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RESEARCH ARTICLE

AWARENESS AND APPLICATION OF HOSPITAL INFECTION CONTROL MEASURES AMONG HEALTHCARE PROFESSIONALS IN THE HOSPITALS OF AN URBAN AREA IN EL- MINIA GOVERNORATE.

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Abstract

Background: Infection control principles in healthcare are becoming of great importance nowadays all over the world, while there is a lack of practice and a shortage of knowledge about it of some healthcare professionals. Our study aims to understand the infection control knowledge, attitudes, and practices among healthcare professionals of 4 different hospitals in an urban area in EL- Minia governorate in relation to the process of health care.

The aim of the study: To estimate the current basic knowledge and application of infection control measures by healthcare professionals in the hospitals of an urban area in EL- Minia governorate.

Methods: a self-administered structured questionnaire about knowledge of infection control procedures were completed by 200 medical staff recruited from 4 different hospitals in Mallawy district which is an urban area in EL- Minia governorate

Results: In our study, there were 200 responses from doctors and nurses comprising junior doctors, consultants, and staff nurses in 4 hospitals in Mallawy district EL- Minia governorate. The median overall percent knowledge and practice scores were 70% and 65%, respectively. Nurses were more knowledgeable of the fact that hand hygiene is the most effective method to prevent healthcare-acquired infection ($P = 0.001$). The majority agreed that avoiding recapping needles, use of barrier precaution and hand hygiene effectively prevent HCAI. Results of logistic regression analysis indicated that knowledge of infection control was greater among respondents stationed in surgical wards (odds ratio = 3.414 [1.822– 6.395]) compared to those in medical wards. There was no statistically significant difference in both knowledge and practice between male and female respondent, nurses and doctors or those with years of working experience of ≥ 10 years and ≤ 10 . **Conclusion and recommendations:** The study indicates that the 4 hospitals in Mallawy district have no infection control Committee. Gaps have been identified in the knowledge and practice of infection control measures among doctors and nurses. This highlights the need for continued refresher training and measures to induce implementation of infection control in the hospital. According to the high rate of hospital-acquired infection, it becomes vital to adopt strict measures of

infection control in hospitals. Regular training courses for infection control measures are recommended for medical staff.

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..... **Introduction:-**

Hospital or other healthcare facilities acquired infections includes those infections that become symptomatic after the patient discharge or infections among medical personnel. Most nosocomial infections are transmitted by the healthcare team with the improper practice of hand washing procedures or gloves changing between patient's contacts [1].

All body fluids, secretions, excretions and mucous membranes may cause infections. The standard precautions include hand hygiene, use of personal protective equipment (PPE), use of the aseptic technique to reduce patient exposure to infections and proper management of sharps, blood spills, linen, and hospital wastes to maintain a safe hospital environment [2].

Healthcare professionals including nursing and medical students with standard precautions are efficient to prevent and control hospital infections which caused by healthcare workers. These measures protect both the patient and the healthcare workers. Hand hygiene is considered the most important infection control precaution [3,4]. Adequate use of gloves, to protect the healthcare workers, as well as the patient is very important. Safe practices for handling needle sticks and other sharp objects are a preventive measure for parenteral infection like hepatitis B virus and hepatitis C virus infections [4]. There is very low compliance with these standard precautions, in many hospitals [3].

Assessing the necessary knowledge, attitude and practice and the skills on infection control procedures in general hospitals can give way to manage the limited resources available in the Egyptian health sector for health providers and patients [4].

Antibiotic resistance, multi-drug resistant tuberculosis and increasing infectious diseases including HCV are creating major risks for health care system [5]. These conditions make the environment of the health professionals unsafe and risky which could interfere with the appropriate care of patient health [6].

World health organization reporting that unsafe injections and needle stick injuries cause every year at least 8-16 million HBV infections, 2.3-4.7 million HCV infections, and 160,000 HIV infection. WHO estimated that in developing countries 12 billion injections administered each year at least 50% of them are unsafe to recipients, health care professionals, health students and the public. Injuries from sharp devices this also transmit more than 40 infectious agents including (HBV), (HCV) and HIV [4].

The practice of standard precautions in developed countries is done to protect healthcare professionals from exposure to blood and the risk of infection with blood-borne pathogens while in developing countries the standard precautions are improperly practiced [7].

