

Effect of an Educational Program on Nurses' Performance Regarding Reducing Pressure Ulcer and Safety of Immobilized Patients

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Abstract

Background: Pressure ulcers remain a prevalent concern in hospitals and the community. It affects any patient, regardless of age or gender yet, it is more prevalent in immobile patients. Aim of this research was: To assess influence of an instructional program on nurses' performance related decreasing pressure ulcer and safety of immobilized patients. hypotheses: H1: The mean post-test nurses' knowledge and practice score will be considerably higher than pre-test knowledge and practice score. H2: Shows reduced pressure ulcer for patients after adopting program compared to preprogram participants. Design: A quasi-experimental design was adopted. Setting: This research was done in the orthopedic department of Benha University Hospital. sample: (convenience sample) all available nurses (n=50) &(Purposive sampling) (n=80) patients at orthopedic department Tools: four tools were utilized, I Interview Questionnaire, II Observational check list for nurses' practice ,III Braden Scale &Inpatient's' Assessment questionnaire Results: This study showed only 22 percent , 20of studied nurses had good level of total (knowledge, practice) about pressure ulcer at pre implementation of program, however immediately post implementation of program changed to 80 percent ,86 but after one month follow up slightly decline in level of knowledge was observed to 74 percent ,80 respectively. Conclusion The educational program is extremely efficient in improving (knowledge and practice) related lowering of pressure ulcer and Safety of immobilized orthopedic, which validated the research hypotheses Recommended Provide continual education and training sessions for nurses caring for immobilized patient to increase their knowledge and practice concerning pressure ulcer prevention.

Key words: Pressure ulcer, Patient safety, Education program, Reducing, Immobilized patients-Nurse-Performance.

1.Introduction

Long-term bed rest or sitting may lead to pressure ulcers, also known as pressure injuries in the US, Canada, and Australia. It has been demonstrated in various investigations that PUs are a source of morbidity, death, pain, and impaired health-related quality of life. (23).

In terms of volume, the skin is our biggest organ and serves as our first line of protection against the outside world. it serves as Protector, Regulator, Sensor, Metabolism and Communicator. Pressure ulcer is the main condition which emerges when tissue damage, ischemia and tissue necrosis has been occurring. It is prominent in bedridden patient. (20).

NPUAP defines a pressure ulcer as "localised injury to the skin and/or underlying soft tissue commonly over a bony prominence or associated with an external medical or other device as a consequence of excessive pressure." (Source) (21).

As the description of a pressure ulcer suggests, the development of such damages may occasionally be ascribed to medical equipment that are imposed on the patient's body. When it comes to assessing patient safety and the quality of treatment they get, medical device-related pressure ulcers (MDRPU) are seen as a crucial indication (15).

The emergence of pressure ulcers may be related with many concerns for the patient and the healthcare providers such as the feeling

of pain, loss of autonomy, poor quality of life, increased duration of hospital stay, increased risk of infections and an increased mortality rate (29). (29).

Hospitals and the general public are still plagued with pressure ulcers. There is a higher incidence among people who are unable to move, but it may affect anybody. In the recent years, there has been tremendous effort to minimise the frequency of pressure ulcers and accompanying injury. Nurses play a critical role in the prevention and treatment of this condition by providing moisturising cream to the patient's skin on a regular basis and employing pillows to keep the patient in the proper posture (24).

Systematization of Nursing Assistance in care and treatment might benefit from the identification of individual risk factors. Patients in hospitals benefit from the methodical care planning made possible by scales used to measure their risk of acquiring PU. These injuries may then be diagnosed, treated, and prevented. The Braden Scale is one of the tools that allow to identify the risks of developing PU, in addition to helping nursing professionals to design better the development of the care prescriptions supplied these patients (16). \sThe nursing process bases the organisation, in a methodical fashion, for the provision of care by the nursing profession. Patients' requirements and the nurse's role in meeting them are all addressed in the paperwork. Thus, the multidisciplinary

health team, including the nursing team, has to employ tools that can daily categorise patients at greater risk of PU and implement preventative interventions. (6). Patient safety is a global public health challenge, which has led the World Health Organization, in partnership with the International Classification for Patient Safety (ICPS), to characterise it as the act of avoiding, preventing or improving adverse results or injuries caused in the medical-hospital care process. (10). The most often discussed medical subject is the safety of the patient. Falls, hospital-acquired infections (HAIs), hospital-acquired pneumonias (HAPs), and pressure ulcers developed in the hospital are all common patient safety outcomes in the nursing industry (HAPU). These results question the quality of care. (17) The number of nurses has been found to have a major influence on patient-safety outcomes, but the organisation of the nursing workforce has received less consideration. (32). Pressure ulcer is a serious healthcare concern around the globe. Nurse educators should be held accountable for the improvement of their students' knowledge, abilities, and attitudes related to pressure ulcer prevention, and they should set aside enough time to do so utilising a variety of instructional approaches. In this research we investigate impacts of education regarding prevention of pressure ulcer on knowledge and attitudes of nursing students. (31).

2. Aim of the Study

The current research aims to assess influence of an instructional programme on nurses' performance related decreasing pressure ulcer and safety of immobilised patients.

Research hypotheses

To fulfill the aim of this study, the following research hypotheses were formulated:

- **H1:** The mean post-test nurses' knowledge and practice score will be significantly higher than pre-test knowledge and practice score .
- **H2:** Shows reducing pressure ulcer for patients post implementing program comparing to preprogram

Research design: A quasi-experimental design was utilized to achieve the aim of the study.

