding respiratory instrument processing in Mansoura hospitals. **Method:** A cross section study design was used. **Setting:** The study was conducted at four governmental hospitals in Mansoura city. (Chest hospital, Mansoura university hospital, Talkha, and Mansoura general hospital). **Sample size:** the study was carried out on 50 nurses who are responsible for instrument processing. The researcher used four tools in this study. Tool I: Nurses' socio demographic and occupational characteristics self-administrated questionnaire. Tool II: self-administrated questionnaire to assess the nurses' knowledge about instrument processing process (cleaning, disinfection, inspection, packing, sterilization, transport, storage, use and infection control measure), Tool III: Rubric observational checklist of respiratory instrument processing performance, Tool IV: Self-administered scale to assess attitude of nursing staff about the management of respiratory instrument processing. **Results:** the current study indicates that 60%, 66 % of studied nurses have poor total score level of knowledge and improper performance respectively regarding respiratory instrument processing. **Conclusion:** The study concluded that, most of the studied nurses have poor total knowledge score level, improper performance regarding respiratory instrument processing and the mean of total positive attitude was 44.8 (5.1). **Recommendation:** design protocol for nursing staff about respiratory instrument processing in Mansoura hospitals.

**Keywords:** Infection preventive measures; knowledge; Nurses; Performance, Respiratory instrument processing

### 2.Introduction:

Respiratory tract infections (RTIs) whether upper or lower are the fifth overall cause of death in the world. Acute Respiratory Infections (ARI) is responsible for nearly two million childhood deaths worldwide. Most causes of respiratory tract infection are nosocomial infection. (WHO, 2016)

The national surveillance of health care-associated infections in Egypt 2016 among ninety-one Intensive Care Units (ICUs) in 28 hospitals contributed to 474,544 patient days revealed 2,688 Hospital Associated Infections (HAIs). Of these, 30% were blood stream infections, 29% were surgical site infections, 26% were pneumonia, and 15% were urinary tract infections. Ventilator-associated pneumonia had the highest incidence of device-associated infections (4.3/1,000 ventilator days) (Talaat et al., 2016).

In addition to corona virus disease (COVID-19) that is a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which is spread rapidly and globally posing serious problems in terms of morbidity, mortality and

overall costs for the healthcare system (WHO, 2020). In Egypt from 3 January 2020 to 12 March 2022, there have been 493,658 confirmed cases of COVID-19 with 24,257 deaths. (WHO, 2022)

The cause of health care-associated infections is related to poor infection control measure linked to inadequately process of flexible bronchoscopes and invasive devices such as catheters and ventilators. Frequently prevalent infections include ventilator-associated pneumonia (Kovaleva et al., 2013). Improving infection control and prevention (ICP) program, adhering, and monitoring to infection prevention and control practices becoming mandatory for responding to outbreak of infectious disease especially COVID 19 and provide safe and high quality of patient care across all health care settings (Rheet al., 2020)(WHO, 2020).

In Egypt El-Sokkary, et al., 2017 assessed the performance of health care workers during gastrointestinal endoscope reprocessing and evaluated their knowledge about reprocessing in endoscopy units at Zagazig University and Fayoum University hospitals. This study shows that the

mean knowledge score was poor. Moreover, **Talaat et al., 2016** reported that health care providers need improving of decontamination techniques for respiratory instrument, surgical devices and the reduction, elimination of such infections. While **Mohapatra, S. 2017** revealed that every hospital should have its own guidelines of sterilizing and disinfecting items based on their intended use of medical devices and associated infections.

**Caston, et al., 2018** documented that Spaulding classified instruments and devices into three categories based upon how the device is used (non-critical-semi critical- critical). Noncritical instrument need cleaning, semi critical need disinfection and critical instrument need sterilization. In addition to **Mohapatra, et al., 2017** who clarified that respiratory instruments were divided into 5 categories, Single-use devices (nasal cannula, face mask, and nebulizer cup) are equipment that were used once and then discarded. Noncritical Equipment needs cleaning such as patient personal equipment and non-critical environmental surfaces. Semi critical equipment needs disinfection such as (ambo bag and its mask). Equipment needs High level of disinfection such as (endoscope, broncho-scopes and thorachoscope). Critical equipment such as surgical instruments which used in chest surgical operation need sterilization. **Cairo, J. M. 2017** identified that most equipment used for respiratory therapy (e.g. items that come into contact with mucous membranes) is considered semi-critical such items should be cleaned and highly disinfected between patients. High-level disinfection of respiratory equipment takes place after cleaning and is typically accomplished by chemical disinfectant or physical methods.

