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Awareness of Risk Assessment and Prevention of Pressure Ulcers amongst Nurses Working in Surgical and Orthopedic Wards of a Kenyan National Hospital

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ABSTRACT

Background: Pressure ulcers (PU) are very familiar with incidences of up to 38% in acute care. They occur following prolonged period of immobility or when there is a neurological deficit. Whenever they occur, they can lead to a lengthy hospital stay, are costly, and may contribute to premature mortality in patients. Since nurses are the main care providers, this study aims to find out the level of awareness of pressure ulcer risk assessment and prevention among nurses in a Kenyan Hospital.
Objective: To determine the level of awareness and perceived barriers of PU risk assessment and prevention methods among nurses working in the surgical and orthopedic units.
Methodology: This was a descriptive study. The study was done in Surgical and orthopedic units of a National Hospital in Kenya. All the 90 nurses who were working in these two areas during the study period were included in the study with a final response rate of 89% (80). Data was collected using self-administered semi-structured questionnaires and an International PU Knowledge Test. Qualitative data was cleaned, coded and analyzed thematically while quantitative data was entered in Excel worksheet and analyzed for descriptive statistics.
Results: The majority of nurses (N= 40%) had inadequate knowledge about PU risk assessment and prevention. The mean scores of the test, for all participants, was 22.26 out of 41 (SD = 2.3) with the lowest score in themes related to PU risk assessment, classification, and preventive measures. Shortage of staff and lack of time were cited as barriers to carrying out PU risk assessment and prevention.
Conclusion: There is inadequate knowledge among nurses about PU risk assessment and prevention. Efforts should be made to nurses' training institutions and hospitals to improve awareness and practice of PU risk assessment and prevention.

Key Words: Pressure Ulcers (PU); Nurses; Awareness; Risk Assessment; Prevention.

Introduction

Pressure ulcer (PUs), still exist as a pervasive problem occurring in hospital and community settings, affecting all age groups, but mostly prevalent among the elderly, the immobile, and those patients with severe acute illness or neurological deficits (European Pressure Ulcer Advisory Panel, 2009). PU remains a significant health problem causing suffering for patients and a growing financial burden (Spilsbury, 2007). The epidemiology of PU varies considerably by clinical setting, with

incidence rates ranging from 0.4% to 38% in acute care, 2.2% to 23.9% in long-term care (LTC), and 0% to 17% in home care (Lyder , 2003). In US acute care facilities alone, approximately 2.5 million PU(s) are treated each year (Lyder, 2003). A study at Kenyatta National Hospital (Nangole, 2009), showed that fifty patients, among all the patients in the medical and surgical wards, had PUs giving a prevalence of 5.32%. Among patients in the special wards, 80 patients had PU giving rise to a prevalence of 9.96%. At the National Spinal Injury Hospital, 17 of the 25 patients present had PUs, resulting in a prevalence of 68%.

Pressure ulcers can be prevented in many cases, and a targeted preventive approach may be less costly than one focused on the treatment of established ulcers (Gallant, 2010). Pain and distress from PU are viewed as indications of poor PU prevention practices since they restrict a patient's lifestyle. PU prevention should be regarded as a priority in clinical and non-clinical areas, particularly when patients are at high risk (Hopkins, 2006). Nurses are often found to demonstrate poor adherence to the PU prevention guidelines (Panagiotopoulou, 2002; Halfens, 1995). The compliance of nurses to the guidelines was found to be influenced by several barriers (Van Gaal, 2010; Gunningberg, 2005). A lack of knowledge is an apparent barrier for using the guidelines in clinical practice (Buss, 2004; Ajzen, 1986).