Setting: The study was conducted in orthopedic department at Benha university hospital; the orthopedic department has 17 room, include 68 beds.

Sampling type:

of 50nurses was recruited in the present study& Purposive sampling) (n=80) patients
A convenience sample

Tools of data collection

Four tools were used to collect data for this study:

Tool I - Interview Questionnaire, it was designed by the researcher through a review of recent relevant literatures and scientific references. It included two parts as the following:

- Part (1): Nurses' demographic characteristics: This part was concerned with assessment of nurse demographic characteristics related to their age, sex, residence, educational qualification, years of experience in nursing, years of work in the care of orthopedic patients and training courses in reducing of bed sores.
- Part (2): Nurses' knowledge assessment questionnaire (pre/post):

It designed to assess the nurses' knowledge related to pressure ulcer was, adapted from Mohamed&Weheida (2015) consisted of the following questions:-

- Concepts of pressure ulcer and possible complications (19 questions).
- Infection control regarding PU (4 questions).
- Preventive nursing care for PU (11 questions).
- Health education for patients (4 questions).

Knowledge scoring system:

All knowledge variables were multiple choice questions. The total numbers were 38questions; they were scored as the following.

- Each correct answer was given one score.
- Each incorrect' 'unknown or wrong" answer was given zero. With total knowledge score ranged from 0to 38.
- The knowledge score converted into percentage and categorized into:
- >75% was considered good level of knowledge.
- 50 – 75% was considered average level of knowledge.
- <50% was considered poor level of knowledge.

Tool II- Observational check list for nurses' practice (pre/post) :

It designed by the researcher aimed to assess nurses' practice to reducing of pressure sores it was adapted from Ostendorf.et al,(2016), Linton.et al,(2017)&Patricia.et al, (2017) it was included items regarding patients' position (turning patient), skin assessment, use supportive devices, bed sheet

care and improve nutritional status. This tool was filled three times; the first time before the educational program implementation, the second time immediately after educational program implementation the third time after one month educational program implementation.

The total score was distributed as the following:

- Patients' position (turning patient) (4 steps).
- Use supportive devices (4 steps).
- Skin care (6 steps).
- Bed sheet care (14 steps).
- Improve nutritional status (5 steps).
- Risk assessment (5 steps).

Nurses' practice scoring system:

Practices scoring were distributed as, each step scoring from 0-2.

- Done correctly was scored as (2)
- Done incorrectly was scored as (1)
- Not done was assigned a scored as (0)

Total score of nurses' practice was classified into:

- $\geq 75\%$ was considered satisfactory level of practice.
- $< 75\%$ was considered unsatisfactory level of practice.

Tool III - Braden Scale (pre/post):

The Braden scale is a highly reliable instrument in the identification of patients at high risk of pressure ulcers (Bergstrom & Braden, 1987)&(Adibelli& Korkmaz 2019) " risk assessment tool in predicting pressure ulcers" It was be used to assess knowledge about how to identify patients at risk for pressure ulcer.

It is a summated rating scale composed of six subscales: sensory perception, mobility, activity, moisture, nutrition, and friction and shear. The six subscales are rated from 1 (least impaired) to 4 (most impaired), except friction and shear, which rates from 1-3.

Braden Scale total score range

- Low risk: total score 18-23
- Moderate Risk: total score 11-17
- High risk: total score less than 11

Tool IV- Patients' Assessment questionnaire: It was included two parts as following:

- Part (1): Patients' Socio-demographic characteristics: This part was concerned with assessment of patients' socio-demographic characteristics related to their age, sex, educational level, marital status .
- Part (2): Medical History: It was designed by the researcher to identify diagnosis on admission , chronic disease (D.M, renal

disease and others), weight , circulatory disorder and length of hospital stay(days).

Pilot study:

Pilot Study

Pilot study was conducted on 5 nurses (10%) of all nurses and also 8 patients (10%) of all patients at orthopedic department in order to test the clarity and applicability of the study tools and the guidelines, to estimate time needed for filling the sheets as well as to identify any possible obstacles that may hinder data collection. There were some modifications done to the developed tools. Nurses involved in the pilot study were excluded from the main study. The pilot study was done two weeks before starting the study.

Content validity:

The face and content validity were ascertained for comprehensiveness, relevance, simplicity, clarity and ambiguity through a jury of five experts from medical surgical nursing department, faculty of nursing, Benha University (two professor and three assistant professors). Also a prepared developed educational program which covered all items related to (nurses' performance regarding reducing pressure ulcer and safety of immobilized patients) based on newest current literature was revised by the same experts and all recommended modifications were done.

Tool reliability:

Reliability was testing statistically to assure that the tool were reliable before data collection. Cronbach's alpha for Nurses' knowledge assessment questionnaire 0.813, for braden Scale 0.841 and Observational check list for nurses' practice was 0.836

3.Results

Table (1) shows the distribution of the studied nurses according to their demographic characteristics. It was observed from the table that 56% of the studied nurses' aged between 30 to less than 45 years old and the nurses was mean age of 34.6 ± 10.6 years; females were more prevalent and constituted 76% of the studied nurses. As well, 50% were graduated from technical institute of nursing. Moreover, 56% of them had 5 to less than 10 years of experience in the orthopedic department with Mean \pm SD = 9.71 ± 5.2 years. Furthermore, 32% had attended training courses on how to prevent pressure ulcer and 62.5% of them attended only one course.