In Egypt, there is increasing the prevalence of hepatitis B and hepatitis C virus infections and the unsafe injections and needle stick injuries cause the majority of infectious diseases. [4].

Health science students reported as they had sustained at least one form of accidental injury by needle or other sharps. Nurses and health assistants sustained the highest proportion of accidental injuries by needles or sharps [8]. So the purpose of this research was to assess the knowledge, attitude and practice of standard precautions among health care workers in the health care system to all levels of staff at the 4 Hospitals in Mallawy district EL-Minia governorate (Mallawy central hospital, Mallawy fever hospital, Mallawy chest hospital and Mallawy ophthalmology hospital). The study will help in identifying and improving the practice of infection control precautions at the hospital level in the study area and will provide information for both governmental and private health care workers regarding infection control precautions.

This will estimate the current basic knowledge and attitudes of the healthcare professionals to measure what is known and practiced so that educational and training programs better designed [18]. The professional relations between Physicians and nurses may have differences with respect to their attitudes towards patient-care [19]. The

present study aimed to clarify the knowledge, attitude, and practice of the physicians and nurses in relation to healthcare infection control precautions in an urban area in EL-Minia governorate.

The aim of the study:

To estimate the current basic knowledge and application of infection control measures by healthcare professionals in the hospitals of an urban area in EL- Minia governorate

Methods:-

Study design

A cross-sectional hospital based descriptive study design was conducted to assess knowledge, attitudes, and practice of health professionals towards infection preventions in 4 Hospitals in Mallawy district EL-Minia governorate

Study area and period

a study was done in July 2017 where a self-administered questionnaire about knowledge of infection control procedures and the role of it in the health care system to all levels of staff at the 4 Hospitals in Mallawy district EL-Minia governorate (Mallawy central hospital, Mallawy fever hospital, Mallawy chest hospital and Mallawy ophthalmology hospital). The total number of working physicians in the 4 hospitals was 225The number of respondents was 200 (100 physicians &100 nurses) these respondents included all levels of staff of physicians and nurses. The respondents were 200 (117 males & 83 females) and the number of nurses was 100(35 males & 65 females). the number of physicians was 100 (82 males & 18 females).

The questionnaire: It is designed to identify the practitioner's knowledge, attitudes and practice towards infection control procedures in patient healthcare, and consisted of:

1- Demographic data such as occupation, age, gender, the duration of work experience and the frequency of infection control measures in practice.

2- Asking questions about the importance and source of knowledge about infection control measures.

We asked whether the respondent knew of the presence of an infection control unit in the institution and if they know about its role and if it satisfied its role.

3- In the final part of the questionnaire, respondents were asked about their opinion as regards infection control measures practice in their hospital.

study definitions

1. Knowledge is a clear awareness of healthcare workers on infection control activities.
2. Attitude-is the personal view of healthcare workers on infection control activities.
3. Practice a skill of healthcare workers on infection control activities.

Study ethical considerations

Data was collected with the consent of health care workers after they informed about the objective, procedures, potential risks, and benefits of the study. They were asked to provide accurate and honest responses. verbal consent obtained from each participant. The identification of the respondents was possible only through numerical codes which were secured so that there are anonymity and confidentiality in completing the questionnaire. Health care workers were reassured of the information they provided to this study.

Study Population

Among the 225distributed questionnaires, 210 were returned; out of which ten questionnaires were incompletely filled and were not included for analysis the remaining were 200 questionnaires (100 physicians & 100 nurses).

Data analysis

Analysis of data was done using the Statistical Package for Social Sciences (SPSS) – version 17.

Results:-

A total of 225 questionnaires were distributed out of which 200 were retrieved, 25 did not respond giving a response rate of 88.8%. Of the 200 responders, 100 were nurses and 100 were doctors. The study population has a median age of 35 years (interquartile range [IQR] 31–39) and median years of experience of 7 years (IQR 4–12) [Table 1].

