Relationship between Nurses` Awareness, Practice and their Perceived Barriers towards Pressure Ulcer Prevention

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Abstract

Background: Pressure ulcers are localized damage in the bedridden patient`s skin that increase morbidity and mortality rates and it can be prevented if appropriate nursing measures are implemented. **Aim**: The present study was aimed to determine relationship between nurses` knowledge,practice and their Perceived barriers toward PU prevention**. Research design**: a descriptive correlational design was utilized for the current study. **Sitting:**The study was conducted in the orthopedic, neurosurgery and intensive care units at El-Mahalla General Hospital and Benha University Hospital. **Sample**: A convenient sample of all available nurses (40 nurses from each hospital) were included in the study and eighty patients (40 patients in each hospitals) who are assigned for care by studied nurses who participated in the study. **Two tools** were employed in this study, **Tool 1:**It included 2 parts, **part I:**concerned with Nurses` knowledge assessment and sociodemographic characteristics, **Part II:** attributed to perceived barriers towards pressure ulcer prevention practice. **Tool 2:** It included 2 parts, **Part I**: included nurses' practice observational checklist toward actual nurses' care for pressure ulcer prevention**.Part II:** Patients` diagnosis and their functional level observational checklist. **Result and conclusion:** The present study revealed that nurses' knowledge was satisfied while their practice was unsatisfied which it may be attribute to that they did not integrate their knowledge into practices. There was statistically significant correlation between level of nurses' knowledge and practice in Benha and El Mahallaand between nurses' practice and perceived barriers by nurses in El Mahalla hospital.**Recommendations:**The present study recommended that continues education and in service training program for the nurses, which is necessary for improving care provided for patients. Health service managers should identify and minimize the barriers as much as possible to prevent pressure ulcer.

Key words: pressure ulcers, nurses` knowledge, practice, barriers, nursing preventive measures

Introduction

pressure ulcer is defined as localized damage to the skin and /or underlying tissue over a bony prominence at the sacrum, hip (trochanter), heel, shoulder, or elbow or related to a medical or other device **(Ayello et al., 2018 and Donald, 2017)**. The lesion begins as reddened area, which can quickly include deeper structures and become an ulcer .The injury can present as an intact skin or

an open ulcer and may be painful. It caused by prolonged pressure or pressure in combination with shear and friction that damaged skin and Risk factors for pressure ulcer include immobility, incontinence malnutrition, compromised skin perfusion, and current medical illness. Number of neurological and non-neurological disease may lead to or exacerbate the development of pressure ulcer (Fred 2016). It considers a major challenge worldwide and a major cause of mortality, morbidity and the burden of health care in the world**(Touhy& Jett 2014).**

Pressure ulcers have 4 grades in its formation which start with damage in skin layers and it can reach to the muscles and bones, so if not treated early, it can reach gradually to the end stage and lead to serious complication like cellulitis, blood poisoning (septicemia), skin cancer and bone and joint infection that can lead to delayed healing and increasing in mortality and morbidity rates. Other complications of pressure ulcers include endocarditis, heterotopic bone, amyloidosis, pain and depression that have been associated with decreased wound healing **(Sarabahi &Tiwari 2012).**

Nurses have a primary role in PUP; however patients may also contribute through active participation in PUP care .Prevention and treatment of pressure ulcers are a major nursing priorities in assessment for nurse's awareness because they must have basic knowledge and clear perception towards pressure ulcer and how to prevent it **(Potter &Perry 2016**). Increased knowledge about pressure ulcer prevention between nurses not only improves their practice of pressure ulcer care but also reduces hospital stay (**Qaddumi &Khawaldeh 2014).**

underlying tissue due to lack of mobility and blood circulation **(Lacey & Walker, 2018).**

There are some of barriers or obstacles that can interfere with pressure ulcer prevention, barriers related to nurses such as poor in nurses' knowledge, poor in practice and skills, shortage of nursing staff, poor in clear written documentation and recording, poor in guidelines of prevention bed sores**(Chamanga& Ward 2015).**

In addition to lack of time for making an adequate skin assessment and Lack of evidence supported by research may be included as well as barriers related to the patient as obesity and patient refusal for receiving nursing care or treatment),another barriers related to the environment such as lack of resources and facilities like mattresses ,pillow ,bed sheets ,patient`s clothes trapeze, skin lotions and powder and insufficient budget**(Valles et al., 2016).**

