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### Assessment of nurses' and assistants' knowledge on the prevention and management of pressure ulcers

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## RESEARCH ARTICLE

## ASSESSMENT OF NURSES' AND ASSISTANTS' KNOWLEDGE ON THE PREVENTION AND MANAGEMENT OF PRESSURE ULCERS

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## Abstract

**Background:** The pressure ulcers constitute a major clinical problem with enormous socio-economic consequences worldwide. Nurses' knowledge on pressure ulcers' management plays a crucial role in the prevalence of pressure ulcers.

**Aim:** The investigation of nurses' knowledge, working in a general hospital, regarding the prevention and management of pressure ulcers.

**Material and Method:** It was a cross-sectional study using a structured questionnaire. The sample consisted of 54 nurses and assistants working in medical and surgical departments of a General Hospital in Athens, Greece. The collection of data took place from June 2019 until November 2019. The analysis of data conducted using the IBM SPSS® program, version 25 (IBM Corp. in Armonk, NY).

**Results:** The mean age of the participants was 42,73 ±8,42 years, and 90,6% were women, with an average work experience of 19,05±9,84 years. The age of nurses of the sample was not associated with the knowledge regarding the prevention of pressure ulcers ( $p = 0,80$ ). No significant differences were found between their knowledge and the department of work, or the years of work experience and the related seminars organized in the department ( $p > 0,05$ ). Nurses who had a postgraduate degree had statistically significant more correct answers ( $p = 0,01$ ).

**Conclusions:** Despite the development of nursing science in the treatment of pressure ulcers, nurses continue to present insufficient knowledge in the daily clinical practice. The implementation of clinical guidelines and the continuing education courses may help nurses to enhance their knowledge.

**Keywords:** Knowledge, nurses, pressure ulcers, prevention, management.

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## INTRODUCTION

Pressure ulcers or differently known as pressure sores, or bed sores, are localized damage of the skin or the underlying tissues that are developed over a bony prominence or as a result from intense or prolonged pressure or mechanical forces of friction and shear.<sup>1</sup>

In our days, the prevention and management of pressure ulcers, is an issue that is discussed widely. The pressure ulcers constitute a tremendous challenge for health care systems and the reduction of their frequency constitute criterion of effectiveness for any health care system.<sup>2</sup> The pressure ulcers represent a growing problem in the clinical practice with enormous impact on economic resources.<sup>3,4</sup>

Despite the enormous technological evolution, the pressure ulcers continue to represent an important problem with significant impact on the quality of life of patients but also with tremendous socioeconomic and financial consequences.<sup>5</sup> Cost elements vary considerably and depend on various factors, such as hospitalization time, support surfaces, and heterogeneity of the population. In the ordinary way, the studies only concern the costs of inpatient treatment and do not include the cost after discharge from the hospital. The cost of treating pressure ulcers is 3.6 times that of preventing them.<sup>6</sup> Pressure ulcers are particularly costly for national health systems, especially in the advanced stages. Future evaluations should use a specific methodology so that they can compare alternative modes of action.<sup>7</sup>

Nurses have the most predominant role in the prevention and care of pressure ulcers. They need to be able to assess which patients and when are at risk of developing pressure ulcers, and always offer the appropriate care. In order to offer an effective assessment, nurses need to have knowledge on repositioning techniques, monitoring strategies and use of risk assessment tools.<sup>8</sup> There is a positive relationship between nurses' knowledge, attitudes and practice on the pressure ulcers' prevention.<sup>9</sup> Nurses' knowledge skills and behavioural beliefs ensure qualified and effective care.<sup>10</sup> Nurses should be adept and well versed in skills.<sup>11</sup> Several factors can affect the nursing competency as the work experience, adherence to professionalism,

critical thinking, the nursing environment, educational level, and personal factors. Work experience and education significantly influence the development of competency of nurses.<sup>12</sup>

## AIM

The aim of the present study was the investigation nurses' knowledge, working in a general hospital regarding the prevention and management of pressure ulcers.

## METHODOLOGY

It was a cross-sectional study using a structured questionnaire. The sample consisted of 54 nurses and assistants working in medical and surgical departments of a General Hospital in Athens, Greece. The collection of data took place from June 2019 until November 2019.