Figure (1) illustrates that, only 22% of the studied nurses had good level of total knowledge about pressure ulcer at pre implementation of program, however immediately post implementation of program changed to 80%, but after one month follow up

slightly decline in level of knowledge was observed to 74%, respectively

Figure (2) illustrates that, only 20% of the studied nurses had satisfactory level of total practice to reducing of pressure ulcer and safety of immobilized patients at pre implementation of program. While increased to 86% immediately post implementation of program, but there was a slightly decline in these results at one month of follow up to 80%.

Table (2) shows the distribution of the studied patients according to their personal characteristics. It was found that 40% of the studied patients' aged between 30 to less than 45 years old. The mean age of the studied patients was 52.9 ± 12.5 years; males were more prevalent and constituted 72.5% of the studied patients, 62.5% of them were married. As well, 60 % of them were intermediate education. Moreover, 67.5% were workers, while 59.3% of them need physical effort in work and 72.5% lived in rural areas.

Figure (3) illustrates that, 75% of the studied patients had severe level of risk for pressure ulcer pre implementation of program. While decreased (improved) significantly immediately post implementation of program to 12.5% and to 5% after one month follow up of program implementation.

Table (3) shows the correlation between the total mean scores of knowledge and the total mean of practice among the studied nurses. There were high statistically

significant positive correlation between nurses' knowledge and their practice throughout the program phases ($r=0.487, 0.503$ & 0.513 respectively at $p < 0.01^{**}$).

Table (4) shows the correlation between the total mean scores of knowledge, the total mean of practice among the studied nurses and total mean of Braden scale scores among the studied patients, there was significant statistical correlation between nurses' knowledge, practice and total Braden scale of the studied patients pre implementation of program $p < 0.01$. Also, there was significant statistical negative correlation between nurses' knowledge, practice and total Braden scale of the studied patients at immediate post and after one month of implementation of the program ($r=0.214, -0.413$ & -0.404 at $p=.014, p=.000$ & $p=.000$ respectively) and ($r=0.226, -0.427$ & -0.419 at $p=.012, p=.000$ & $p=.000$ respectively).

Table (5) Multivariate linear regression model in this table presents that pressure ulcer among the studied patients after implementation of the program which assessed by Braden Scale was best predicted by patients' age, weight, chronic disease, and length of hospital stay accounting for 9.953% of the variance of Braden Scale assessment of patients at risk for pressure ulcer as well as there was highly significant statistical positive effect on total patients Braden Scale at ($p = < 0.01^{**}$).

Table (1): Distribution of nurses according to their demographic characteristics (No=50).

Nurses' personal characteristics	Studied sample (n=50)	
	N	%
Age (year)		
18-<30	15	30
30-<45	28	56
45-<60	7	14
Mean \pmSD	34.6\pm10.6	
Range	22-56	
Sex		
Male	12	24
Female	38	76
Education qualification		
Nursing Diplome	8	16
Nursing Diplome + specialty	8	16
Technical Institute of Nursing	25	50
Bachelor of Nursing	9	18
Postgraduate Studies	0	0.0
Years of experience in the orthopedic department		
2 yrs.	5	10
3-<5 yrs.	10	20
5-<10 yrs.	28	56
≥ 10 yrs.	7	14
Mean \pmSD	9.71\pm5.2	
Range	2-32	
Attending any training courses on how to prevent pressure ulcer?		
Yes		
No	16	32
If yes, how many training courses have you attended? (n=16).	34	68
One	10	62.5
Two	4	25
Three	2	12.5

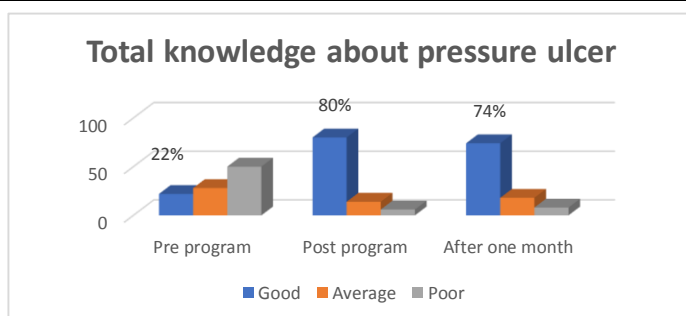


Fig 1: Distribution of the studied nurses according to total knowledge about pressure ulcer at pre, post and after one month of educational program (n=50).

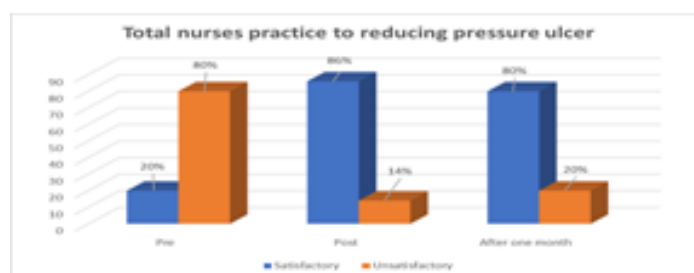


Fig 2 : Percentage distribution of the studied nurses according to their total practice to reducing of pressure ulcer and safety of immobilized patients at pre, post and after one month of educational program (n=50).

Table (2): Distribution of the studied patients according to their socio-demographic characteristics (No=80).