Significance of the study

Approximately 1millon pressure ulcer occur each year in the United States and 2% to 30% of hospitalized patient develop pressure ulcer with elderly and critically ill patient(Farlex&Partners 2011. More studies in the United State have shown that incidence of acquired pressure ulcer remains high in ICU(10% to 41%) and increase health care facilities budget for treatment **(Touhy& Jett 2014).**

In Egypt statistics of incidence or prevalence rate of pressure ulcer among immobilized patients are totally lacking, because of the fear of legal accountability and it consider an indicator for knowledge and practices defect of nurses toward prevention and management of pressure ulcer. So only one study in 2009 according to statistics record at health insurance organization in

Alexandria, indicate that pressure ulcer ranged from 40% to 50%. Regarding the lac[11]k of nurses` knowledge and practice, the complication of PU were ranged from 20% to 30% in each department **(El Enein & Zaghloul 2011).**

Aim of the study

The aim of the present study was to determine the relation of nurses` knowledge, and practice with their perceived barriers toward pressure ulcer prevention through:

1-Assess nurses' level of knowledge and practice regarding pressure ulcer (PU) prevention

among bedridden patients.

2- Determine the relationship between nurses` knowledge, and practice and their perceived barriers toward pressure ulcer prevention?

Research questions:

To achieve the aim of the study the following research questions are formulated:

1-What are the levels of nurses` knowledge toward prevention of pressure ulcers?

2-What are the levels of nurses` practice toward prevention of pressure ulcers?

3- Are there relationships between nurses` knowledge, and practice and their perceived barriers toward pressure ulcer prevention?

Operational definition

Nurses` awareness: - Nursing knowledge or perception

SUBJECTS AND METHODS

Research design:

A descriptive correlation study design was utilized to conduct the aim of this study.

Setting:

The study was carried out in the orthopedic, neurosurgery and intensive care units at El-Mahalla General Hospital and Benha University Hospital

Subjects:

a- Nurses

A convenient sample of all available nurses (40 nurses from each hospital) were included in the study from Benha University Hospitals (40 nurse) and from El Mahalla General Hospital (40 nurse), who are working at the above mentioned setting and assigned for caring the bedridden patients**.** Nurses` number in each department were (10) in ICU, (14) in Neurological and (16) in orthopedic at Benha hospital and (12) in ICU, (10) in Neurological and (18) in Orthopedic at El-Mahalla hospital.

b-Patient

Eighty patients (40 patients in each hospital) who are assigned for care by studied nurses who participated in the study.

Inclusion criteria:

a- Nurses

1. The nurses' experience not less than two years.
2. Having educational level of at least three years diplom in nursing.

b- Patients who are assigned on nurses who participated in the study were bedridden for at least not less than two weeks and had partial or complete immobility.

3-Tools of data collection:

Tool (1):- Structured interview questionnaire: It included two parts

Part I: Nurses` knowledge assessment and socio demographic characteristics

It aimed to assess nurses' knowledge related to pressure ulcer and preventive measures for bedridden patients. It was designed by the researcher after reviewing the related recent literature and was based on **Cash & Glass (2017),Ferri (2016)** which included; knowledge about definition of pressure ulcer(**2 score**), causes and risk factors(**2 score**), signs and symptoms and grades(**5 scores**), nursing assessment and diagnosis(**5 sores**), complications(**2 score**) and preventive nursing measures of pressure ulcer(**10 scores**) **.**For items related to knowledge, two point Likert scales of responses were used as correct answer = 1 and incorrect answer = zero. Each question answered on a 2 point rating scale with end points (From 0 to 1).The total score of the questionnaire was 26 marks. Nurses' knowledge was considered satisfactory if the total percent score was 60% or more of total scores and unsatisfactory if less than 60%.

Total knowledge score: 26

- 0-15< **60% un satisfaction**
- 16-26> **60% satisfaction**

- Socio-demographic datawas attached to this questionnaire which included; the nurses' age, sex, education, qualification, years of work experience in the units and previous educational session for pressure ulcer prevention.