**Cleaning, disinfection, and high-level disinfection** are indicated for processing instruments and medical devices that in contact with non-intact skin and mucous membranes. It is widely used to process reusable endoscopes because most endoscopes are made of materials that cannot withstand high temperature (**Solon, et al., 2019**). Instrument processing defined as all steps that are necessary to make a contaminated reusable medical device ready for its intended use. These steps may include pre clean, transport equipment to sterilization unit, cleaning, inspection functional testing, packaging, sterilization, storage & delivery, and quality assurance until arrive the instrument at the point of use. The process if instrument processing must be happened at the central Sterile Services Department (CSSD) at health care facility (**WHO, 2016**).

The processes of decontamination and sterilization are complex, require specific infrastructure, equipment and involve several steps that need to be correct, from devices collection, receipt by the unit, processing, storage, and distributing them throughout the facility. Quality management is important to assess the correct functioning of the equipment. (**CDC, 2019**). The effective management of respiratory instrument processing is very important to ensure safe and effective patient outcomes, reduced incidence of infection, reduce patient length of stay, reduce expenses related to hospital-associated infection, reduce expenses related to complications, extend instrument life, reduce replacement costs, and improve of quality of health care. (**Haque, et al., 2018**)

#### **Aim of the study**

Assess nurses' knowledge, performance and attitude related to the effective management of respiratory instrument processing.

#### **Research Questions:**

What is the nurses' knowledge related to the effective management of respiratory instrument processing?

What are the nurses' performances related to the effective management of respiratory instrument processing?

What are the nurses' attitudes related to the effective management of respiratory instrument processing?

### **3. Method**

#### **Study Design**

A cross section study design was used throughout this study.

#### **Settings**

The study was conducted at four governmental hospitals in Mansoura city. (Chest hospital, Mansoura university hospital, Talkha, and Mansoura general hospital. Pilot study conducted in Aga hospital).

#### **Participants and sampling**

Convenience sample was used in this study.

Fifty sterilization staff nurses who are responsible for instrument processing in sterilization unit on duty from five governmental hospitals in Mansoura city was included in the study have different qualifications and had at least one year of experience in sterilization units at the previous mentioned setting.

**Tools of data collection**

The researcher developed four tools for data collection after reviewing the relevant literature.

**Tool I: Nurses' socio demographic and occupational characteristics self-administrated questionnaire**

The researcher used this tool to assess socio demographic and occupational characteristics of nurses such as gender, age, educational level, and years of experience.

**Tool II: Nurses' knowledge self-administrated questionnaire**

The researcher used this tool to assess nurse's level of knowledge regarding instrument processing as cleaning, disinfection, inspection, packing, sterilization, transport, and storage. In addition to use infection control measure such respiratory hygiene and cough etiquette. To explore in depth nurse's knowledge the researcher used open ended question.

**Scoring system:**

This tool was classified into 6 categories; all these categories were composed of 61 questions. One mark awarded for each correct response. Based on the researcher cut of point, the knowledge level was categorized into three levels as:

- **Poor:** Scores less than 50% of total scores (less than 30.5)
- **Fair:** Scores from 50% to less than 65% of total scores (30.5 to less than 39.65)
- **Good.** Scores from 65% and more of total scores (39.65 and more).

**Tool III: Rubric observational checklist of respiratory instrument processing performance:**

The researcher used this tool to assess nurse's level of performance regarding management of respiratory instrument processing (cleaning, disinfection, inspection, packing, sterilization, transport, storage, use and infection control measure precaution (hand washing, gloving, Personal Protective Equipment) during the different working shifts.