The median overall percent knowledge and practice scores were 70% and 65%, respectively. On examining the knowledge of the respondents [Table 2], nurses were more knowledgeable of the fact that hand hygiene is the most effective method to prevent healthcare-acquired infection (HCAI) ($P = 0.001$). When asked about standard precautions, the majority agreed that avoiding recapping needles, use of barrier precaution and hand hygiene effectively prevent HCAI [Table 2]. Despite the nurses having better knowledge on hepatitis B virus (HBV) seroconversion compared to doctors, knowledge on percentage estimated risk of acquiring infection with the human immunodeficiency virus (HIV), HBV or hepatitis C virus (HCV) following exposure to blood and other body fluid

was generally poor [Table 2]. As regards to the practice of hand hygiene, 77% of doctors' versus 92% of nurses ($P = 0.004$) and 52% of doctors' versus 76% of nurses ($P = 0.002$) always practice hand hygiene before and after glove use and in between patient care, respectively. When asked about recapping needles, none of the respondents reported not recapping his/her needle after use, however, 32% versus 18% of doctors and nurses, respectively, said they recap needles most of the time.

Results of logistic regression analysis [Table 3] indicated that knowledge of infection control was greater among respondents stationed in surgical wards (odds ratio = 3.414 [1.822–6.395]) compared to those in medical wards. There was no statistically significant difference in both knowledge and practice between male and female respondent, nurses and doctors or those with years of working experience of ≥ 10 years and ≤ 10 years. There was a weak negative correlation between overall percent knowledge score and overall percent practice score ($r = -0.004$, $P < 0.001$).

Discussion:-

This current study approves a gap in knowledge about hand hygiene, with about fifty percent of the doctors agreeing with the use of sterile glove as the most effective method of preventing Healthcare-acquired infections. The overall knowledge about the risk of transmission of blood-borne infections (HIV, HBV, and HCV) and post-exposure prophylaxis was poor. The practice of hand hygiene is generally good, but relatively fewer of the respondents of the healthcare professionals stated washing their hands in between patient care, with nurses reporting a better practice. There was a weak negative correlation between good knowledge and good practice among the respondents of the healthcare professionals.

The regular obligatory training by the hospital infection control committee would likely explain the overall good knowledge and practice shown in this study. A similar pattern has been previously reported in Nigeria.[24] Studies elsewhere also showed that training improves knowledge and compliance with standard precaution.[19,26,27] In another study among healthcare providers in family health settings in Shebin El-Kom district, Menoufia Governorate training on standard precautions was predictive of correct knowledge of standard precaution.[37] The identified gaps in knowledge and practice of hand hygiene in this study despite regular training alarming. Ogoina *et al.*[11] reported the poor practice of hand hygiene despite good knowledge among health care providers in two tertiary hospitals in Nigeria. In Uganda, Sethi *et al.*[28] reported that up to 75% of healthcare providers at Mulago general hospital disagreed with the fact that their hands, when unclean, can be a source of infections.

The poor knowledge on the risk of transmission of blood-borne infections (HIV, HBV, and HCV) suggests most of the respondents undervalue the risk of transmission and this may put healthcare providers at risk of being infected. This may explain the poor compliance with the use of simple personal protective equipment such as caps, gowns, goggles, and masks with invasive procedures. According to WHO, globally 40% of HBV infections among healthcare providers are due to occupational exposure.[29]

The lower compliance to the observance of hand hygiene by medical doctors as shown in this study is in accordance with the observation in many other studies where doctors are shown to poorly comply with infection control precaution compared to nurses.[23,24,30,31,37] Bamigboye, Adesanya[32] and Abu Salam *et al.*,[37] observed a higher level of knowledge among nursing staff 77%, compared to medical students, 61%, with only 18.9% of the students claiming that infection control precautions. Adinma *et al.*,[24] in their study suggested years of experience as one of the factors responsible for poor compliance with infection control precautions among doctors compared to nurses who have more years of experience. This finding is in conflict with Gershon *et al.* [33] observation of the better practice of infection control precautions among younger health care providers. In a study among medical students, females were shown to comply more with infection control precaution than males. [34] In the present study, we did not find any significant association between years of experience or gender of health care workers and good knowledge and practice of infection control respectively.

The weak correlation between good knowledge and good practice suggests that good knowledge does not always produce good practice. This agrees with a previous study by Abu Salam which was done among healthcare providers in family health settings in Shebin El-Kom district, Menoufia Governorate.[37] Other confusing factors affecting the infection control practice may probably have a role. Excess workload and lack of resources were influencing the poor practice of infection control in healthcare workers in Nigeria,[11,24,35] and other countries of the world.[26,36]

Conclusion and recommendations:-

This study in the 4 hospitals in Mallawy district indicates that gaps have been identified in the knowledge and practice of infection control measures among doctors and nurses. This highlights the need for continued refresher training and measures to induce implementation of infection control in the hospital. According to the high rate of hospital-acquired infection, it becomes vital to adopt strict measures of infection control in hospitals. Regular training courses for infection control measures are recommended for medical staff.