Part II:Perceived barriers towards pressure ulcer prevention practice

It aimed to assess perceived barriers by the nurses that interfere them for carrying out PU prevention and treatment practice. It was developed by the researcher through review of related literature based on **Latimer, Chaboyer& Gillespie, (2015)** and **Grove& Gray (2018)** and used list of barriers related to risk assessment, documentation and carrying out PU prevention and treatment practices as the following:

The respondents ranked the most important barriers in each category whichincluded factors related to patient, nurse as well as factors related to environment (institution).If barrier presents the respondent answers (Yes) with score (1) andif barrier absents the respondent answers (No) with score (0). The total score of the perceived barriers was (10) marks.

Tool (2): Observational checklist:

Part I: Nurses' Practice assessment toward pressure ulcer prevention

It aimed to assess the actual nursing care of pressure sores prevention practice. It was developed by the researcher through review of recent related literature**, Doughty (2012)** which included; patient position and mobility(**8 scores**) ,use supportive devices(**8 scores**), skin care(**12 scores**), bedsheet care(**26 scores**) ,improve nutritional status(**14 scores**) ,risk assessment(**12 scores**) and monitor progress of pressure ulcer(**14 scores**)**.** Three point Likert Scale of the nurses` responses was used as done correctly=2, done incompletely = 1, and not done or done

incorrectly=0. The total score of the nurses' practice was 94 marks. The researcher was considered the nurses` practice in the satisfactory level if it was 75% or more of total scores and unsatisfactory if less than 75%.

Practice total score: 94

- 0-70<**75% un satisfaction**
- 71-94≥**75% satisfaction**

II-Methods

- **Content Validity:**

(**5**) expertise from the field tested the tool to ensure the validity of the tool and necessary modification was done.

- **Pilot Study:**

Pilot study was conducted on 10 % of nurses (studied sample) to test the clarity and applicability of the tool (part I- 2). The obtained results of the pilot study were used as a guide in modification of the tool if needed. The nurses involved in the pilot study were excluded from the study.

Field of work and Data collection

All available nurses agreed to participate in the study. The aim of the study and the component of the tools were explained to the nurses at the beginning of data collection. The nurses were interviewed individually and collected the data by the nurses using self-administration technique regarding their knowledge and sociodemographic characteristics utilizing **tool 1** andNurses' perceived barrier in the Intensive Care, Orthopedic and Neurosurgery units using **tool 1 part II,** which was answered by subjects` nurse .The nurse's practice was observed by the researcher regarding the prevention of pressure sores using observational checklist **(tool 2 part I**) as well as the patients' diagnosis and their functional status were recorded by the researcher using **tool 2 part II.** The researcher visited the hospitals in the morning shift from 10.00 am to 1.00 pm for 3days weekly i.e. Saturday for Benha hospital, Monday and Tuesday for EL-Mahalla hospital in the period from June to September 2017. The researcher distributed the questionnaire which was filled in the time of 20 – 30 minutes.

Statistical design:

After the finishing of data collection, the data were organized and tabulated statistically analyzed using statistical program social science (SPSS) to evaluate the nurses under the study. The statistical analysis included number (N), mean and stander deviations (SD), percentage %, chi square (x^2),Student t-test, ANOVA test, Monte Carlo and Fisher Exact for chi test. For all statistical tests done the threshold of significance was fixed at the 5% level (Pearson chi square). A Pearson chi-square >0.05 indicates no significant result, when the Pearson chi-square <0.05 indicates a significant result and the Pearson chi-square is the degree of significance.

Results:

Table (1): Frequency distribution of the studied nurses in Benha and El -Mahalla hospitals according to their Socio-demographic(n = 80)