**Scoring system:**

The total scores of the nurses' staff performance ranged from 0 to 224. one mark was awarded for each correct response based on the researcher cut of point, the performance level was categorized into two levels as:

- **Improper.** Score less than 75% (less than 168)
- **Proper.** Score more than 75% of total score (168 and more)

**Tool IV: Self-administered scale to assess attitude of nursing staff**

The researcher used this tool to assess the attitude of nursing staff about the management of respiratory instrument processing by using Likert-rating scale. This tool consisted of 13 positive attitudes statements and 15 negative attitudes statements. These statements requiring a response on a four-point Likert- rating scale (strongly agree, agree, disagree, and strongly disagree).

A scoring system was used to quantify the nursing staffs' attitude; four marks to strongly agree, three marks to agree, two marks to disagree and one mark to strongly disagree.

If the statements were negative, the scoring system was reversed in statistical product and service solutions (SPSS) program whereas one mark was given to strongly agree and two marks to agree, three mark to disagree and four marks to strongly disagree. That made up a total score of **112 marks as the following:**

- Positive attitude (It includes 13 items = 52 marks)
- Negative attitude (It includes 15 items = 60 marks)

**Phases of the Study**

**I. The preparatory phase**

**Ethical consideration.** The researcher obtained approved from Research Ethics Committee, Faculty of Nursing, Mansoura University and obtained verbal consent from each nurse before starting of the study after the explanation of the aim and process of the study. The researcher was emphasized that the participants' nurses at four governmental hospitals in Mansoura city are voluntary and the collected data will be treated confidentially and used only for research purpose. Any participant had the right to withdraw from the study at any time without any responsibility.

**Administrative process.** The researcher gets an official letter from the faculty of nursing to the manager of four governmental hospitals in Mansoura city. To permit the researcher conducting the current study.

**Literature review** of national and international literature using available books, articles, periodicals and magazines was necessary to be acquainted with all aspects of the study

problem to develop relevant tools for data collection.

**Face and content validity.** A jury group consist of five experts from professors of community health faculty of nursing; Mansoura University tested the study tools, and evaluated the appropriateness and relevant items, to achieve the criteria of trust worthiness. Experts' elicited responses that were either agree or disagree for the face and content validity. The items in which 85% or more of the professors had agreed were included in the proposed tool.

**Pilot study.** A pilot study was conducted on 10% (5) of the studied nurses which are considered one hospital from studied hospital (AGA ) who met the predetermined criteria to test applicability feasibility of the study tools, and the time needed to complete tools and the required modifications were done. Participants in the pilot study are not included in the main study sample. Cronbach's coefficient alpha used to test the applicability of attitude scale 0.89.

## II. Field work phase

**Initial data collection.** The researcher started by introducing herself to the studied nurses, explained the purpose and method of the study. Starting initial assessment on Sunday and Thursday/week visit from 8.30 am to 1.30 pm consuming 6 weeks. The researcher used data collection tools to assess nurses socio demographic and occupational characteristics, knowledge, performance and attitude of each nurse about respiratory instrument processing (tools I, II, III and IV).

## 4. Results

**Table (1):** represents the socio-demographic and occupational characteristics of nursing staff. Results indicates that the mean age of the nursing staff was 32.2 (7.8) years. 52 % were less than 30 years old. Most of nursing personnel (96%) were female. Regarding the qualification 50% of nursing staff had nursing diploma. More than half of them (58%) had less than 10 years of experience and 74% of them had less than 5 years of experience in sterilization unit. Regarding the training courses about sterilization only 10% attended this training, 6% of them received last training less than a year.

**Table (2):** represents knowledge of nursing staff according to all processing process. The nursing staff had poor level of knowledge regarding the definition of all process, disinfection, disinfectant, Timing and stage of processing endoscopes and processing endoscopes procedure as 78 %, 74%, 80%, and 60% respectively while

40% of nurses had fair level of knowledge regarding cleaning process and Sterilization process.

**Table (3):** represents nurses' total knowledge score level about respiratory instrument processing. It was observed that 60% of the nurses had poor knowledge score level.