In Canada, a study was conducted to investigate the level of knowledge retained by nurses concerning pressure ulcers and whether this knowledge links to the preventive care they provided. The results of this study showed that nurses had insufficient knowledge consequently affecting the care they provided in preventing PU (Gallant, 2010). Limited application of knowledge is a common problem in clinical practice (Gunningberg, 2005). Nurses are not completely aware of the importance of using up-to-date PU prevention protocols, and may not have been exposed to current evidence-based practices, and sometimes their practices can be influenced by intuition, experience, or habit (Gunniberg, 2004). A study by Jordan O'Brien, 2011, found a significant gap between nursing records of skin condition, and actual skin examination concerning PU, which means that nurses were unable to identify the early signs of PU development. Hill, 1992 concluded that lack of knowledge and faulty equipment are barriers that prevent healthcare providers from maintaining effective PU prevention and treatment.

Lack of knowledge and skills in PU prevention contributes significantly to the occurrence or worsening of PU; therefore, nurses require regular training and education in this area of practice (Gunniberg, 2004). Moreover, increased knowledge about PU prevention among nurses not only improves the quality of PU care, but also reduces hospital stays, and the number of patients suffering from this condition (Smith, 2009). Beeckman et al., 2010, declared that adequate knowledge about PU prevention is essential in deciding which patients should receive prevention (European Pressure Ulcer Advisory Panel, 2009), which prevention should be applied (Spilsbury, 2007), and how prevention should be implemented (Hopkins , 2006). Although PU education improves knowledge, studies have also shown that regular educational updates are

needed to maintain and enhance PU knowledge and practice standards.

Methods

The study was conducted at Moi Teaching and Referral Hospital (MTRH) orthopedic and surgical wards. The study assumed a cross-sectional descriptive design. The study population included all qualified nurses working in both the surgical and orthopedic wards. During the study period, there were 80 nurses working in the two study areas and were all included after they consented. Data was collected by use of self-administered questionnaires and an international pressure ulcer knowledge test20. The questionnaires were delivered by the researchers to the individual nurses of each ward. The contents of the knowledge test were explained to the respondents and this included items on PZ-PUKT (Pieper et.al., 2014): classification, risk assessment, and prevention. The level of awareness on methods of prevention, frequency of evaluation and practices of preventive measures were recorded. The descriptive statistical analysis which includes percentage values and averages was carried out to describe the data. Approval for executing the study was obtained from Institutional Research and Ethical Committee (IREC) - Moi University. Permission to collect data was also sought from the Hospital management. Participants were informed via a cover letter on the questionnaire that participating in the study was voluntary. Precautions were taken to protect confidentiality and identity of those participating.

Results

The questionnaire was completed and returned by 80 out of 90 (88.9%) of the respondents who were working in the study areas at the time of the study. A total of 10 (11.1%) respondents did not complete the questionnaire because five of them did not consent and the rest failed to return the questionnaire.

Most of the respondents were female nurses, (n= 58) forming 73% while the rest 27% (n=22) were male nurses. A majority of the nurses fell between the age group of 20-40 years (81%) while the least were in the category of 50-59 years (14%). Eighty-two percent (82%) of the respondents are diploma level registered nurses, 16% are degree level registered nurses, while enrolled and master's nurses are at 1% each. This shows that registered nurses form the bulk.

Thirty-eight percent (38%) of the nurses had experience of 1-5 years, 24% had 6-10 years' experience, 14% had more than 15 years of experience, 13% had less than one year while 11% had an experience of between 11-14 years. Forty-five percent (45%) had worked in the unit for 1-5 years, 37% for less than one year, 14% had been employed for 6-10 years while 4% for 11-14 years.

Seventy-five percent (75%) of the nurses obtained their education on pressure ulcers from the universities and colleges while a small number, 12% received their education during their clinical experience. Eighty-one percent (81%) of the nurses had never participated in a pressure ulcer research before while a negligible 19% had been previously involved.

Seventy-nine percent (79%) of the nurses were able to define pressure ulcers while the remaining 21% could not define.

Forty percent (40%) of the respondents reported to encounter the pressure ulcers always, 29% encounter them monthly,17% encounter them daily,7% encounter them yearly while the other 7% report to encounter them from patients who come as referrals.