Personal data	Hospital				Test of Sig	p	Total (n = 80)	
	Benha (n = 40)		Elmahalla (n = 40)					
	No.	%	No.	%			No.	%
Age								
20 - 30 year	29	72.5	18	45.0	χ^2= 6.595	MCp= 0.077	47	58.8
>30 – 40	10	25.0	19	47.5			29	36.3
>40 -50 year	1	2.5	3	7.5			4	5.0
Mean ± SD	28.12 ± 4.20		30.98 ± 5.39		t=2.638*	0.010*	29.55 ± 5.01	
Sex								
Male	4	10.0	5	12.5	χ^2= 0.125	FEp= 1.000	9	11.3
Female	36	90.0	35	87.5			71	88.8
Marital status								
Single	10	25.0	12	30.0	χ^2=1.151	MCp= 0.802	22	27.5
Married	30	75	28	70.0			58	72.6
Education								
Diploma in nursing with specia	10	25.0	13	32.5	χ^2=2.831	MCp= 0.4	23	28.8
Institute of technical healthy	16	40.0	10	25.0			26	32.5
Bachelor in nursing	14	35.0	17	42.5			31	38.8
Years of work experience								
2 - 5 years	28	70.0	16	40.0	χ^2=9.818*	0.007*	44	55.0
> 5-10 years	7	17.5	7	17.5			14	17.5
More than 10 years	5	12.5	17	42.5			22	27.5
Past Educational program -training program								
No	21	52.5	13	32.5	χ^2=3.274	0.070	34	42.5
Yes	19	47.5	27	67.5			46	57.5
-courses								
No	30	75.0	21	52.5	χ^2=4.381*	0.036*	51	63.8
Yes	10	25.0	19	47.5			29	36.3
-workshops								
No	31	77.5	29	72.5	χ^2=0.267	0.606	60	75.0
Yes	9	22.5	11	27.5			20	25.0
Departments								
ICU	10	25.0	12	30.0	χ^2=0.966	0.617	22	27.5
Neurological	14	35.0	10	25.0			24	30.0
Orthopedic	16	40.0	18	45.0			34	42.5

χ^2, p: χ^2 and p values for **Chi square test** for comparing between the two groups

MCp: p value for **Monte Carlo** for Chi square test for comparing between the two groups

FEp: p value for **Fisher Exact** for Chi square test for comparing between the two groups
t, p: t and p values for **Student t-test** for comparing between the two group
*: Statistically significant at p ≤ 0.0

This table shows the frequency of the studied nurses in Benha and ElMahalla hospitals according to their personal characteristics .It noticed that nearly three quarter of the subjects` nurses in Benha hospital (72.5%) aged from 20– 30 years old but in El Mahalla hospital nearly half (47.5%) aged from 30-40 years old. The majority of sample in both hospitals were female (90% and 87.5%), respectively. Concerning their experience, 70%was from2-5 years in Benhaand 42.5%were more than 10 yearsin El Mahalla.More than one third of nurses graduated from Institute of technical healthy in Benha (40%) and 42.5% had bachelor in nursing in ElMahalla. Concerning to departments of nurses` work, more than one third of the nurses in Benha (40%) and (45%) in El Mahalla were at orthopedic department (p=0.617).

Table (2): Significant differences of studied nurses' knowledge between El Mahalla andBenha hospitals regarding PU prevention

Total score	Total Score	Hospital		T	P	Total (n = 80)
		Benha (n = 40)	Elmahala (n = 40)			
Concept of PU						
Min. – Max	2	0.0 – 2.0	0.0 – 2.0	1.624	0.108	0.0 – 2.0
Mean ± SD.		1.48±0.64	1.23 ± 0.73			1.35 ± 0.70
M % S		73.75±32.00	61.25±36.67			67.50±34.77
High risk patient for PU its causes						
Min. – Max	2	0.0 – 2.0	0.0 – 2.0	0.636	0.527	0.0 – 2.0
Mean ± SD.		1.43 ± 0.68	1.33± 0.73			1.38 ± 0.70
M % S		71.25±33.76	66.25±36.49			68.75±35.02
Signs& symptoms grades						
Min. – Max	5	1.0 – 5.0	2.0 – 5.0	0.335	0.738	1.0 – 5.0
Mean ± SD.		3.78±0.95	3.85±1.05			3.81 ± 0.99
M % S		75.50±18.94	77.0±21.03			76.25 ± 19.90
Complicationof PU						
Min. – Max	2	0.0 – 2.0	0.0 – 2.0	0.446	0.657	0.0 – 2.0
Mean ± SD.		1.15±0.77	1.23 ± 0.73			1.19 ± 0.75
M % S		57.50±38.48	61.25±36.67			59.38±37.39
Nursing assessment						
Min. – Max	5	0.0 – 5.0	1.0 – 5.0	1.271	0.208	0.0 – 5.0
Mean ± SD.		2.98±1.21	2.65 ± 1.08			2.81 ± 1.15
M % S		59.50±24.17	53.0±21.51			56.25±22.97
Preventive nursing measu						
Min. – Max	10	4.0 – 10.0	3.0 – 10.0	0.909	0.366	3.0 – 10.0
Mean ± SD.		6.68 ± 1.46	6.98 ± 1.49			6.83 ± 1.47
M % S		66.75±14.57	69.75±14.93			68.25±14.74
Total knowledge score						
Min. – Max	26	12.0 – 23.0	12.0 – 22.0	0.417	0.678	12.0 – 23.0
Mean ± SD.		17.48 ±2.29	17.25 ± 2.53			17.36 ± 2.40
M % S		67.21 ± 8.80	66.35 ±9.73			66.78 ±9.23