**Table (4):** represents performance of nursing staff according to adherence of standard precautions in central Sterile Services unit .The nursing staff had improper performance regarding hand hygiene, Personal Protective Equipment (PPE), Respiratory Hygiene, Cough Etiquette and Environmental cleaning as 70%, 74%, 72%, and 60% respectively.

**Table (5):** represents performance of nursing staff according to sterilization processes, disinfection of bronchoscope, thoracoscope and disinfection of the respiratory instrument in central sterilization unit. The nursing staff had improper performance regarding Sterilization processes of surgical instrument, disinfection of bronchoscope, thoracoscope and disinfection of the respiratory instrument as 60%, 66% and 74% respectively in all the studied hospitals.

**Table (6):** represents nurses' total performance score level about respiratory instrument processing. It was observed that 66% of the nurses had improper performance score level.

**Table (7):** represents the availability of policies and design of central sterilization unit in (4) hospital in Mansoura city. Regarding policies in sterilization unit, design of central sterilization unit and occupational Health and Safety are not available in 75% of the studied hospitals. Regarding education and training of staff about annual infection prevention and control (IP&C) education, it was observed that 50 % of hospitals conducted this training.

**Table (8):** indicates that most of the studied nurses were strongly agree about cleaning step before any disinfection or sterilization process 78%, wearing PPE is protecting nurses from infection 80%, wearing PPE is protecting patients from infection 76%. While 58% of the studied nurses were strongly agree about using sterilization or disinfection for medical equipment's. 62% were strongly agree for using respiratory hygiene and cough etiquette inside and outside the hospital and 52% were strongly agree for using respiratory hygiene and cough etiquette inside the home. The studied nurses were strongly agreeing of nursing training related wearing PPE, continuous training related handling contaminated materials for the

sterilization staff and protection role of vaccination from infection 68%, 78% and 66% respectively.

**Table (9):** indicates that 58% of the studied nurses were disagreed that respiratory instrument spread the infection, whether processed or not. More than half 56% of the studied nurses disagreed that sterilization process may not be preceded by cleaning, 52% of them disagreed that sterilization or disinfection of the reusable medical instrument for the same patient. More than half 54% of the studied nurses disagreed of changing glove between the different procedures for one patient, 60 % disagreed of wearing a mask during washing equipment and 44 % disagreed to get rid of chemical decontaminants in the basin. The studied

nurses strongly disagreed to shorten of sterilization procedures, wearing gloves is better than frequent hand washing, need of training and experience for handling respiratory instrument, using respiratory hygiene and coughing inside the hospital only, spread of infection from respiratory equipment does not limited by treatment, training sterilization staff to wear PPE, continuous training for sterilization staff responsible for handling respiratory instrument 42%,66%,74%,62%,48%,66%,70% respectively. The mean of total negative attitude was 50.4 (6.2). In addition, the mean of total attitude was 95.2 (9.6).

**Table1: Socio-demographic and occupational characteristics of nursing staff (N=50)**

Item	N	%
<b>Age/ years</b>		
<30 years	26	52.0
30 - < 40 years	18	36.0
≥40	6	12.0
Mean (SD)	32.2 (7.8)	
<b>Gender</b>		
Male	2	4.0
Female	48	96.0
<b>Qualification</b>		
Nursing Diploma	25	50.0
Technical Nursing Institute	13	26.0
Bachelor's of nursing	12	24.0
<b>Years of experience</b>		
<10 years	29	58.0
10- < 20 years	16	32.0
≥ 20 years	5	10.0
Mean (SD)	11.4 (7.2)	
<b>Years of experience in sterilization unit</b>		
<5 years	37	74.0
5- <10 years	8	16.0
≥ 10 years	5	10.0
Mean (SD)	5.4(4.8)	
<b>Training courses about sterilization</b>		
Last training course about sterilization	5	10
<1 year	3	6.0
≥1 year	2	4.0

**Table2: Knowledge of nursing staff according to definitions, cleaning process , disinfection, and sterilization, timing, stage and processing of endoscopes procedure (N=50).**