Table 1:-Demographic data of the respondents of healthcare professionals in the hospitals of an urban area in EL-Minia governorate in July 2017

	Nurses (100)	Doctors (100)	Total (200)
Median age (years)	34 (IQR: 30-38)	37(IQR: 32 -42)	36 (IQR: 31-42)
Males	35	82	117
Females	65	18	83
Median experience (years)	7 (IQR: 5.25-12)	6 (IQR: 4-7)	7(IQR: 4-12)
Medical wards	40	45	85
Surgical wards	60	55	115

IQR=Interquartile range

Table 2:-Knowledge and practice of the respondents of healthcare professionals in the hospitals of an urban area in

	Doctor's n (%)	Nurse's n (%)	Crude OR (95% CI)	P
<u>Knowledge</u>				
Hand hygiene is the most effective method to prevent Healthcare-acquired infection,	73 (73)	91 (91)	3.97 (1.64-9.59)	0.001
sterile gloves is the most effective tool to prevent Healthcare acquired infection,	52(52)	34 (34)	0.48 (0.25-0.92)	0.027
Wearing gloves eliminates the need to wash hands	88 (88)	83 (83)	0.69 (0.27-1.80)	0.448
Component of universal precaution				
Avoid injury with sharp	91 (91)	84 (84)	0.48 (0.16-1.47)	0.194
Barrier precaution	96 (96)	88(88)	0.32 (0.07-1.45)	0.122
Hand hygiene	91 (91)	92 (92)	1.06 (0.33-3.46)	0.922
Risk of transmission of blood borne pathogens				
Percentage estimate of Human immunodeficiency virus transmission risk	54 (54)	41 (41)	0.58 (0.30-1.12)	0.104
Percentage estimate for Hepatitis B virus transmission risk	46 (46)	66 (66)	2.27 (1.176-4.394)	0.013
Percentage estimate for Hepatitis C virus transmission risk	31 (31)	45 (45)	1.82 (0.918-3.642)	0.08
Post exposure prophylaxis should begin within 72 h	56 (56)	58 (58)	1.07 (0.556-2.059)	0.84
<u>Practice</u>				
Hand wash before and after glove use	77 (77)	92 (92)	3.468 (1.418-8.487)	0.004
Hand wash on contact with excretion and secretion of patients	100 (100)	98 (98)	0.000	0.33
Hand wash before and after any invasive procedure	90 (90)	94 (94)	1.848 (0.588-5.807)	0.29
Hand wash in between patient care	52 (52)	76 (76)	2.859 (1.453-5.626)	0.002
Wear cap and mask before invasive procedure	50 (50)	55 (55)	1.235 (0.645-2.366)	0.524
Wear long-sleeved gown before invasive procedure	46 (46)	45 (45)	0.98 (0.512-1.885)	0.958
sterile gloves use before invasive procedure	83 (83)	93(93)	2.564 (0.966-6.804)	0.05
Wear goggles before invasive procedure	60(60)	72 (72)	1.66 (0.843-3.271)	0.14
Recap needles after use	32 (32)	18 (18)	2.10 (1.005-4.405)	0.050

EL- Minia governorate regarding infection control practices in July 2017

Table 3:-Factors influencing levels of good knowledge and practice of the respondent's healthcare professionals in the hospitals of an urban area in EL- Minia governorate in July 2017

Variables	Crude OR (95% CI)	
	Knowledge	Practices
Gender		
Female	1.0 (reference)	1.0 (reference)
Male	0.708 (0.395-1.272)	0.804 (0.451-1.434)
Years of experience		
<10	1.0 (reference)	1.0 (reference)
>10	1.423 (0.748-2.702)	1.183 (0.6113-2.290)
Cadre		
Nurses	1.0 (reference)	1.0 (reference)
Doctors	1.092 (0.561-2.124)	1.770 (0.916-3.416)
Station		
Medical wards	1.0 (reference)	1.0 (reference)
Surgical wards	3.414 (1.822-6.395)	1.103 (0.619-1.967)

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