Eighty percent (80%) of the respondents perform pressure ulcer risk assessment while 20% do not perform pressure ulcer risk assessment. Seventy-three percent (73%) of the nurses always perform pressure ulcer risk assessment, while 27% non-frequently conduct pressure ulcer risk assessment.

Ninety percent (90%) of the respondents do not use the pressure ulcer classification system while 10% use the pressure ulcer classification system.

The international pressure ulcer knowledge test: This test is divided into two parts based on the items found in it I.e., those on risk assessment and classification, and those on prevention. The results have been presented in terms of percentages and have been classified into 90% or more, between 70 and 89.9%, between 50 and 69.9% and below 50%. According to the international guidelines, the knowledge is considered adequate if the score is 90% or more. The nurses' results on the PU risk assessment and classification areas of the knowledge test are shown in Table 1 below.

Table 1: *Percentage of correct answers by research participants on the knowledge test* (Pieper & Zulkowki, 2014)

No.	Items about pressure ulcer risk assessment and classification	Nurses (n)	%
1.	Stage I pressure ulcers are defined as non-blanchable erythema. (T)	20	25
6.	A stage III pressure ulcer is a partial thickness skin loss involving the epidermis and/or dermis. (F)	10	13
9.	Stage IV pressure ulcers are a full thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structure. (T)	15	19
20.	Stage II pressure ulcers are a full thickness skin loss. (F)	30	38
31.	Pressure ulcers are sterile wounds. (F)	50	63
32.	A pressure ulcer scar will break down faster than unwounded skin. (T)	40	50
33.	A blister on the heel is nothing to worry about. (F)	50	63
38.	Stage II pressure ulcers may be extremely painful due to exposure of nerve endings. (T)	15	19

On the items related to PU assessment and classification, no participant obtained 90% or more, between 70 and 89.9% of correct answers on any item, and between 50 and 69.9% on three items (numbers 31, 32 and 33) and below 50% on five items (numbers 1, 6, 9, 20 and 38). The lowest number of correct answers (13%) was for the item related to stage III PU description.

Table 2: *Results for the 33 test items on PU risk assessment and prevention*

	Items about Pressure ulcer risk assessment and prevention	(n)	%
2.	Risk factors for development of pressure ulcers are immobility, incontinence, impaired nutrition, and altered level of consciousness. (T)	80	100
3.	All individuals at-risk for pressure ulcers should have a systematic skin inspection at least once a week. (F)	48	60
4.	Hot water and soap may dry the skin and increase the risk for pressure ulcers. (T)	40	50
5.	It is important to massage bony prominences. (F)	38	48
7.	All individuals should be assessed on admission to a hospital for risk of pressure ulcer development. (T)	45	56
8.	Corn starch, creams, transparent dressings, and hydrocolloid dressings do protect against the effects of friction. (T)	50	63
10.	An adequate dietary intake of protein and calories should be maintained during illness or hospitalization. (T)	78	98
11.	Persons confined to bed should be repositioned every 3 hours. (F)	43	54
12.	A turning schedule should be used for patients at risk. (T)	78	98
13.	Heel protectors as gloves filled with water or air relieve pressure on the heels. (F)	40	50
14.	Air/water donut devices/ring cushions help to prevent pressure ulcers. (F)	29	36
15.	In a side lying position, a person should be at a 30 degree angle with the bed. (T)	39	49
16.	The head of the bed should be maintained at the lowest degree of elevation (hopefully, no higher than a 30 degree angle) consistent with medical condition. (T)	30	38
17.	A person who cannot move self should be repositioned while sitting in a chair every two hours. (F)	30	38
18.	Persons, who can be taught, should shift their weight every 15 minutes while sitting a chair. (T)	46	58
19.	Chair-bound persons should be fitted for a chair cushion. (T)	80	100
21.	The skin should remain clean and dry. (T)	80	100
22.	Continuous prevention measures do not need to be used when an individual has already a pressure ulcer. (F)	42	53
23.	Turning or lift sheets should be used to turn or transfer patients. (T)	43	54
24.	Dependent patients should be repositioned or transferred by two individuals. (T)	55	69
25.	Rehabilitation should be instituted if consistent with the patient's overall goals of therapy. (T)	38	48
26.	All bed or chair-bound individuals should be assessed for pressure ulcer risk. (T)	80	100
27.	Patient/Caregiver should be educated about the causes and risk factors for pressure ulcer development. (T)	80	100
28.	Bony prominences may be kept with direct contact with one another. (F)	55	69
29.	Every person assessed to be at risk for developing pressure ulcers should be placed on a pressure-reducing bed surface. (T)	41	51
30.	Skin, macerated from moisture, tears more easily. (T)	80	100
34.	A good way to decrease pressure on the heels is to elevate them off the bed. (T)	54	68
35.	All care given to prevent or treat pressure ulcers do not need to be documented. (F)	58	73
36.	Shear is the force which occurs when the skin sticks to a surface and the body slides. (T)	51	64
37.	Friction may occur when moving a person up in bed. (T)	67	84
39.	For persons who have incontinence, skin cleaning should occur at the time of soiling and routine intervals. (T)	80	100
40.	Educational programs may reduce the incidence of pressure ulcers. (T)	80	100
41.	Hospitalized individuals should be assessed for pressure ulcers risk only once. (F)	62	78
	Mean percentage	2597/41=63.3	