The inclusion criteria were as follows: Nurses or assistants nurses working in medical or surgical departments with sufficient knowledge of Greek language. They were excluded from the study all nurses working in operating theatres, ICUs, or outpatient's departments, or other health care professionals and those who did not comprehend the Greek language.

A structured questionnaire, developed by Gouda et al<sup>4</sup>, was used for data collection and specifically for the evaluation of nurses' knowledge regarding the prevention and management of pressure ulcers. The first part of the questionnaire included questions related to the demographic characteristics of participants and the second part had questions regarding the nurses' knowledge of prevention and management of pressure ulcers. The questionnaire's reliability had a Cronbach alpha coefficient of 0.75.

The collection of data started after a written approval by the scientific and administrative councils of the hospital was obtained. Participation in the study was voluntary and all participants signed an informed consent form. The conduct of the study did not impose any financial burden in the hospital and did not cause any distraction or interruption in the departments.

The analysis of data conducted using the IBM SPSS® program, version 25 (IBM Corp. in Armonk, NY).

Chi square test and Pearson's correlation were applied to analyze the data. The reliability was assessed by Cronbach's alpha test. The assessment of the normal distribution of the data was measured using the Kolmogorov-Smirnov test, while the homogeneity of variances was evaluated by using the Levene test. For the independent-samples (two groups), t-test was used, and the one-way ANOVA, was used to determine whether there are any statistically significant differences between means of two or more groups, and Sidak correction was used for multiple comparisons between group means. Pearson correlation Coefficient (Pearson's  $r$ ) was used to test the correlation between demographic variables and the correct answers. In all the questions that the expected absolute frequency was smaller than 5, the  $p$  was calculated with precise method (exact method). The level of significance was set as  $p < 0,05$ .

## RESULTS

In total 54 participants completed the questionnaire. From 53 of the participants who agreed to declare their sex, 90,6% were women and only 9,4% were men. The mean age of the sample was  $42,73 \pm 8,42$  with the youngest was 24 years old and the oldest was 57 years old. The mean length of clinical experience was  $19,05 \pm 9,84$  years with the smaller length of experience to be 0 years and the bigger length to be 36 years. 46,9% were holding a degree of higher education, while 26,5% had secondary education and 26,5% had a postgraduate degree. Regarding the work setting, 48,1% were working in medical departments and 46,3% were working in surgical departments. 35,2% declared that educational seminars on the pressure ulcers were organized in the institution where they work (table 1).

From the correlations between experience, setting of work and educational seminars, concerning the correctness of answers, no significant cross-correlations has been detected (tables 2 and 3). The cross-correlation between age and number of correct answers ( $r = -0,04$ ,  $p = 0,80$ ) was not statistical significant. This means that the nurses' age is not connected with the knowledge about the care and prevention of pressure ulcers. The questions concerning the staging and the prevention of pressure ulcers,

had the highest percentage of responses (92.3% and 88.5%). Smaller percentages of correct answers were observed at the question of covering pressure ulcers with full thickness black necrosis (21.2%) and at pressure ulcers' cleaning (40.4%).

Table 4 presents the results of correlations between levels of education, work setting, years of experience and nurses that declare that in their departments educational seminars were organized, and the number of correct answers. Significant differences regarding the department of work (medical or surgical), the years of experience (above or less than 17 years) and the organized educational seminars or not in the departments ( $p = 0,31$ ), were not detected. However, regarding the level of education, significant effect of education to the number of correct answers was detected. Nurses who had a postgraduate degree had statistically significant more correct answers ( $p = 0,01$ ).

In almost all the questions, no difference was detected between nurses of medical and those of surgical departments ( $p > 0,05$ ). Nevertheless in the question "is the decreased arterial pressure a risk factor for development of pressure ulcers? (Yes)" a significant cross-correlation was detected between the department and the correctness of the answer ( $p = 0,01$ ) where the largest percentage of nurses from medical departments (84%) had answered correctly in comparison with nurses from surgical departments (37,5%).