Patients' personal characteristics	Studied sample (n=80)	
	N	%
Age (year)		
18-<30	12	15
30-<45	32	40
45-<60	25	31.3
≥ 60	11	13.7
Mean ±SD	52.9±12.5	
Range	18-67	
Sex		
Male	58	72.5
Female	22	28.5
Marital status		
Unmarried	15	18.8
Married	50	62.5
Widowed	10	12.5
Divorced	5	6.2
Educational level		
Illiterate	8	10
Read and write	12	15
Intermediate education	48	60
University education	12	15
Working status		
Working	54	67.5
Not working	26	32.5
If yes, what is the nature of work? (n=54).		
Need physical effort	32	59.3
Need mental effort	10	18.5
Need physical and mental effort	12	22.2
Residence		
Rural	58	72.5
Urban	22	27.5

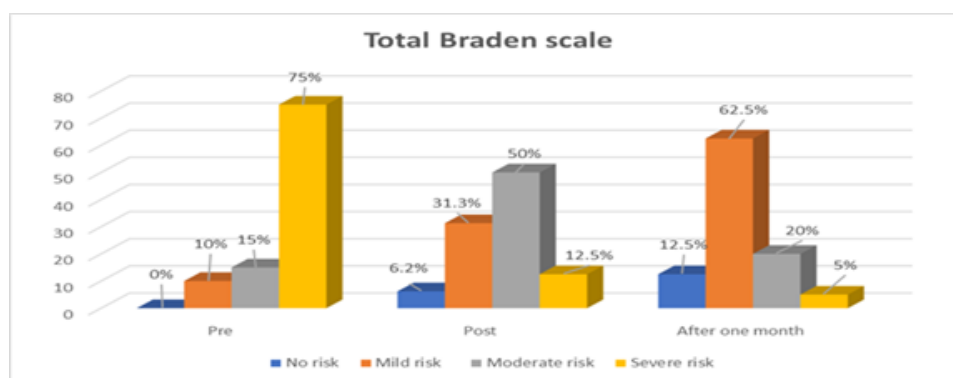


Fig 3: Percentage distribution of the studied patients according to Braden scale at pre, post and after one month of the program (n=80).

Table (3): Table (21): Correlation between total nurses' knowledge score and their practice score throughout the program phases (No=50).

Variables	Total nurses' practice			
	Pre	Post	After one month	
Total nurses' knowledge	r	0.487	0.503	0.513
	p	.000**	.000**	.000**

****highly significant at p < 0.01.**

Table (4): Correlation between total nurses' knowledge and practice at pre, post and after one month implementation program and total Braden scale of the studied patients.

Variables	Total Braden scale			
	Pre	Immediate Post	After one month	
Total nurses' knowledge	r	0.214	-0.413	-0.404
	p	.014*	.000**	.000**
Total nurses' practice	r	0.226	-0.427	-0.419
	p	.012*	.000**	.000**

****highly significant at p < 0.01.**

Table (5): Multiple linear regression analyses for predictor variables of pressure ulcer among the studied patients after implementation of the program (n=80).

Predictor variables	Braden Scale to assess patients at risk for pressure ulcer				
	Standardized Coefficients		Unstandardized Coefficients	T	P value
	B	SEB	β		
Age	.073	.021	.158	2.957	.009
Weight	.086	.030	.184	3.501	.000
Presence of chronic disease	.081	.029	.180	3.400	.001
Length of hospital stay	.119	.051	.214	4.214	.000
Constant	1.299	.274		2.957	.009
Regression=	F= 9.953,		P = .000		

(**) Highly significant statistically
(SEB): Standard Error

(*) Significant statistically

(B): Beta Co-Efficient

4. Discussion

Pressure ulcers are characterised as "an injury that tears down the skin and underlying tissue. They're called "bed sores" or "pressure sores" because they develop when a pressure point on the skin becomes infected. Individuals of all ages, including the elderly, who have special medical requirements such as a lack of mobility or cognitive impairment, or who need palliative or end-of-life care, may develop pressure ulcers. Other relevant variables include diabetes, poor bladder or bowel

function, or dietary and hydration impairment (Webster, 33). (Webster, 33).

More than half of the nurses in the present research were between the ages of 30 and 45, according to the findings. According to the researcher, this finding might be explained by the fact that the bulk of the study's participants were mid-career orthopaedic nurses rather than new entrants. This findings coincide with Ebi, Hirko, & Mijena (8) who did a research named " Nurses' awareness on pressure ulcer prevention in public hospitals in

Wollega " whose results indicated that the majority of nurses were 38-47 years old. Therefore this results disagree with Mohamed & Weheida, (26) who stated in his study entitled "Effects of implementing educational programme about pressure ulcer control on nurses' knowledge and safety of immobilised patients" whose results revealed that the majority of nurses were less than 30 years old. There is a discrepancy between this conclusion and that of Mohsin and Atiyah (27), who performed an investigation into the knowledge of Orthopaedic Ward nurses about cast complications and found that the majority of them were in the age range of (23-27). Also this conclusion contrast with Qaddumi& Khawaldeh,(25) research regarding "Pressure ulcer prevention knowledge among Jordanian nurses: a cross- sectional study", which indicated that half of nurses had age from 26-30 year and 13.8 percent had age from 30-40 years old.

As regards gender, the majority of examined nurses were female. From the researcher's point of view this outcome may be because to guys learnt nursing lately in recent years, and before that, most of the nursing education was done by females. This research in agreement with Ali (26) study on "Relationship between Nurses` Awareness, Practice and their Perceived Barriers towards Pressure Ulcer Prevention" who revealed that the majority of the sample were female . The findings of Albuquerque et al. (28) are also in accord with this research "Nurses in critical care were asked to assess and prevent pressure ulcers based on "knowledge and practise," and the majority of the patients were female. In addition, these findings are in line with Haleema & Thair's (30) research on "An investigation into how nurses prevent orthopaedic wound infection. Thesis, University of Baghdad, College of Nursing "that the majority of the population was female. According to Hassan(31), who performed a research titled "Impact of teaching guidelines regarding avoidance of pressure injuries among newborns in critical care unit," the majority of the nurses evaluated (84 percent) were women.