Knowledge of nursing staff according to	Poor		Fair		Good	
	N	%	N	%	N	%
Definitions	39	78	0	0	11	22
Cleaning process	17	34	20	40	13	26
Disinfection and disinfectant	37	74	13	26	0	0
Timing and stage of processing endoscopes	40	80	10	20	0	0
Processing endoscopes procedure	30	60	14	28	7	14
Sterilization process	19	38	20	40	11	22

**Table (3): Nurses' total knowledge score level about respiratory instrument processing (N=50)**

Item	N	%
Poor	30	60
Fair	13	26
Good	7	14

**Table (4): Performance of nursing staff according to adherence of the standard precautions of infection control in central sterilization unit (N=50).**

performance of nursing staff according to	Proper		Improper	
	N	%	N	%
Hand hygiene	15	30	35	70
Personal Protective Equipment (PPE)	13	26	37	74
Respiratory Hygiene / Cough Etiquette	14	28	36	72
Environmental cleaning	20	40	30	60

**Table(5): Performance of nursing staff according to sterilization processes, disinfection of bronchoscope, thoracoscope and disinfection of the respiratory instrument (N=50).**

Performance of nursing staff according to	Proper		Improper	
	N	%	N	%
Sterilization processes of surgical instrument	20	40	30	60
disinfection of bronchoscope and thoracoscope	17	34	33	66
disinfection of the respiratory instrument	13	26	37	74

**Table 6: Nurses' total performance score level about respiratory instrument processing (N=50) in 4 central sterilization unit.**

Item	N	%
Proper	17	34
Improper	33	66

- Improper less than 75%
- Proper more than 75%

**Table (7): The availability of policies and design of central sterilization unit in (4) hospital in Mansoura city.**

Items	Available		Not available	
	N	%	N	%
Policies in sterilization unit	1	25	3	75
Design of central sterilization unit	1	25	3	75
Occupational health and safety	1	25	3	75
Education and training about disinfection, sterilization and infection control measure.	2	50	2	50
Hospital conducted annual infection prevention and control (IP&C) education for nursing staff	2	50	2	50

**Table 8: Nursing staff positive attitudes regarding respiratory instrument processing.**

Positive attitudes' categories	Strongly agree		Agree		Disagree	
	N	%	N	%	N	%
Explore your opinion about the cleaning step before any disinfection or sterilization process.	39	78.0	11	22.0	0	0
Explore your opinion about equipment processing in reducing the spread of infection.	15	30.0	31	62.0	4	8.0
Explore your opinion about that wearing PPE is protecting nurses from infection.	40	80.0	10	20.0	0	0
Explore your opinion about the wearing PPE is protecting patients from infection.	38	76.0	12	24.0	0	0
Explore your opinion about using sterilization or disinfection for medical equipment's.	29	58.0	21	42.0	0	0
Explore your opinion about using respiratory hygiene and cough etiquette inside and outside the hospital.	31	62.0	19	38.0	0	0



Identify your opinion about using respiratory hygiene and cough etiquette inside the home.	26	52.0	16	32.0	8	16.0
Identify your opinion about nursing training related wearing PPE.	34	68.0	16	32.0	0	0
Explore your opinion about continuous training related handling contaminated materials for the sterilization staff.	39	78.0	11	22.0	0	0
Explore your opinion about the protection role of vaccination from infection.	33	66.0	16	32.0	1	2.0
Explore your opinion about the concept of re-processing of respiratory equipment.	11	22.0	20	40.0	19	38
Total positive attitude						
Mean (SD)	44.8 (5.1)					