In most questions, there was not any cross-correlation detected between the educational level and the correctness of answers ( $p < 0,05$ ). However, significant cross-correlations were detected, between the level of education and the correctness of answers in the following questions: "The best position for prevention of pressure ulcers over a bony prominence is the 30° side position." ( $p = 0,02$ ) where the percentage of correct answers of nurses with postgraduate degree (76,9%) was bigger than those with higher education degree (39,1%) and from those with secondary education (23,1%), "For the more rapid healing, the ulcer should be left uncovered. (not correct)" ( $p = 0,02$ ) where the assistants nurses had smaller percentage of correct answers (15,4%) compared to those with higher education degree (60,9%) and those with postgraduate degree (61,5%) Nevertheless, regarding the

level of education, significant effect of education to the number of correct answers was detected [ $F(2) = 5,78, p = 0,01$ ]. Multiple comparisons with the correction method Sidak, revealed that the nurses with postgraduate degree had statistical significantly more correct answers in comparison to those from secondary education ( $p < 0,05$ ). (table 4).

## DISCUSSION

In the present study, the nurses' knowledge on the prevention and management of pressure ulcers in daily practice, were examined. Particularly important was the fact that there were more correct answers regarding measures of prevention of pressure ulcers, as opposed to pressure ulcers' care. Nurses have a particular role always trying to give priority in the prevention of pressure ulcers, something that is supported by the multicenter study of Samuriwo in 14 hospitals of NHS<sup>13</sup> and by the study of Aydogan and Caliskan in Turkey.<sup>14</sup> Studies of Etafa et al.,<sup>15</sup> and Berihu et al.,<sup>16</sup> showed that nurses in Ethiopia have negative attitude towards the prevention of pressure ulcers and they experience a lot of obstacles in the application of clinical protocols for the prevention of pressure ulcers. A study of Qaddumi and Khawaldeh<sup>17</sup> in Jordan, revealed that nurses had insufficient knowledge regarding the prevention of pressure ulcers. In a similar study, by Dimou et al.,<sup>18</sup> with 92 nurses working in medical and surgical departments of a general hospital in Greece, nurses had high levels of knowledge regarding the definition and the staging of pressure ulcers while they had a reasonable level of knowledge about pressure ulcers in total.

In the questions regarding the cleaning and in general the care of pressure ulcers, the percentage of correct answers was smaller. It became apparent in the present study, that there is a lack of nurses' knowledge about prevention and management of pressure ulcers. According to Soozani et al.,<sup>19</sup> lack of knowledge can be due to overloaded work of nurses and due to their difficulty to attend educational programs for pressure ulcers. The study by Gunningberg et al.,<sup>20</sup> involving 415 nurses, assistants' and even nursing students in Sweden, revealed that there is a lack of knowledge in the prevention of pressure ulcers,

and the importance of conducting educational programmes, was stressed. Similar results came from the study by Nuru et al.,<sup>21</sup> involving 248 nurses in the Aithiopia. According to Dalvand et al.,<sup>22</sup> nurses have limited knowledge on pressure injury prevention. They do not use clinical protocols regarding the care, and they do not have updated evidenced based knowledge. On the contrary, a study by Mwebaza et al.,<sup>23</sup> revealed that 66% of nurses in Uganda have sufficient knowledge regarding the care of pressure ulcers.

The cross-correlation between nurses' age and their knowledge regarding the care of pressure ulcers, in the present study, did not reveal any significant difference. Studies of Saleh et al.,<sup>24</sup> as well as Kaddourah et al.,<sup>25</sup> revealed a correlation between the older age and the longer working experience of nurses and more knowledge regarding the prevention and the care of pressure ulcers.

In the present study, it was revealed that the level of education in the provision of care of pressure ulcers was very important. The graduates of higher education and the holders of postgraduate degree (regardless of the scientific area of the MSc), answered more correct answers in comparison to the assistants nurses. According to Ünver et al.,<sup>26</sup> nurses that worked in surgical departments in academic hospitals of Turkey and had previous education in the care of pressure ulcers, had more correct answers from the ones who did not have previous education. As Feng et al.,<sup>27</sup> reported in their study, in a hospital in Zhongda in China, that the knowledge of nursing personnel was improved considerably after a two-years education program with a result in the reduction of pressure ulcers. In a multicenter study by Khojastehfar et al.,<sup>28</sup> with 308 nurses in ICUs in Iran, the authors suggested that the development of suitable educational programs is needed for the increase of knowledge's level. In a study of Vaggelatos et al.<sup>29</sup> in Greece with 115 oncological patients, it became apparent that the planning and the conducting of educational programs will contribute to the updating nurses' knowledge and in the improvement of provided nursing care. However, Seo and Roh<sup>30</sup> in their study in hospitals of Republic

of Korea reported that further research is required for the verification of the long effect of education on nurses' performance and on the incidence of pressure ulcers among patients.