t, p: t and p values for **Student t-test** for comparing between the two groups

This table illustrates mean scores, standard deviation and significant differences of studied nurses' knowledge between El Mahalla and Benha hospitals regarding prevention of PU. It revealed that the highest mean percent score was (75.50±18.94) in Benha and (77.0±21.03) in El Mahalla hospitals regarding nurses' knowledge about“ Signs& symptoms and grades of PU ” but the lowest mean percent score was (57.50±38.48) in Benha hospital, regarding the nurses` knowledge about "complication of PU" and (53.0±21.51) regarding “Nursing assessment” in El Mahalla.

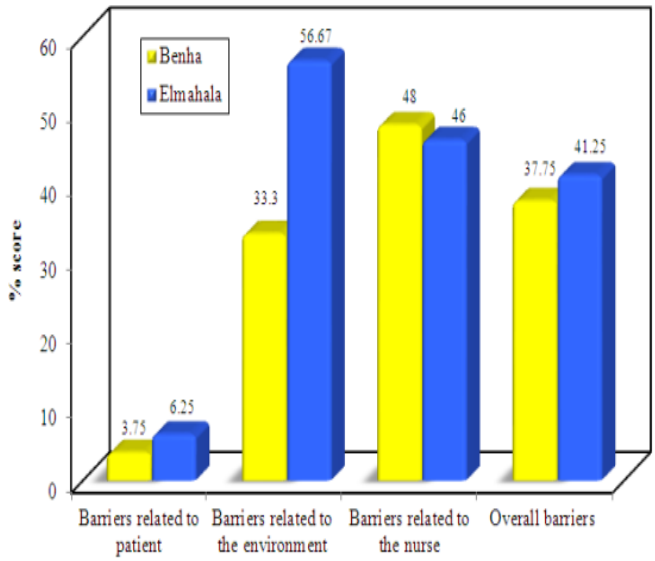
Table (3): Mean Scores, Standard deviationand Significant Differences of study subject of nurses' practice between El Mahalla and Benha hospitals toward PU prevention (n=80)

Total score	Total Score	Hospital		t	p	Total (n = 80)
		Benha (n = 40)	Elmahala (n = 40)			
Patient position and mobility Min. – Max Mean ± SD. M % S	8	0.0 – 5.0 2.40 ±1.22 30.0±15.19	0.0 – 5.0 2.65 ±1.83 33.13±22.92	0.719	0.475	0.0 – 5.0 2.53 ± 1.55 31.56±19.38
Supportive devices Min. – Max Mean ± SD. M % S	8	0.0 – 5.0 1.90±1.37 23.75±17.17	0.0 – 6.0 2.60±2.02 32.50±25.29	1.810	0.075	0.0 – 6.0 2.25 ± 1.75 28.13±21.92
Skin care Min. – Max Mean ± SD. M % S	12	0.0 – 8.0 2.68±2.08 22.29±17.34	0.0 – 7.0 2.88±2.05 23.96±17.11	0.433	0.666	0.0 – 8.0 2.78 ± 2.06 23.13±17.13
Bed sheet care Min. – Max Mean ± SD. M % S	26	10.0 – 18.0 14.10±2.09 54.23±8.02	11.0 – 19.0 14.38±2.48 55.29±9.53	0.537	0.593	10.0 – 19.0 14.24±2.28 54.76±8.77
Nutritional status Min. – Max Mean ± SD. M % S	14	2.0 – 6.0 2.85±1.39 23.75±11.56	0.0 – 6.0 2.68±2.03 22.29±16.92	0.450	0.654	0.0 – 6.0 2.76±1.73 23.02±14.42
Risk assessment Min. – Max Mean ± SD. M % S	12	0.0 – 0.0 0.0 ± 0.0 0.0 ± 0.0	0.0 – 0.0 0.0 ± 0.0 0.0 ± 0.0	-	-	0.0 – 0.0 0.0 ± 0.0 0.0 ± 0.0
Monitor progress of pressure ulcers Min. – Max Mean ± SD. M % S	14	0.0 – 7.0 0.78 ± 1.59 5.54±11.38	0.0 – 5.0 0.50 ± 1.52 3.57±10.85	0.790	0.432	0.0 – 7.0 0.64 ± 1.55 4.55±11.09
Total performance score Min. – Max Mean ± SD. M % S	94	15.0 – 42.0 24.58 ± 6.76 26.14 ± 7.19	14.0 – 40.0 25.58 ± 7.89 27.21± 8.40	0.608	0.545	14.0 – 42.0 25.07 ± 7.32 26.68± 7.79

