Risk of Microbial Infections Associated with Complications Diabetic Foot Ulcer Patients and Poor Knowledge of Nurses' Staff about Using Optimal Sterilizers to Treatment of Ulcer in Basrah Hospitals

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Abstract:

Diabetic wound care DWC ,is an evolving specialty with the rising prevalence of diabetes foot(DF) complications. The nurses play an important key role in wound care , their attitudes and knowledge are important in providing optimum care to patients.

Design:

This study is a nonexperimental descriptive cross-sectional study

Methods:

The study was conducted in two hospitals (General Basrah Hospital and AL-Sader teaching Hospital) located in Basrah city**.** 70 sample were collected from nurses staff employed in special orthopedic wards (n=35) and other wards (n=35) at AL-Sader teaching Hospital and General Basrah Hospital , The data collection was carried out from December 2018 to February 2019, In this Correlation study a questionnaire composed of three parts. **Part 1**-Sociodemographic characteristic. **Part2-** Assessing the knowledge of nursing staff toward DFUs patient care and complication of the disease**. Part 3**- Evaluation of knowledge and practice nursing staff towards the selection of the best and the correct types of antiseptic and dressings, so and their concentration percentage for sterilize DFUs**.**

Results:

Most of nurses from each group do not have previous training toward care of diabetic foot ulcer, most of them , recorded high percentage response for needing training course and recorded low percentage for each of : knwoledge toward DFUs

patient care and complication of the disease ,and Evaluation of knowledge and practice nursing staff towards the selection of the best and the correct types of antiseptic , dressings and their concentration percentage for sterilize , Where their knowledge was very weak about this aspect

key words: microbial infection ,diabetic foot ulcers, antiseptic ,Iodine,

Introduction

The estimated prevalence of diabetes covers (DC) 382 million people (Tao *et al*., 2015). Initially, the diabetic foot (DF) was recognized in 19th century .However, clinician's attention towards the matter was turned only after last half of the 20th century, any foot ulcer(FUs) are potentially dangerous in diabetic patients , about 15% of diabetic mellitus patients(DM) develop Diabetic Foot Ulcer (DFUs) . In the Worldwide, the prevalence of the diabetic foot (DF) accounts for around 20% of hospital admissions.

Wound care (WC) is rapidly increasing specialty (Ennis, 2012). Accurate wound assessment is required to plan and carry out management regimens as well as to evaluate care (Ousey &

Cook, 2011). Caregivers require appropriate working environments, education, and training in order to provide high-quality care (Department of Health, 2008). Previous research has shown that a multidisciplinary foot care team at an independent wound care center can effectively manage wounds. (Got- trup, 2001). Although, Despite the fact that the health team should ideally include specialists, wound care nurses, and allied health professionals, nurse-led wound care has been found to enhance patient outcomes (Harrison et al., 2005).

Many healthcare workers, including nurses, have been found to have gaps in their wound care knowledge in previous research (Coetzee, &Hagemeister, 2010). Positioning and staging of patients are only a few of the many areas where knowledge gaps have been discovered. Nurses from various contexts appear to have varying levels of wound care knowledge, according to studies. Although diabetic foot infections are multimicrobial, the most commonly identified species is Staphylococcus aureus, which causes a variety of ailments (Murali et al., 2014).

The ideal wound care dressings for diabetic foot ulcers DFUs should maintain a moist wound healing environment, removing excessive exudates, odor and be effective in treating

infection of diabetic foot (DF) wounds, Although the exact threshold for distinguishing bacterial infection from bacterial colonization is unknown, chronic and acute wound care has altered dramatically in the previous decade, in the other hands, most attention has been focused on the types of solutions used for wound cleansing and Healing (Sibbald *et al*., 2003).

Aim of study:1 Assessing the nurses staff knowledge about diabetic foot ulcer management**.** 2-To know the types of the antiseptic uses to diabetic foot ulcer from nursing staff during dressing

METHODS

Research design : This study is a nonexperimental descriptive cross-sectional study in two hospitals (Basrah General Hospital and Al-Sader Teaching Hospital) located in Basrah city.

Research questionnaire : In this Correlation study a questionnaire composed of three parts included of :-

Part 1-Sociodemographic characteristic .**Part 2-**Assessing the knowledge of nursing staff toward DFUs patient care and complication of the disease.

Part 3- Evaluation of knowledge and practice of nursing staff towards the selection of the best and the correct types of antiseptic and dressings, so and their concentration percentage for sterilize DFUs.These parts are developed by referring to relevant literature in wound management (Coetzee et al., 2010; International best practice guidelines: Wound management in diabetic foot ulcers, 2013).

Study sample and setting:-

70 sample were collected from nursing staff employed in special orthopedic wards (n=35) and other wards (n=35) at AL-Sader teaching Hospital and General Basrah Hospital . The data collection was carried out from December 2018 to February 2019.

All these sample from both sexes, and from different levels education (diploma and nursing secondary school).

Statically analysis:-

Analysis was made by using SPSS, data was expressed in (percentage and frequency) and chi squire test.