### LIMITATIONS

The present study used a small sample and consequently it cannot proceed in generalization of the results. The specialization of the postgraduate degree was not recorded in order to assess its relevance with the care of pressure ulcers. It is usual also in Greece the rotation of nurses in different department which in return alters their knowledge concerning the prevention and the treatment of pressure ulcers.

### CONCLUSIONS

In the present study, it became apparent that there is a lack of nurses' knowledge regarding the prevention and specifically the care of pressure ulcers and that clinical guidelines are not being used in practice.

It is of imperative importance that health care providers will organize seminars at regular time such as in-service educational seminars regarding the prevention and care of pressure ulcers or even intensive seminars for nurses that deal with the daily care of pressure ulcers. It would be also important the nurses to be engaged in the educational process for the enhancement of their knowledge in the right use of dressings and all related materials and the use of this knowledge in their daily care of patients. The implementation of clinical guidelines constitutes a safeguard for the prevention and care of pressure ulcers as it can ensure a quality nursing care. The prevention helps in the reduction of appearance of pressure ulcers, in the psychological well-being of patients and in the avoidance of further economic burden for patients and for National Health System.

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## ANNEX

**Table 1.** Demographic characteristics of the sample.

<b>Demographic characteristics</b>	<b>N (%)</b>
<b>Sex</b>	woman
Women	48 (90,6%)
Men	5 (9,4%)
Mean age $\pm$ Standard Deviation	42,62 $\pm$ 8,47
Mean clinical experience $\pm$ Normal Deviation	18,83 $\pm$ 9,81
Clinical experience (in two groups based on the median)	
Until 17 years of experience	<b>25 (51%)</b>
Above 17 years of experience	24 (49%)
<b>Educational Level</b>	
Higher Education	23 (46,9%)
Secondary education	<b>13 (26,5%)</b>
Postgraduate Degree	<b>13 (26,5%)</b>
<b>Work department</b>	
Medical	26 (51%)
Surgical	25 (49%)
<b>Educational Seminars organized in the department</b>	
Yes	19 (37,3%)
No	32 (62,7%)

**Table 2.** Distributions of level of education, experience and organization of seminars according to the department of work.

	Medical Department	Surgical	Department (%)	(%) $\chi^2$ (df), p
<b>Education</b>				
Higher education	52,4%	47,6%		<b>1,41 (2), p = 0,49</b>
Secondary	38,5%	61,5%		
Postgraduate	61,5%	38,5%		
<b>Experience</b>				
Until 17 years	56,0%	44,0%		0,32 (1), p = 0,57
Above 17 years of experience	47,8%	52,2%		
Organisation of educational Seminars on the pressure ulcers in the working place				
Yes	55,6%	44,4%		0,51 (1), p = 0,47
No	<b>44,8%</b>	<b>55,2%</b>		

**Table 3.** Perceptions of nurses regarding the prevention and management of pressure ulcers.

Question	Correct Answers N (%)	Wrong Answers N (%)	They did not give answer N (%)
Pressure ulcer is localized damage of the skin or/and the underlying tissues that usually are developed over a bony prominence as a result from intense or prolonged pressure or mechanical forces of friction and shear or a combination of the above factors.	52 (100%)	0	0
All pressure ulcers are colonized by pathogen microorganisms, regardless the existence of other factors	21 (40,4%)	31 (59,6%)	0
The devices and products that should not be used to prevent pressure ulcers are: ring-cushions and gloves filled in with water	27 (51,9%)	25 (48,1%)	0
The diet of patients that have pressure ulcers does not constitute fundamental factor for the healing of pressure ulcers. (Wrong)	46 (88,5%)	5 (9,6%)	1 (1,9%)
Pressure ulcers with full thickness black necrosis without discharge. Hydrogel dressings will be used to cover them.	26 (50%)	25 (48,1%)	1 (1,9%)
Full thickness dermal deficit with necrosis of subcutaneous tissue, without damage of the underlying tissues and bones is 3rd grade pressure ulcer	41 (78,8%)	9 (17,3%)	2 (3,8%)
Redness in the surface of skin that does not become white when we press it and after we remove the pressure, is 1st grade pressure ulcer.	48 (92,3%)	2 (3,8%)	2 (3,8%)
Full thickness dermal deficit with extensive necrosis and damages of the underlying tissues and bones is 4th grade pressure ulcers.	42 (80,8%)	8 (15,4%)	2 (3,8%)
Partial thickness dermal deficit, that is, damage that affects the	46 (88,5%)	4 (7,7%)	2 (3,8%)