t, p: t and p values for **Student t-test** for comparing between the two groups
*: Statistically significant at $p \leq 0.05$

This table shows mean scores, standard deviation and significant differences of studied nurses` practice between El Mahalla and Benha hospitals toward PU prevention (n=80). It was noticed that; the highest mean percent score was in relation to bed sheet care by the nurses in both hospitals (54.23±8.02, 55.29±9.53), respectively, but the lowest mean percent score in both hospitals were monitor progress of pressure ulcers (5.54±11.38, 3.57±10.85), respectively. On the other hand, in both hospitals, no one of the nurses got score regarding risk assessment practice.

Figure (1): The ranking for perceived barriers by the studied nurses according to mean percent score between El Mahalla and Benha hospitals.



This figure shows that the highest mean percent score for barriers of practice in Benha (48.0 ± 10.91) related to the nurse, and environment (33.33 ± 0.0), and related to patient (0.08 ± 0.27). In El Mahalla hospital, the highest mean percent score in ranking for nurses' perceived barriers was (**56.67 ± 15.47)** related to environment, (**46.0 ± 9.28)** related nurse, and (**6.25 ± 16.75)** related to patient

Table (4): Relation between Benha and El Mahalla hospitals according to nurses' knowledge and practice (n = 80)

Variables	Hospital				χ^2	p
	Benha (n = 40)		Elmahala (n = 40)			
	No.	%	No.	%		
Nurses' knowledge about P prevention						
<60 % Unsatisfactory	6	15.0	11	27.5	1.867	0.172
≥60 % Satisfactory	34	85.0	29	72.5		
Nurses` practice regarding P prevention						
<75 % Unsatisfactory	40	100.0	40	100.0	–	–
≥75 % Satisfactory	0	0.0	0	0.0		

χ^2, p: χ^2 and p values for **Chi square test** for comparing between the two groups
*: Statistically significant at $p \leq 0.05$

This table illustrates the number and percentage distribution between two studied hospitals according to nurses' total knowledge and practice (n = 80). It was noticed that; the majority of nurses had satisfactory knowledge in Benha and El Mahalla hospitals (85% and 72.5%), respectively. On the other hand, all of nurses had unsatisfactory practice in Benha and El Mahalla hospitals.

Table (6): Correlation between knowledge and practice and barriers in each hospital

Variables	Benha (n = 40)		Elmahala (n = 40)	
	r	p	r	p
Knowledge VS Practice	**0.491***	**0.001***	**0.447***	**0.004***
Knowledge VS barriers	**0.115**	**0.479**	**0.026**	**0.874**
Practice VS barriers	**0.075**	**0.644**	**-0.512***	**0.001***

r: Pearson coefficient
*: Statistically significant at $p \leq 0.05$

This table illustrates the correlation between overall nurses' knowledge , practice and barriers in each hospital .It revealed that; there was statistically significant positive correlation between level of nurses' knowledge and practice in Benha and El Mahalla (p=0.001* and 0.004*),respectively. Also, it shows that there was statistically significant negative correlation between nurses' practice and perceived barriers by nurses in El Mahalla hospital (p= 0.001*).