On the 33 test items regarding PU prevention, participants scored more than 90% on 10 (30.3%) items, between 70 and 89.9% on three (9.1%), between 50 and 69.9% on fourteen (42.2%) and less than 50% on six (18.2 %) items.

Aspects of which nurses had the lowest percentage of correct answers were related to the use of massage (48%), air/water donut devices or ring cushions (36%), water or air-filled gloves (50%) and positioning the patient with regard to the head of the bed (38%), the time period for repositioning while sitting in a chair (38%) and side-lying positioning (49%).

Table 3: *Perceived barriers to carry out PU risk assessment and prevention*

Barriers to carrying out risk assessment and prevention	(n)	%
Understaffing or lack of enough staff	60	75
Lack of time	77	96.25
Unstable patients	53	66.25
Lack of or inappropriate documentation of the skin status	62	77.5
Lack of adequate training and current updates	75	93.75
Lack of continuity	55	68.75
Lack of knowledge	52	65
Lack of resources and equipments	80	100
Absence of national or organizational guidelines	80	100
Lack of assessment tool	80	100
Forgetfulness on the part of the nurses	34	42.5
Un co-operative or too ill patients	32	40

Discussion

From the findings, it is clear that that nurses' knowledge from the PU knowledge test was inadequate (M= 63.34% and SD= 6.7%) as compared to the international guidelines which state that, a mean percentage of 90% or more is considered as adequate knowledge. These results were associated with their basic education, age and years of work experience. Results of the present

The mean percentage of correct answers on the knowledge test for nurses (mean=63.34%, SD=6.7%) showed knowledge deficits about the theme. Some areas stand out that need a greater focus on continuing professional education activities like PU classification and use of PU risk assessment scales.

study confirm those of Choa, 2011, which analyzed nurses' characteristics concerning PU prevention and found that more PU prevention was documented by those who were younger, less experienced, and more educated. Additionally, other researchers (Sinclair, 2004; Panagiotopoulou, 2002; Gunningberg, 2001; Pieper, 1995) who assessed the knowledge among nurses before implementing an educational program also reported that knowledge regarding pressure ulcer prevention among nurses was moderate.

In this study, the influence of age, previous participation in PU research, special PU education and level of education was markedly observed. The study included only one Master's degree holder, (Gunniberg. C, 2004) baccalaureate nurses and the majority of nurses were diploma holders. The results showed that the nurses with higher education, those who had previously participated in PU research and those with additional training in PU had more knowledge than the other nurses. This trend is confirmed by a previous study which found that Spanish nurses with university degrees and specific education obtained high scores for knowledge and clinical practice in PU prevention (Pancorbo-Hidalgo, 2007).