epidermis and chorion. (developing of bubbles) is 2nd grade pressure ulcer			
Putting a cushion on the calf, so that the heel does not touch anything, helps to decrease the pressure on the heels	43 (82,7%)	9 (17,3%)	0
The healing is achieved by removing the scab of the pressure ulcer (correct)	36 (69,2%)	14 (26,9%)	2 (3,8%)
The best position to prevent pressure ulcers on bony prominences, is the 30° side position	25 (48,1%)	27 (51,9%)	0
Pressure ulcer with compact black necrosis with a lot of discharge. Hydrogel and foamy dressings are used to cover it.	11 (21,2%)	41 (78,8%)	0
Every patient potentially may develop pressure ulcers, if the risk factors exist, and for this reason the assessment of patients in the first 6 hours of admission, is necessary.	43 (82,7%)	9 (17,3%)	0
All patients who are in risk at developing pressure ulcers, should be placed at a specialized foamy mattress, as a minimum prevention strategy (correct)	46 (88,5)	6 (11,5%)	0
Placing the patient, who is in risk at developing pressure ulcer, on a supporting surface, does not mean that this patients shouldn't change position regularly.(correct)	46 (88,5)	6 (11,5%)	0
The bed sheets should be carefully straight on a supporting, alternating pressure mattress. (correct)	43 (82,7%)	9 (17,3%)	0
For achieving the most rapid healing, the pressure ulcer should be left uncovered. (wrong)	26 (50%)	24 (46,2%)	2 (3,8%)
The use of antiseptic solution is needed for every type of pressure ulcer. (wrong)	48 (92,3%)	4 (7,7%)	0
When an antiseptic solution is used for the cleaning of an infected pressure ulcer, this should	50 (96,2%)	2 (3,8%)	0

be removed few minutes after its application			
Which type of dressing offers humidity to the pressure ulcer? (hydrogel)	35 (67,3%)	15 (28,8%)	2 (3,8%)
The cleaning of pressure ulcer is achieved with soft handlings and the use of normal saline N/S 0,9%	21 (40,4%)	31 (59,6%)	0
How often, on a pressure ulcer with clinical picture of local infection, the dressings should be changed? 1-2 times daily and even more often when is needed	29 (55,8%)	22 (42,3%)	1 (1,9%)
When a pressure ulcer has a cavity, an alginate dressing or a specialized foamy dressing is needed in order to support the walls of the cavity.	34 (65,4%)	17 (32,7%)	. 1 (1,9%)
Permanent redness at places with continuous pressure: is 1 <sup>st</sup> grade pressure ulcer.	44 (84,6%)	6 (11,5%)	2 (3,8%)
The decreased blood pressure is considered as a risk factor for developing pressure ulcers.	33 (63,5%)	17 (32,7%)	2 (3,8%)
The reposition of hospitalized patients every 2 hours is necessary (provided his condition) (Yes)	51 (98,1%)	0	1 (1,9%)

**Table 4.** Effects of individual characteristics of nurses in the correctness of answers.

<b>Variables</b>	<b>M.O±T.A or N (%)</b>	<b>t (df) or ANOVA, p</b>
<b>Level of Education</b>		
Higher Education	19,43 ±2,04	F (2) = 5,78, p = 0,01
Secondary education	17,38±2,84	
Postgraduate degree	20,92±3,40	
<b>Department</b>		
Medical	19,80±2,92	t (47)=1,22, p = 0,23
Surgical	18,75±3,12	
<b>Years of Experience</b>		
until 17 years of experience	18,68±2,85	t (47) = 1,22, p = 0,16
above 17 years of experience	19,92±3,15	
Organized seminars in the de-		
partment		t (47) = 0,31, p = 0,31
Yes	20,06±2,80	
No	19,16±3,06	