**Table 9: Nursing staff negative attitudes regarding respiratory instrument processing.**

Negative attitudes' categories	Agree		Disagree		Strongly disagree	
	N	%	N	%	n	%
Explore your opinion about respiratory instrument spread the infection, whether processed or not.	21	42	29	58.0	0	0
Explore your opinion about the sterilization process may not be preceded by cleaning	0	0	28	56.0	22	44.0
Explore your opinion about sterilization or disinfection the reusable medical instrument for the same patient	2	4	26	52.0	22	44.0
Explore your opinion about shorten of sterilization procedures	3	6.0	16	32.0	31	62.0
Explore your opinion about wearing gloves is better than frequent hand washing	9	18.0	20	40.0	21	42.0
Explore your opinion of changing glove between the different procedures for one patient	5	10.0	27	54.0	18	36.0
Explore your opinion of wearing a mask during washing equipment.	3	6.0	30	60.0	17	34.0
Explore your opinion about the get rid of chemical decontaminants in the basin.	13	26.0	22	44.0	15	30.0
Explore your opinion about the need of training and experience for handling respiratory instrument.	7	14	10	20.0	33	66.0
Explore your opinion about using respiratory hygiene and coughing etiquette inside the hospital only.	6	12.0	7	14.0	37	74.0
Explore your opinion spread of infection from respiratory equipment does not limit by treatment	5	10.0	14	28.0	31	62.0
Explore your opinion about training sterilization staff to wear PPE.	0	0	17	34.0	33	66.0
Explore your opinion about continuous training for sterilization staff responsible for handling respiratory instrument.	0	0	15	30.0	35	70.0
Explore your opinion about applying infection control measures in the sterilization unit does not reducing infection.	0	0	15	30.0	35	70.0
Total negative attitude						
Mean (SD)	50.4 (6.2)					
Total attitude						
Mean (SD)	95.2 (9.6)					

**5. Discussion**

Discussion of the study results covered five main parts starting with the first part: **socio-demographic and occupational characteristics** of nursing staff. The results of the current study revealed that the mean age of the nursing staff was 32.2 (7.8) years. More than half of them were less than 30 years old. Most of nursing staff are female. Regarding the qualification, half of nursing staff had nursing diploma. More than half of nursing staff had less than ten years of experience and around three quarters of them had less than five

years' experience in sterilization unit. Regarding the training courses about sterilization only ten percent attended this training, six percent of them received last training less than one year.

This finding is somewhat similar to **Fashafshehet al. (2015)** finding who conducted study in Palestinian and **Shrestha et al. (2018)** finding who conducted study at Bir Hospital in Kathmandu, Nepal revealed that the majority of the respondents had work experience of 5 years. , In addition to, **Sana'a and Mahmud (2011)** results who conducted study on nurses in Azady Teaching Hospital in Kirkuk city revealed that only eleven

percent of the respondents had received training, above quarter reported more specific training in areas such as sterilization, disinfection and operation of autoclaves While, the majority of them had not participated in continuous learning about infection control respectively.

**Regarding to decontamination, cleaning, disinfection, and sterilization process.** The nurses' staff total knowledge in the current study showed poor scores. These findings are inconsistency with the Krause *et al.* (2021) results who conducted study in regional hospital in the Czech Republic revealed that most of sterilization staff had good level of knowledge regarding decontamination process and most of nurses correctly using the Spaulding classification, mechanical cleaning and more than half of nurses had knowledge of the preparation of the disinfectant solution respectively.

**Concerning nursing staff knowledge to cleaning process;** the current study indicated that the nursing staff had fair level of knowledge regarding the cleaning process. This finding is somewhat like Panta, *et al.* (2018) finding conducted study in Nepal revealed that the nursing staff had fair level of knowledge regarding the cleaning process (manual cleaning, cleaning agents, and disinfectant solution).

**Concerning nursing staff knowledge to disinfection process and disinfectant;** the current study indicated that the nursing staff had poor level of knowledge, this finding is inconsistency with the Sahiledengle, *et al.* (2019) results who conducted study in Ethiopia, revealed that the nursing staff had good level of knowledge regarding disinfection process and how to prepare a disinfectant solution with adequate concentration.

**Concerning nursing staff knowledge about timing and stage of processing endoscopes;** the current study indicated that the nursing staff had poor level of knowledge regarding the processing endoscopes. This finding is inconsistency with the Kenters, *et al.* (2018) result which revealed that the respondents had fair level of knowledge regarding the processing endoscopes when conducted worldwide survey.

**Concerning nursing staff knowledge to processing endoscopes procedure;** in the current study documented that nursing staff had poor level of knowledge. This finding is inconsistency with Amer *et al.* (2015) study in Gastrointestinal Endoscopy Unit at Zagazig University Hospitals which revealed that the majority of nurses had fair level of knowledge. **In addition to California**

**Department of Health Services (CDHS) (2018) and Parveen, *et al.* (2021) study** which conducted in Nishtar Hospital Multan in Pakistan which recommended that continues educational and training guideline program for endoscopies reprocessing will help in effective performance and control infection.