Years of clinical nursing experience are also another contributing factor to whether or not a nurse participates in risk assessment and prevention of the development of PU. The present study shows that nurses with fewer years of clinical experience demonstrated more knowledge on this subject. This realization is in line with a study which found that a lower level of knowledge among nurses with many years of experience was due to a lack of current educational exposure about pressure ulcer prevention (Bostrom, 1992).

The majority of the nurses did not receive any education on PU after qualification. In-service training is the second source of knowledge on PU, coming after university. Of these, most of those who underwent the training did so more than two years ago. Most of the respondents had never participated in a PU research before. This lack of knowledge would contribute substantially to their inadequacy of knowledge of PU prevention. The finding thus concurs with a study by Sinclair (2004), who reports that nurses who are specifically trained have a better understanding of PU risk assessment and prevention. This belief is supported by Pieper, 1995, who stated that nurses who had recently attended a lecture or read a PU related article had a higher knowledge than nurses who did not.

The majority of the nurses performed a PU risk assessment at the start of every shift while others do not regularly carry out the risk assessment. They reported that they performed these risk assessment tests through a head to toe examination majoring on the susceptible sites/areas. They observed these areas for signs and symptoms of PU, which are pains, warmth, redness, tenderness and impaired skin integrity. Results of this study, therefore, concur with previous studies that found nurses' knowledge of risk factors to be good (Bostrom, 1992).

An additional aspect of PU prevention is the Risk Assessment Scale (RAS). Risk assessment tools along with advanced PU prevention measures are not available in the study areas. The fact that nurses were not well oriented with such advanced measures and using the PU RAS could also explain their lack of knowledge about PU prevention. This lack of knowledge could lead to less than optimal care, especially if the nurses' use and practice outdated methods and inconsistent therapies.

Preventive strategies involve methods used to assess individual patients' level of risk (that is, risk assessment tools) and also interventions used to prevent PU from developing. The methods of PU prevention that the nurses reportedly used included: two hourly turning, tight or straight linen without creases, use of dry linen, assessment of high-risk areas such as bony prominences. Also, application of Vaseline to the high-risk areas, massaging of the high-risk areas, educating the patient and caretakers, balanced diet, padding pressure points, change soiled linen, daily and frequent assessment of the bed-ridden patients and use of air rings and air mattresses.

The number of studies that have explored preventive practice is relatively small. These current study results are in harmony with one of the key studies by Halfens, 1995 that was discussed previously concerning knowledge of preventive strategies. Poor knowledge about methods that should not be

applied was translated into practice, with a significant proportion of nurses reporting that massage, topical creams and donuts (air rings) were regularly used. The fact that massage is a commonly used preventive strategy was also documented by other researchers (Wilkes, 1996; Hill, 1992).

In determining the barriers to good practice in pressure area care, the most commonly cited factors were 'work-related', and this finding has been reported elsewhere. In particular, it has often been reported that the work environment is unsupportive of 'good practice' especially, the utilization of research findings is not always supported and low staffing levels that make it difficult to provide the desired level of nursing care (Wilkes, 1996). The most common perceived barriers to 'good practice' of PU risk assessment and prevention in the present study were: understaffing; lack of adequate training/current updates, time, documentation of the skin status, resources and equipment, national or organizational guidelines, PU risk assessment tools and uncooperative patients.

Personal barriers, such as lack of awareness and lack of understanding of the relevant literature, have also been reported by others (Gunningberg, 2001; Wilkes, 1996). Research findings have often been criticized for not being 'user-friendly' (Hunt, 1981). These results are similar to the study highlighted by other researchers (Hunt, 1981; Plati, 1992) which revealed that many of the barriers included nurses' lack of knowledge, failure to implement research findings, lack resources, and equipment.