Concerning to educational qualification, the research found that half of the investigated nurses had been graduated from technical institute of nursing. Many students attend Benha University's nursing technical institutes, and many of them graduate within two years, according to the researcher's hypothesis. Therefore, the number of graduates of the technical institution is larger than any educational level of nursing. This finding is in

line with that of Mohamed & Weheida(26), who found that the majority of registered nurses had only had a secondary education. Also, Al-Barwari,(27) who discovered in their research on "Evaluation of Nursing Knowledge and Practices Concerning Nursing Care of Patient with Skin Traction in Orthopedic Units in Kurdistan Region" study indicated that majority of the study participants were secondary nursing graduates.

Regarding to years of experience in the orthopaedic department, this present research demonstrates that the more than half of the investigated nurses were having 5 to less than 10 years of experience. From the researcher's point of view this result may be due to the years of experience they have are consistent with their ages, this result was disagree with Lotfi et al., (22) mentioned in their study about " Iranian nurses' knowledge, attitude and behaviour on skin care, prevention and management of pressure injury "these study illustrates that almost third of them had more than 14 years of experience, this result is disagree with Al-Barwari,(23) study results who indicated that more than half of nurses have 1-5 years of experience in the care of orthopaedic patients . consequently this finding conflict with Mohsin& Atiyah,(27) whose data showed that the bulk of the nurses years working in nursing varied from (1-5) years. According to Bader(28)research,)'s which was published under the title "Nurses' attitudes and behaviours concerning orthopaedic wound infection are being studied. Baghdad University's College of Nursing master's thesis "Nearly half of the research sample had at least one year of orthopaedic patient care experience.

Finally, when it comes to pressure ulcer prevention training, virtually all of them lacked formal instruction. According to the study's findings, the lack of pressure ulcer prevention training at the hospital may be to blame for these outcomes. They conducted a study on "Caregivers' knowledge and practise toward pressure ulcer prevention in national orthopaedic hospital," and the results show that nearly all of the study nurses did not participate in sessions relating to pressure ulcer prevention in orthopaedic patients. Ingwu (14) found the same thing. And consistent with Lotfi et al., (22) demonstrates that majority of study nurses not have training concerning pressure ulcer. Nearly majority of the study nurses did not take part in training sessions relevant to immobilised patient care, as shown by Al-Barwari,(21) research.

Regarding nurses complete knowledge ,

The research demonstrated that considerable improvement in nurses' knowledge regarding pressure ulcer after implementation of programme with a highly statistically significant difference at ($P = < 0.01^{**}$) between pre, immediate post and after one month follow up of the programme implementation. These results show that the educational programme has been successful in raising the knowledge of nurses. From researcher's points of view, this improvement was significantly associated with more familiarity and understanding of the educational programme, reinforcement of sessions, uses of multiple media as booklet with colourful and laptop to increase clarification and understanding, successful method to increase nurses' knowledge about pressure ulcer, take feedback during every session. This result was consistent with Kathirvel, et al., (18) in the study entitled "Impact of structured educational interventions on the prevention of pressure ulcers in immobile orthopaedic patients in India: A pragmatic randomised controlled trial" showed statistically significant improvement in knowledge on the prevention and management of PU. According to Kim, Park & Kim (19), who conducted a research on the topic, I'm in agreement "A meta-analysis and systematic review of the impact of pressure injury training for nurses. Skin and wound care innovations "The improvement in knowledge scores for PIs was not only statistically significant immediately after executing the programme, but it also increased after 6 to 12 months.

In terms of the overall number of nursing assignments, The study found that nurses' practises toward patient position, mobility, use of support devices, skin care, bed sheet care, and improvement in nutritional status and risk assessment improved significantly after implementation of the programme, with a highly statistically significant difference at ($P = 0.01^{**}$) between pre, immediately after, and one month after the program's implementation's implementation. Which demonstrate the favourable influence of the educational programme on enhancing nurses' level practise. From the researcher's point of view this outcome may be attributed to utilisation of many media like videos and laptop to enhance clarity the abilities. Recognize comments throughout the session. Apply techniques for study nurses to boost competency. Seo & Roh's findings back up this assertion (18). They did a research project on the subject "Training nurses in long-term care facilities to reduce pressure ulcers. The current state of nursing education "A pressure ulcer

audit and feedback regional programme at 1 and 2 years in nursing homes: A prospective longitudinal study was conducted by Righi et al. (19) and they found that significant improvements in preventive practise — patient repositioning, anti-decubitus bed o — were made by nurses who had received the pressure ulcer prevention training.