The tool was validated prior to data collection ,Through content validation by a team of experts including a physiologist and a general surgeon who manage patients with diabetic ulcers, 5 of the College of Nursing teaches four specialties of nursing and one specialization of statistics15 nursing practitioners specializing in wound care management. The tool has been modified by the comments of this expert's team. Pre-testing was performed by instrument administration.

Five wound care nurses were not involved in the study. Instrument reliability was assessed using first item data. Like Cronbach's alpha values of .704 for knowledge, Section 728 for the position section considered acceptable (Danielson et al., 2015). Analysis was made by using SPSS ,data was expressed in (percentage and frequency) and chi squire test .

Results:

Diabetes mellitus is most prevalent in middle-aged and elderly populations. Of the total of 70 nurses invited, response rate = 100% . Their demographic characteristics are shown in Table (1).

In table (1) show in the majority of participants were male n=51(72.9%) .Regarding age between 20-61 years, high

percentage n=39 (55.7%) were 20- 40 years . Regarding the duration of employment, in special orthopedic wards and in other words ,However high percentage n=53 (75.7%) from AL-Sader teaching Hospital .As well as for education level, high percentage n= 36(51.4%) are High Nursing School , their year service between from 1-40 years but high percentage between 1-20 years n=46 (65.7 %).

Table (1): Demographic characteristics of the participants

Variables	N	%
gender		
Male	51	(72.9 %)
Female	19	(27.1%)
Age (in years)		
20-40	39	(55.7%)
41-60	30	(42.9%)
≥61	1	(1.4%)
hospital		
Al-Basrah General Hospital	17	(24.3%)
Al Sader Teaching Hospital	53	(75%)
High Nursing School	36	(51.4%)
Level of education		
Secondary Nursing School	36	(51.4%)
Diploma	34	(48.6%)

Nursing experience (in years		
1-20 years	**46**	**(65.7%)**
21-40 years	**24**	**(34.3%)**
Do Have previous training toward care of diabetic foot ulcer		
Yes	9	(12.9%)
No	61	(87.1%)
If you don't take training / Do you need a training course		
yes	58	(82.9%)
no	12	(17.1%)

The part two of questionnaire including 10 items in the Table (2**)** showed all answers of nursing staff for all items no significant difference ($p<0.05$) between nursing were employed in special orthopedic ward and nursing were employed in other ward . question no. 1 to 5 respectively the knowledge of nursing staff were recorded low percentage for nurses were employed in special orthopedic , and other ward, this indicates a lack of nursing staff information about the stages of progression of (DFUs) and the types of bacteria that cause infection , three major factors for diabetic foot ulcer (Neuropathic ,Ischaemic ,Neuroischaemic) that can lead to gangrene and amputation(McPhee *et. al.* 2012), therefore , anaerobic and aerobic bacteria have been shown to infect

diabetic foot wounds (DFWs), also Fungal infections are common in diabetic foot (Singh *et.al*.,2009).

Table (2): Comparison knowledge between nursing staff who Employed in special orthopedic ward and Employed in other wards.in special orthopedic ward and Employed in other wards.

No.	Item (correct answer)	Employed in orthopedic ward n= 35	**Mean score**	Employed in other ward n= 35	**Mean score**
		Frequency of correct answer n= (%)		**Frequency of correct answer n= (%)**	
1-	**Did you know the stages of progression of Diabetic foot ulcers? (yes)**	**2 (5.7%)**	**0.7**	**1 (2.9%)**	**0.1**
2-	**Do you know the types of bacteria that cause Infection of diabetes foot? (yes)**	**6 (17.1%)**	**0.4**	**11 (31.4%)**	**0.7**
3-	**Do you work as a multidisciplinary team?(yes)**	**17(48.6%)**	**1**	**19 (54.9%)**	**1.1**
4	**Do you remove the dead**	**16**	**1**	**26 (74.3%)**	**1.5**

	tissue at every Treatment? (yes)	**(45%)**			
5-	**Did you know that the acidic PH helps to healing wounded faster (yes)**	**3(8.6%)**	**0.2**	**4 (11.4%)**	**0.3**
6-	**Do you wear sterile gloves when treating Ulcerated feet? (yes)**	**35 (100%)**	**2**	**35 (100%)**	**2**
7-	**Do you measure diabetic foot ulcers at each Medication? (yes)**	**26 (74.3%)**	**1.5**	**24(68.6%)**	**1.4**
8-	**Do you examine the whole foot until the foot is not infected to the patient? (yes)**	**26 (74.3%)**	**1.5**	**24 (68.6%)**	**1.4**
9-	**Do you sterilize surgical instruments every time the patient is treated?(yes)**	**25 (71.4%)**	**1.5**	**35 (100%)**	**2**
10	**Do you inform the patient about the risk factors of DFUS and complications?(yes)**	**29 (82.9%)**	**1.7**	**24 (68.6%)**	**1.4**
Total& grad mean		**185 (52.9%)**	**11.5**	**203(58%)**	**11.9**

Mean score use liker score yes =2, no=1 (1+2) ÷2= (2 that mean score)
Chi.- square =.835,df=1.Asymp . sig.=0.361p≤ 0.005

The part three of questionnaire including 5 items, these items are evaluation of practice nursing staff who employed in the special orthopedic ward and employed in the other ward towards the selection of the best and the correct types of antiseptics ,Table (3) showed no significant difference ($p \leq 0.005$) for all result between nursing staff were employed in special orthopedic ward and other ward. Were their knowledge was very weak regarding this aspect.