Additional explanations of lack of nurses' knowledge on PU care exist. One is related to educational opportunities; availability, timing, staffing, and costs. Second, staff turnover has been increasing in the last two years, making it difficult to the facility to maintain essential PU education and to maintain staff PU knowledge up to date. All these are in harmony with Hayajneh, 2009 where consideration for the turnover of Jordanian registered nurses in hospitals as a significant problem that requires effective strategies to deal with was made.

Raising awareness of PU risk assessment and preventive interventions using a variety of approaches (education, use of risk assessment tools, grading scores and clinical guidelines) are probably all useful. Guidelines for implementation require a comprehensive approach (Clarke, 2005) including education and refresher courses for nurses (Hulsenboom, 2007).

Conclusions and Recommendations

This study has demonstrated that nurses are not well equipped to appropriately predict and prevent Pressure Ulcers. The nurses' knowledge about PU risk assessment and prevention was inadequate. Furthermore, there is the inadequate dissemination of PU prevention guidelines which is a prerequisite to improving the quality of PU prevention. This inadequacy supports the need to implement a PU educational program in MTRH and other hospitals in Kenya, especially the units with high-risk patients so as to improve patients' outcomes.

This study recommends that an immediate educational program and continuous professional development of PU risk assessment and prevention should be

instituted in the hospital, and cascaded to other facilities.

A longitudinal study to investigate the relationship between the level of knowledge of staff nurses and their attitudes to pressure ulcer risk assessment and prevention should be done. Further research on PU prevention in healthcare settings is also needed.

The theme of PU should be publicized to create awareness nationally of the burden that comes along with it. This has been observed in the UK where politicization of pressure ulcers has certainly heightened the awareness of the problem of pressure ulcers and has provided much-needed guidelines for care. Recommended national guidelines on the PU risk assessment, prevention and management should be developed to promote proper PU care. This information could then form the basis for planning a national pressure ulcer prevention and management strategy. Apart from the guidelines, a risk assessment tool/scale should either be adopted newly developed for PU risk assessment that will help in early identification of high-risk patients.

References

Ajzen I, M. T. (1986). Prediction of goal-directed behaviour: attitudes, intentions and perceived behavioral control. . *J Exp Soc Psychol* , 22:453–474.

Beeckman D, V. K. (2010). Pressure ulcer prevention: development and psychometric validation of a knowledge assessment instrument. . *Int J Nurs Stud* , 47(4):399–410.

Bostrom J, K. H. (1992). Staff nurse knowledge and perceptions about prevention of pressure sores. . *Dermatology nursing/Dermatology Nurses' Association* , 4(5):365.

Buss I C, H. R.-S. (2004). Pressure ulcer prevention in nursing homes: views and beliefs of enrolled nurses and other health care workers. *J Clin Nurs* , 13:668–676.

Choa, I. P. (2011). Exploring practice variation in preventive pressure-ulcer care using data from a clinical data repository. *International Journal of Medical Informatics* , 80, 47–55.

Clarke, H. B. (2005). Perssure ulcers: Implementation of evidence based nursing practice. *Journal of Advanced Nursing* , 49, 578-590.

European Pressure Ulcer Advisory Panel, N. P. (2009). *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide.* Washington DC: National Pressure Ulcer Advisory Panel;.

Gallant, C. M.-G. (2010). Prevention and treatment of pressure ulcers in a university hospital centre: A correlational study examining nurses' knowledge abd best practice. *International Journal of Nursing practice* , 16, 183-187.

Gunniberg. C (2004). Pressure ulcer prevention: evaluation of an education programme for Swedish nurses. . *J Wound Care* , 13(3):85–89.

Gunningberg, L. L. (2001). Risk, prevention and treatment of pressure ulcers- nursing staff knowledge and documentation. *Scandinavian Journal of Clinical Sciences* (15), 257-263.

Gunningberg. (2005). Are patients with or at risk of pressure ulcers allocated appropriate prevention measures? *Int J Nurs Prac* , 11:58–67.