Regarding to patients' personal characteristics; the findings of the present research showed that fewer than half of the examined patients' aged from 30 to < 45 years, reveals that the mean age for the studied patients was 52.9 ± 12.5 years old Therefore this conclusion conflicted with El-Saidy & Aboshehata (9), who did a research named "Effect of Skin Care and Bony Prominence Protectors on Pressure Ulcers among Hospitalized Bedridden Patients" and noted that mean age for the examined patients was 48.7 ± 13.3 years old. According to the researchers, this may be due to a number of things, including sample selection criteria and the fact that accidents are more likely to occur among those in the older age groups, if not even older ones. As for gender, the findings of the current research demonstrated that the majority of patients' were males and more common. This result was agreed with the study done by Kathirvel et al., (18) whose study was about "Impact of structured educational interventions on the prevention of pressure ulcers in immobile orthopaedic patients in India: A pragmatic randomised controlled trial" and reported that the more than half of patients' were male. This discovery was also in accordance with. Perioperative variables related with pressure ulcer formation following major surgery were the focus of a research by Kim et al. (19), whose findings indicated that men accounted for the vast majority of those affected. From a scientific standpoint, this might be explained by the well-documented fact that Egyptian males provide for their families and go to work every day, making them more prone to accidents. Concerning marital status, the current research demonstrated that the majority of analysed patients' were married, this result were in agreement with El-Saidy & Aboshehata (9) who observed that more than half of patients' were married. As respect to employment the current research demonstrated that more than half of the analysed patients' were manual labourers. This finding matched with Haisley, Sørensen, & Sollie (12) who researched "impact of Nursing Management on Pin Site Infection Among Incidence Patients with External Fixators" who discovered that two third of the analysed patients' were manual

labourers . More than half of the patients in this research had at least an intermediate level of education, according to the findings. This finding was incongruent with Kathirvel et al., (18) who observed that more over half of patients' had an education level of high school. From the researcher point of view, this may be owing to that the study was done in the governmental hospital which accommodates numerous numbers of patients' with poor socioeconomic levels with low educational level. As respects residence it was noted that more than half of the analysed patients' had resided in rural. The finding is in agreement with El-Saidy & Aboshehata(9) who reported that half of study sample were reside in rural.

Regarding total Braden scale among investigated patients' prior and after programme implementation. There was a statistically significant change ($P= 0.01^{**}$) between pre-, immediately-after-, and one-month follow-up following programme implementation in terms of overall Braden scale scores. This finding was similar the study conducted by Darmareja, Kosasih & Priambodo (10) they performed a study about "The Effect Of Effleurage Massage Using Virgin Coconut Oil On The Risk Level Of Pressure Ulcers In Intensive Care Unit Patients" they noticed that results of the analysis show that the 34 immobilised patients in the ICU who had interventions showed either an increase in their Braden Scale scores or a decrease in their PU risk levels after the interventions. Another study conducted by Alkadrie., (11) whose study entitled " The Description of Implementation of Assisted Mobilization in Stroke Patients in Several Pontianak Hospitals in Predicting the Incidence of Pressure Ulcer" supported the current finding and asserted that minimise the risk of pressure ulcers. The Braden Scale was used to determine the pressure ulcer's prognosis in stroke patients.

Regarding association between total nurses' knowledge score and their practise score throughout the programme stages. There was a strong statistically significant positive association between nurses' knowledge and practise throughout all programme stages ($r=0.487, 0.503, \text{ and } 0.513$ accordingly at $p=0.01^{**}$), according to the present research. From the researchers' point of view, nurses knowledge is enhanced lead to boost nurses practise. This conclusion was in the same line as the research done by Awad & Hewi (4) they observed that, that a significant link is established between knowledge and behaviours of the study participants, before the study treatments (Pearson correlation

coefficient = 0.467, $P = 0.002$). After the administration of the treatments, knowledge and practises are associated and the association is statistically significant (Pearson correlation coefficient = 0.763, $P = 0.001$). A research by Ramadan & Mohamed (30) found that scores of nurses' knowledge were statistically significantly correlated with scores of nurses' practise after the deployment of the bundle. As a result, Mohamed & Weheida(34) found a statistically significant association between the research group's knowledge level and practise after the implementation of the programme, confirming this results.

Concern connection between total nurses' knowledge and practise throughout the programme stages and total Braden scale of the investigated patients. Prior to the adoption of the programme, there was a statistically significant association between nurses' knowledge, practise, and the whole Braden scale (risk levels for PI), which was found in this research. Also, there was substantial statistical negative link between nurses' knowledge, practise and overall Braden scale(levels of risk for PI) of the investigated patients at immediate post and after one month of implementation of the programme. It's good news for pressure ulcer prevention experts that these results provide further evidence in favour of implementing an educational programme, as it helps nurses gain more information and improve their performance while also decreasing their risk of PI (patient safety). Okhovati, Esmaeili, and Shariat (28) found a significant statistical negative correlation between nurses' knowledge, practise, and the total Braden scale in their study entitled "Effect of intensive care unit nurses' empowerment programme on ability in visual differential diagnosis of pressure ulcer classification." additionally , the mean scores of nurses in the intervention group were substantially higher than the mean score of nurses in the control group ($P < .001$). This research demonstrates that the adoption of an empowerment programme may boost the capacity of nurses to recognise pressure ulcers and reduce in their PU risk levels . Therefore this finding agree with, Ghali ., (11) who conducted a study entitled" Incidence and risk factors of pressure ulcers in a Tunisian university hospital "who highlight those , the application of different nursing interventions resulted in a positive decrease in the incidence of pressure ulcers leading to either their prevention or at least decrease the risk of their development