Table (3): comparison Evaluation of knowledge and practice nursing staff towards antiseptics and dressings

N0.	Item	Employed in special orthopedic ward n= 35		Employed in other ward n= 35	
		Poor n=(%)	**Good n= (%)**	**Poor n= (%)**	**Good n= (%)**
1	**types antiseptic used sterilization during the treatment of the patient**	**32(91.4%)**	**3(8.5%)**	**30(86%)**	**5(14%)**
2	**are The concentration of the antiseptic solutions has an impact on the wounds**	**8(23%)**	**27(77%)**	**3(8.5%)**	**32(91.4%)**
3	**types dressing used during the treatment**	**33(94%)**	**2(6%)**	**34(97%)**	**1(3%)**
4	**are the Choosing the type of dressing depends on the type of wound**	**32(91.4%)**	**3(8.5%)**	**35(100%)**	**0**
5	**could you Keeping wet wound environment will speed up the healing process**	**11(31%)**	**24(96%)**	**15(43%)**	**20(57%)**

Total	**116 (66.3 %)**	**59 (33.7 %)**	**117 (66.9 %)**	**58 (33.1 %)**

Chi.- square=0.009.df=1.Asymp. sig. 0.926.p≤0.005

DISCUSSION:

Finally, findings in this study revealed that Most of nurses from each group do not have previous training toward care of diabetic foot ulcer, not engaged in any professional development activity currently are unsatisfactory , the possible reasons for lack of learning resources and time constraints during their working hours owing to staff shortage, this result is in agree with(Kumari & De Alwis, 2015; Nuru et al., 2015) . So that the highest percentage recorded with answer (no) n=61 (87.1%),so most of them , recorded high percentage response for needing training course n=58 (82.9%.). Furthermore, questions no. 6 to 10 respectively were recorded high percentage for nursing were employed in special orthopedic and for other ward, Standard operating protocols, staff training, personal discipline, and meticulous attention to detail are all essential components of asepsis., furthermore, Hand washing, use of barrier protection such as aprons and gloves, the safe handling and disposal of "sharps" and medical waste and proper

cleaning, disinfection and sterilization are all part of creating a safe hospital , also a measure of the wound by planimetry considered One of the protocols is also important to avoid amputation (Harold *et al*., 2004 .Furthermore , The majority of dressings are designed and made to create a moist wound environment and support progression towards wound healing,

It involves maintaining a balanced wound environment that is not too dry or too moist, Dressings that can help to manage wound exudate optimally and promote a balanced environment are key to improving outcomes , It's unclear what level to use to distinguish bacterial infection from bacterial colonization. (Timmons et el., 2010 ; Sibbald et al., 2003) .

Limitations:

Due to the lack of a validated questionnaire to examine the study's aims, data was collected using a self-developed questionnaire. Although the instrument's validity and reliability were proven, a larger sample size for validation would have been preferable. Furthermore, due to the questionnaire's restricted number of questions, it was not able to measure nurses' in-depth knowledge. When analyzing results, take into account the possibility of over-reporting good conduct and vice

versa due to social desirability bias. Because good information and a happy mindset may not always imply best practice, (Gillespie *et al.,* 2014), Future research should be undertaken to evaluate these nurses' diabetic ulcer care practices. When evaluating attitudes and actions, unavoidable circumstances such as a lack of enough time and staff must be taken into account. Furthermore, because the research was done at three teaching hospitals in a single region, the findings cannot be applied to all Basrah nurses. As a result, nationwide studies are required.

Ethical Approval: Basrah General Hospital and Al-Sader Teaching Hospital

Acknowledgment: To all the nurses who participated in the study.

Conclusion:

Lack of knowledge and practice of nursing staff about diabetic foot disease.lack of advice from nurses to patient about DFUs complication and their prevention. Lack of training for nursing staff about diabetic foot management. The lack of a nurse supervisor monitors the work of nurses and corrects their nursing work mistakes. Nursing staff not know regarding iodine

(povidone) toxicity in open wound sterilization (especially DFUs). Lack of work as a team that reduces complications and accelerates healing.

Recommendation :

Do not use antiseptic iodine (povidone) in open wound sterilization (especially diabetic foot ulcer)**.**Establishing a training courses for nursing staff on the care of diabetic foot patients **.**Appoints a supervisor nurse to monitor and assess the work of nurses and teach them about the right and modern ways to take care of diabetic foot**.** Make leaflets for diabetic foot care and prevent them from complications and giving them to patients**.** Making posters about the risks of diabetic foot complications and putting them in the wards to increase awareness among nurses and patients' periodic assessment of nurses' knowledge of diseases in their wardrobes (especially nurses in diabetic foot words).

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