**Concerning nursing staff knowledge to sterilization process;** The current study indicated that the nursing staff had fair level of knowledge regarding the sterilization process; this finding is like Panta, *et al.* (2018) finding in Nepal which reported that more than half of healthcare workers had fair knowledge about specific aspects of the sterilization of medical devices.

**Concerning the performance of nursing staff to adherence of standard precautions in central Sterile Services unit;** the current study results showed that more than half of nursing staff had improper performance regarding hand hygiene, Personal Protective Equipment (PPE), respiratory hygiene/cough etiquette and environmental cleaning .This finding is inconsistency to Mustafa and Lahu (2019) finding in the Vushtri regional hospital center in Sheikh Zayed and Ampadu (2019) )finding in ACCRA, GHANA, which revealed that about three quarters of nursing staff performance was proper regarding infections prevention and control measures.

**Concerning the performance of nursing staff regarding to sterilization of surgical instrument** the current study showed that the nursing staff had improper performance regarding sterilization process of surgical instrument. This finding is inconsistent with Panta, *et al.* (2018) finding who conducted study in Nepal and reported that nursing staff had proper performance regarding sterilization process.

**Concerning the performance of nursing staff to disinfection of bronchoscope and Thoracoscope;** in this study, the nursing staff had improper performance regarding the disinfection bronchoscope and thoracoscope in all the studied hospitals. **This finding** is inconsistency with to Amer *et al.* (2015) study in Gastrointestinal Endoscopy Unit at Zagazig University Hospitals which revealed that the majority of nurses had proper performance in endoscopy unit.

**Concerning the performance of nursing staff to disinfection of the respiratory instrument;** the current study documented that nursing staff had improper performance regarding disinfection of the respiratory instrument in all the studied hospitals. This finding is inconsistency with



**Panta, et al. (2018) result which revealed that** about half of healthcare workers had proper performance regarding disinfection of respiratory instrument.

**Concerning the availability of policies and the standard design of central sterilization unit and availability of occupational Health and Safety** in (4) hospital in Mansoura city; the current study results revealed that three quarters of the studied hospitals doesn't meet the standard criteria. While half of the studied hospitals conducted education and training for staff on infection prevention and control (IP&C measures). **El-sokkary, R. et al. (2015) revealed the same results** in Zagazig University Hospital (ZUH) in Sharkia, Egypt, which revealed that infrastructure of central sterile services of the Zagazig University hospitals, doesn't meet the standard criteria.

**Concerning the nursing staff positive and negative attitudes regarding respiratory instrument processing;** the nursing staff had positive attitudes and agreed that respiratory instrument processing such as that cleaning is necessary before any disinfection or sterilization process, the respiratory equipment processing has an effective role in reducing the spread of infection, wearing PPE to protect nurses and patients from infection. While had negative attitude regarding respiratory instrument processing.

**Panta, et al. (2018) finding showed the same result in Nepal which** revealed that positive attitudes of healthcare workers towards issues related to decontamination and reuse of medical devices. However, only a small proportion of healthcare workers strongly agreed that the number of staff involved in decontamination of medical devices in their hospital was adequate. The majority of healthcare workers strongly agreed that training on the operation of sterilizers/autoclaves helps ensure adequate sterilization of medical devices.

**Concerning the nurses' total knowledge and performance score level about respiratory instrument processing.** The current study indicates that 60%, 66 % of studied nurses have poor total score level of knowledge and improper performance respectively. This finding is similar to **El-Sokkary, R,et al., 2017 finding** which reported the same results in endoscopy units at Zagazig University and Fayoum University hospitals in Egypt.

## 6. Conclusion

Depend on the finding of the current study; most of studied nurses have poor total knowledge and improper performance score level regarding respiratory instrument processing while their attitudes regarding respiratory instrument processing were positive.

## 7. Recommendation

The researcher recommends designing protocol for nursing staff about respiratory instrument processing.

## 8.Reference:

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