Halfens R. J. G, E. M. (1995). Knowledge, beliefs and use of nursing methods in preventing pressure sores in Dutch Hospitals. *International Journal of Nursing Studies.* , *Vol 32*, (16-26).

Hayajneh Y. A. (2009). Turnover rate among registered nurses in Jordanian hospitals: an

exploratory study. *Int J Nur Prac* , 15(4):303–310.

Hill, L. (1992). Wound care nursing. The question of pressure. *Nurs Times* , 88(12):76–82.

Hopkins A, D. C. (2006). Patient stories of living with a pressure ulcer. *J Adv Nurs* , *56*, 345–353.

Hulsenboom MA, B. G. (2007). Knowledge of pressure ulcer prevention: a cross-sectional and comparative study among nurses. *BMC Nursing* , 6(2):doi:10.1186/472-6955-6-2.

Hunt, J. (1981). Indicators for Nursing Practice: The use of research findings. *Journal of Advanced Nursing* , 6, 189-194.

Jordan O'Brien J. A, C. S. (2011). An exploration of nursing documentation of pressure ulcer care in an acute setting in Ireland. *J Wound Care* , 20(5):197–205.

Lyder C, H. (2003). Pressure ulcer prevention and management. *JAMA* , 223-226,289.

Mockridge J, A. D. (1999). Nurses' knowledge about pressure sore treatment and healing. *Nursing Standard* , *XIII* (29), 13(29):66.

Nangole W, K. S. (2009). Pressure Ulcer Presentation and Management at Kenyatta National Hospital and spinal injury Hospital. *East African Medical Journal* , *Vol 86*.

Panagiotopoulou K, K. S. (2002). Pressure area care: an exploration of Greek nurses' knowledge and practice. . *Journal of Advanced Nursing.* , *Vol 40*, 285-96.

Pancorbo-Hidalgo P. L, G.-F. F.-M.-O. (2007). Pressure ulcer care in Spain: nurses' knowledge and clinical practice. *J Adv Nurs* , *IV* (58), 327-338.

Pieper B, M. M. (1995). Nurses' knowledge of pressure ulcer prevention, stating, and description. *Adv Wound Care* , 8(3):34-48.

Pieper B, Zulkowski K. The Pieper-Zulkowski Pressure Ulcer Knowledge Test. *Adv Skin Wound Care.* 2014 Sep; 27(9):413-9. doi:10.1097/01.ASW.0000453210.21330.00. PubMed PMID: 25133343.

Pieper, Barbara, Zulkowski, Karen, (2014) The Pieper-Zulkowski Pressure Ulcer Knowledge Test. Advances in Skin & Wound Care 27(9):413-420 · September 2014

Plati, C. L. (1992). Contributing factors to development and severity of pressure sores. *Greek (i) Nursing Times* , 54, 36-41.

Sinclair L, B. H. (2004). Evaluation of an evidence-based education program for pressure ulcer prevention. *J Wound Ostomy Continence Nurs* , *III* (31), 43–50.

Smith D, W. S. (2009). Research study: an assessment of registered nurses' knowledge of pressure ulcers prevention and treatment. . *Kansas Nurs* , 84(1):3–5.

Spilsbury K, N. A. (2007). Pressure ulcers and their treatment and effects on quality of life: hospital inpatient perspectives. . *J Adv Nurs* , 57(5):494–504.

Tubaishat A, A. D. (2011,). Pressure Ulcer in Jordan: A point prevalence. . *Journal of tissue viability* , 20:14–19.

Van Gaal B. G, S. L. (2010). The effect of the SAFE or SORRY? Programme on patient safety knowledge of nurses in hospitals and nursing homes: a cluster randomized trial. . *Int J Nurs Stud* , 47.

Wilkes, M. L. (1996). Nurses' knowledge of pressure ulcer manegement in elderly people. *British Journal of Nursing* , 5, 858-864.