DISCUSSION

Part I: - Sociodemographic characteristics for nurses

According to personal characteristics of the studied nurses which included in this study, half of subject`s nurses in Benha and nearly half in El Mahalla hospitals their age ranged from **20-30 and > 30-40** years old ,respectively. The finding in Benha hospital is agreement but disagree at El Mahalla hospital with **Qaddumi&Khawaldeh, 2014**study about "Pressure ulcer prevention knowledge among Jordanian nurses: a cross- sectional study", whose revealed that half of nurses had age from **26-30** year and **13.8%** had age from **30-40** years old.

Regarding to nurses` level of qualification, more than one third in Benha and EL Mahalla had bachelor degree. This study is disagree with **Nuru et al., 2015**, whose found in their study about "Knowledge and practice of nurses towards prevention of pressure ulcer and associated factors in Gondar University Hospital, Northwest Ethiopia", that nearly two third of subject nurses had bachelor degree.

In addition to, the majority of nurses in both hospitals were female. This study is agreement with**Albuquerque et al., 2014,** who found in their study titled "Assessment and prevention of pressure ulcer by nurses from intensive care about" knowledge and practice", that the most of subjects nurses were female.

Regarding to nurses` years of work experience, more than two third of nurses had from 2to5 years of experience. This study is disagreement with **Mwebaza et al., 2014**, who found in their study about "Nurses' Knowledge, Practices, and Barriers in Care of Patients with Pressure Ulcers in a Ugandan Teaching Hospital", that more than one third had more than 6 years of experience.

Concerning to subject nurses` area of work, more than one third of nurses in Benha and in El Mahalla are worked at orthopedic department that is disagreement with **Mohamed &Weheida, 2014**, who found in their study about "Effects of implementing educational program about pressure ulcer control on nurses' knowledge and safety of immobilized patients", that half of nurses are worked in ICU department.

The present study revealed that the most of nurses in both hospitals were at orthopedic department because there were many conscious and bedridden patients. In addition to the most of functional level of patient in both hospitals require help from another person and equipment or device, this is harmony with **Williams& Wilkins2013**who mentioned in study about "Nursing Care Planning Made Incredibly Easy", the patients are required help from another person and assistance devices.

Part II: The level of nurses` knowledge toward prevention of PU

The findings of the present study revealed that the nurses` knowledge about signs & symptoms and grades of PU had high mean percent score in Benha and El Mahalla hospitals. This result is disagreement with**Aathi2013,** who found in his study about "Knowledge of Nurses Regarding Prevention Pressure Ulcer"**,** they had high mean percent score about the concept of pressure ulcer.

In addition to,**Tirgari, Mirshekari&Forouzi, 2018,**whose found in their study titled "Pressure Injury Prevention: Knowledge and Attitudes of Iranian Intensive CareNurses" thatnutrition category had the highest mean score and 2 categories, etiology, development and classification & observation had the lowest mean score which are disagreement with the present study`s results. This was attributed to nurses monitor the patient for pressure ulcer that gives them information about signs and symptoms and grades.

Part III: Nurses' practice related to prevention of PU

Also, the present finding showed that the highest mean score for nursing practice was the bed sheet care in both hospitals, this goes in line with **Bates 2016,** who reported in his study about " Role of dressings in pressure ulcer prevention", that the nurses used clean and dry sheets without wrinkles and using the technique of bed making which are important to promote comfort and prevent skin breakdown.

Also, the findings represented the lowest mean percent score in both two hospitals as regard risk assessment that contrast with **Islam,Sae-Sia&Khupantavee 2010,** who found in his study about "Knowledge, attitude, andpractice on pressure ulcer prevention among nurses in Bangladesh", that the nurses had moderate level of as regard risk assessment practice according to mean percent score.

The current findings show that the highest frequency of barriers was related to environment in El Mahalla hospital, but in Benha hospital it was related to the nurses. On the other hand, the area of patients was the lowest barriers in both two hospitals. **Mirshekari, Tirgari, &Forouzi, 2017,**who found in their study titled "Intensive care unit nurses' perceived barriers towards pressure ulcer prevention in south east Iran"**.,**thatthe heavy workload/staff shortage perceived highest barrier towards pressure ulcer prevention and uncooperative patients' achieved the lowest perceived barriers score. This result reported that this hospital doesn't have enough budget to solve the defect of resources.