The present study illustrates that pressure ulcer among the studied patients after

implementation of the programme which assessed by Braden Scale was best predicted by patients' age, weight, chronic disease, and length of hospital stay accounting for 9.953 percent of the variance of Braden Scale assessment of patients at risk for pressure ulcer as well as there was highly significant statistical positive effect on total patients Braden Scale at ($p < 0.01^{**}$). From a similar perspective, Adibelli & Korkmaz (1) found that when comparing the reliability and predictive validity of the Braden and Jackson/Cubbin scales, a decrease of .3 in the total Braden scale score was found when examining multiple linear regression analysis between the Braden scale total score and PI risk factors (age, gender, length of ICU stay, co-morbidity). 58 percent of the change in the overall Braden score was accounted for by these risk variables ($R^2 = .58$). "Nutrition" is a Braden scale item "had a statistically significant association ($r = .29$) with the scale's overall score, which was a mild, positive correlation. The Braden scale elements "Activity" ($r = .93$) and "Mobility" ($r = .95$) exhibited positive, substantial and statistically significant correlations with the overall score of the scale the Braden scale was .86 (95 percent confidence interval .800-.908)

To sum up the discussion of the current study, the study results documented that, the studied nurses patients' showed better improvement of the knowledge & practises resulting in improving their performance and patient safety immediately post and follow up as compared to pre-educational programme implementation which support the study hypothesis.

5. Conclusion

Based on the outcomes of the present research, it can be stated that educational program is extremely helpful in improving (knowledge and practice) about lowering of pressure ulcer and Safety of immobilized orthopedic, which supported the study hypothesis.

6. Recommendations

In the light of the results of this study, the following points are recommended:

- Provide continuous education and training sessions for nurses caring for immobilized patient to improve their knowledge and practice about pressure ulcer prevention
- The availability of printed booklet about pressure ulcer prevention and management will result in significantly better outcomes..
- Further researchers are proposed to investigate the effect of implementation of educational program on preventing and reducing pressure ulcer and improving

Safety of Immobilized Patients on larger sample selected from different geographical areas of Egypt to raise the efficiency of nurses' performance.

7. References

- [1] **S. Adibelli, F. Korkmaz.** Pressure injury risk assessment in intensive care units: Comparison of the reliability and predictive validity of the Braden and Jackson/Cubbin scales. *Journal of clinical nursing*.vol.28 (23-24), pp. 4595-4605, **2019**.
- [2] **M. Aghale. The Effect of Silicone Pad on the Heel and Sacral Pressure Ulcer in Patients Undergoing Orthopedic Surgery** Maedeh Alizadeha, Somayeh Ghavipanjehb, Aylin Jahanbanc, Esmail Maghsoodid. *Turkish Journal of Physiotherapy and Rehabilitation*.vol. 32,pp. 3, **2021**.
- [3] **H. Ahn, L. Cowan, C. Garvan, D. Lyon, J. Stechmiller.** Risk factors for pressure ulcers including suspected deep tissue injury in nursing home facility residents: analysis of national minimum data set 3.0. *Advances in skin & wound care*.vol. 29(4),pp. 178-190, **2016**.
- [4] **W. H. A. Awad, S. A. H. Hewi.** Effect of pressure ulcer preventive nursing interventions on knowledge, attitudes and practices of nurses among hospitalized geriatric patients in Alexandria, Egypt. *J Nurs Health Sci*.vol. 9(2),pp. 1-12, **2020**.
- [5] **D. Calder, R. Freeman, E. Domeij-Arverud, C. Dijk,** Meta-analysis and suggested guidelines for prevention of venous thromboembolism (VTE) in foot and ankle surgery. *Knee Surgery, Sports Traumatology, Arthroscopy journal of preventive medicine*,vol. 24(4),pp. 1409-1420. **2016**
- [6] **MHL Caliri, CMF Simão, CB Santos.** Concordância entre enfermeiros quanto ao risco dos pacientes para úlcera por pressão. *Acta Paul Enferm.*,vol. 26(1),pp.30-5. **2019**
- [7] **K. De Meester, P. Van Bogaert, S. Clarke, L. Bossaert** In-hospital mortality after serious adverse events on medical and surgical nursing units, Available at <https://journalclub.wustl.edu> Accessed on 17/11/2019 on 2.30am. **2019**.
- [8] **W. E. Ebi, G. F. Hirko, D. A. Mijena,** Nurses' knowledge to pressure ulcer prevention in public hospitals in Wollega: a cross-sectional study design. *BMC nursing*, 18(1). **2019**.
- [9] **T. M. K. El-Saidy, O. K. Aboshehata,** Effect of Skin Care and Bony

- Prominence Protectors on Pressure Ulcers among Hospitalized Bedridden Patients. *American Journal of Nursing*, vol.7(6), pp.912-921. **2019**.
- [10] S. Gaspar, F. Botelho Guedes, A. M. Vitoriano Budri, C. Ferreira, M. Gaspar de Matos, Hospital-acquired pressure ulcers prevention: What is needed for patient safety? The perceptions of nurse stakeholders. *Scandinavian Journal of Caring Sciences*. **2021**.
- [11] H. Ghali, R. Chouket A. Ben Cheikh, S. Khéfacha, L. Dhidah, , et al. Incidence and risk factors of pressure ulcers in a Tunisian university hospital. *Nursing and Health Care*, 4, 25-8.
- [12] Haisley, M., Sørensen, J. A., & Sollie, M. (2020): Postoperative pressure injuries in adults having surgery under general anaesthesia: systematic review of perioperative risk factors. *Journal of British Surgery*, vol. 107(4), pp. 338-347. **2019**.
- [13] F.A. Hallaj, Effect of Applying Nursing Interventions for Preventing Pressure Ulcers among Hospitalized Geriatric Patients. *ASNJ*, vol. 19 (2), pp. 57-68. **2017**.
- [14] J. Ingwu, A. Nwaordu, H. Opara, O. Israel, C. Ogbogu, Caregivers' knowledge and practice toward pressure ulcer prevention in national orthopedic hospital, Enugu, Nigeria. *Nigerian journal of clinical practice*, vol. 22(7), pp. 1014-1014. **2019**.
- [15] D. Jackson, A.M. Sarki, R. and Brooke J. Betteridge Medical device-related pressure ulcers: A systematic review and meta-analysis. *Int J Nurs Stud*, pp. 92:109-20. **2019**.
- [16] R. C. S. Jansen, K. B. D. A. Silva, M. E. S. Moura, Braden Scale in pressure ulcer risk assessment. *Revista Brasileira de Enfermagem*, 73. **2020**.
- [17] V. Kalyani, S. K. A. Mohanasundari, Patient Safety: Preventing Pressure Ulcers. *Red*, vol. 5(3) . **2021**.
- [18] S. Kathirvel, S. M. S. Kaur, Dhillon, A. Singh, Impact of structured educational interventions on the prevention of pressure ulcers in immobile orthopedic patients in India: A pragmatic randomized controlled trial. *Journal of Family Medicine and Primary Care*, vol.10(3), pp. 1267. **2021**.
- [19] J. M. Kim, H. Lee, T. Ha, S. Na, Perioperative factors associated with pressure ulcer development after major surgery. *Korean journal of anesthesiology* , vol. 71(1), pp. 48. **2018**.
- [20] J. Kottner, U. Blume-Peytavi, Reliability and agreement of instrumental skin barrier measurements in clinical pressure ulcer prevention research. *International Wound Journal*. **2021**.
- [21] A. Lechner, J. Kottner, S. Coleman, D. Muir, D. Beekman, W. Chaboyer, K. Balzer. Outcomes for Pressure Ulcer Trials (OUTPUTs) project: review and classification of outcomes reported in pressure ulcer prevention research. *British Journal of Dermatology*, vol. 184(4), pp. 617-626. **2021**.
- [22] M. Lotfi, A. M. Aghazadeh, H. Asgarpour, A. Nobakht, Iranian nurses' knowledge, attitude and behaviour on skin care, prevention and management of pressure injury: A descriptive cross-sectional study. *Nursing open*, vol. 6(4), pp. 1600-1605. **2019**.
- [23] A. Lustig, P. Alves, E. Call, N. Santamaria, A. Gefen, The sorptivity and durability of gelling fibre dressings tested in a simulated sacral pressure ulcer system. *International Wound Journal*, vol. 18(2), pp. 194-208. **2021**.
- [24] M. Mäkinen, E. Haavisto, V. Lindström, K. Brolin, M. Castrén, Finnish and Swedish prehospital emergency care providers' knowledge and attitudes towards pressure ulcer prevention. *International Emergency Nursing*, vol. 55, pp. 100873. **2021**.
- [25] S. A. Mohamed, S. M. Weheida, Effects of implementing educational program about pressure ulcer control on nurses' knowledge and safety of immobilized patients. *Journal of nursing education and practice*, vol. 5(3), pp. 12. **2015**.
- [26] A. Mohsin, H. Atiyah, Nurses knowledge Toward Cast Complications in Orthopedic Ward at Al-Najaf AL-Ashraf Hospitals., *International Journal of Scientific and Research Publications*, vol. 6(7), pp. 87-94. **2016**.
- [27] S. Okhovati, M. Esmaeili, E. Shariat, Effect of intensive care unit nurses' empowerment program on ability in visual differential diagnosis of pressure ulcer classification. *Critical care nursing quarterly*, vol. 42(1), pp. 89-95. **2019**.
- [28] H. Rafiei, Stage II pressure ulcer caused by the connection of an electrocardiogram's nonstandard probe on the patient's chest: A case report study. *International Journal of Epidemiology and Health Sciences*, vol. 1(1) . **2020**.
- [29] S. S. Ramadan, S. N. H. Mohamed, Effect of Pressure Ulcer Care Bundle on

- Nurses' Performance at the Intensive Care Unit. IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 9, Issue 6 Ser. IV (Nov. – Dec. 2020), pp 38-47 www.iosrjournals.org.**2020**.
- [30]F. E. Ursavaş, Ö. İşeri, Effects of education about prevention of pressure ulcer on knowledge and attitudes of nursing students. *Journal of Tissue Viability*,vol. 29(4),pp. 331-336.**2020**.
- [31]L. Wang, H. Lu, X. Dong, X. Huang, B. Li, Q. Wan, S.Shang, The effect of nurse staffing on patient-safety outcomes: A cross-sectional survey. *Journal of Nursing Management*,vol. 28(7),pp. 1758-1766.**2020**.
- [32]J. Webster, *Prevention of Pressure Sores. Engineering and Clinical Aspects*, 4th ed., CRC Press, USA, P20.**2019**.
- [33]S. M Weheida, S. A. Mohamed, Effects of implementing educational program about pressure ulcer control on nurses' knowledge and safety of immobilized patients. *Journal of nursing education and practice*,vol. 5(3),pp. 12.**2015**.
- [34]L.M. Wilkers, E. Bostock, L. Lovitt, G.Dennis, NursesKnowldgeof pressure ulcer management in elderly people . *British journal of nursing*. 1996; 5: 858-68. <http://dx.doi.org/10.12968/bjon.1996.5.14.858>.**1996**.
- [35]B. Yan, H. Dandan, M. Xiangli, Effect of training programmes on nurses' ability to care for subjects with pressure injuries: A meta-analysis. *International Wound Journal*.**2021**.