The present study results revealed that the majority of nurses in both two hospitals had satisfactory knowledge for pressure ulcer prevention, this is disagree with **Nasreen ,Afzal, &Sarwar , 2017** who found in their study about " Nurses KnowledgePractices Toward Pressure Ulcer Prevention In GeneralHospital Lahore" that the nurses' knowledge level regarding pressure ulcer prevention was poorbut, it is agree with **Dilie&Mengistu, 2015**, whose found in their study about "Assessment of nurses' knowledge, attitude, and perceived barriers to expressed pressure ulcer prevention practice in Addis Ababa government hospitals, Addis Ababa, Ethiopia ", that more than half of the nurses had good knowledge about pressure ulcer

prevention .This may was because of increasing numbers of bedridden patient with pressure ulcer that increase the knowledge for nurses about pressure ulcer or nurses had past courses about pressure ulcer prevention .

The present study results revealed that all of nurses had unsatisfactory practice for pressure ulcer prevention, this is agree with **Nasreen,Afzal&Sarwar, 2017** who found in their study about " Nurses KnowledgePractices Toward Pressure Ulcer Prevention inGeneralHospital Lahore." the subjects` nurses' practice toward pressure ulcer prevention was poor.

Part IV: **-Relation and correlation between study subject ofnurses` knowledge, practice and their perceived barriers and their demographic characteristics toward pressure ulcer prevention.**

The present study revealed that, there was statistically significant correlation between nurses' practice and barriers in El Mahalla hospital, this is agreement with **Al-Ghamdi 2017**, who found in his study about "Factors Affecting Nurses' Compliance in Preventing Pressure Ulcer Among Hospitalized Patients at King Abdulaziz University Hospital ", that, it is a significant correlation between barriers and nursing compliance in prevention of pressure ulcer practice.

On the other hand, there is statistically significant correlation between nurses' knowledge and practice in both two hospitals, this is in the same line with **Taha 2014,** study titled " Nurses knowledge and practices related to pressure ulcer at intensive care unit**",** but it is disagree with **Islam,Sae-Sia&Khupantavee, 2010**and**Oseni , 2018,** whose reported that there wasn`t statistically significant correlation between level of nurses' knowledge and practice

CONCLUSION:

According to the results of the present study, it concluded that nurses` knowledge about PU and its prevention was satisfied, but, studied nurses` practice was unsatisfied. The highest mean percent nurses' knowledge score in El-Mahalla and Benha Hospitals was regarding to signs & symptoms and grades of PU, but, the lowest mean percent score in Benha Hospital was regarding complications of PU and regarding nursing assessment in El Mahalla Hospital. Also, the highest mean percent nurses` practice score was concerning to bed sheet care and the lowest mean percent nurses` score was regarding risk assessment. Also, from the highest mean percent score by ranking for barriers of practice in Benhawas related to the nurse, environment and patient, while in El Mahalla was related to environment, nurse and related to patient. There was statistically significant correlation between level of nurses' knowledge and practice in Benha and El Mahalla, also, between nurses' practice and perceived barriers by nurses only in El Mahalla hospital.

RECOMMENDATIONS

Based on the findings of the current study, the following recommendations are suggested:

1-Nurses should be given further trainings for to enhance their knowledge on pressure ulcer prevention and practice.

2- Policy makers should prepare policies and guidelines to prevent pressure ulcer in hospitals and make it available to all nurses.

3- Conducting training program for nurses to improve their knowledge and practice toward pressure ulcer prevention

To Health Service Managers

4-Health service managers should identify the perceived barriers of care and then minimize these barriers as much as possible to prevent pressure ulcer.

5-They also should recruit nurses to balance their numbers with the respective patient in order to provide interventions such as pressure ulcer prevention.

- Recommendations of further studies:
  -Develop of a health educational program for nurse's management toward PU prevention
  -Effect of nursing guidelines intervention for a patient with PU on the nurse performance and patients` outcome.

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