

A Study of Care Workers Knowledge on Pressure Ulcer

The purpose of this study was to examine the degree of knowledge of care workers working at long term care hospitals and nursing homes on pressure ulcer. A total of 81 care workers including 34 at long term care hospitals and 47 at nursing homes were surveyed. 24 questions were used to evaluate their degree of knowledge on pressure ulcer. Their knowledge on pressure ulcer scored 12.84 out of the total score of 24 points (SD=3.40), which was equal to 53.50 (SD=24.23) out of 100 points. Their knowledge on the prevention of pressure ulcer was highest among the subareas of evaluation. Their knowledge on pressure ulcer statistically significantly differed according to education on pressure ulcer ($P<0.05$). A pressure ulcer is a skin disorder that may be prevented and cured. At this point when long term care facilities are rapidly increasing, care workers high-level knowledge on and good management of pressure ulcer is very important. Practically educating them on pressure ulcer including the provision of recent, updated relevant knowledge will be necessary.

Key words: Care Worker; Pressure Ulcer; Nursing Home; Long Term Care

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INTRODUCTION

A pressure ulcer refers to necrosis of the skin and deep tissues resulting from a disruption of normal capillary circulation due to continuous pressure on a certain area of the body or continuous or repetitive pressure on it caused by a combination of friction and shearing forces(1).

Once it develops, long term hospitalization as well as medical treatment is necessary and its recurrence rate is high; individual, social, and economic loss from it may be enormous(2). In case of Korea, there have been no precise statistical data released on the incidence and treatment costs of pressure ulcers.

Nonetheless, it is estimated that the ever growing number of patients with spinal injury caused by traffic accidents and those with nervous system disorders who need long term treatment will increase medical expenditure to treat their pressure ulcers(3).

The U.S. reported that its annual medical cost to

treat one lesion of a pressure ulcer patient ranged from 5,000 to 40,000 dollars(4, 5). Its monthly per-capita treatment cost at long term treatment facilities was between 261 dollars and 1,191 dollars(6).

Although annual estimated costs varied among researchers and research institutes, they were estimated to stand at between 1.3 billion dollars and 9 billion dollars(7), suggesting that economic loss triggered by pressure ulcers is huge.

According to a variety of research, the older a patient is, the more likely they develop a pressure ulcer(8, 9, 10, 11). In elderly people, one of physical changes that are directly related with lowered tissue resistance against pressure ulcers is decreased muscle elasticity. Elderly people often have chronic diseases that limit mobility including paralysis.

Further, their physical conditions like arteriosclerosis and sensory organ disorders and decreased amount of exercise raise a high risk of developing pressure ulcers. As a result, they easily succumb to pressure ulcers even with small outside pressure(12). According

to David, the rate of pressure ulcers in elderly people aged 65 or over amounted to 85%(13). Kim et al. reported that those aged 67.4 or older were highly likely to develop pressure ulcers(14). Wurster noted that the direct causes of pressure ulcer in the elderly were decreased muscular elasticity and lowered mitotic rate of skin cells(15). Skin aging, in other words, thinning of the dermis and flattening of dermal-epidermal junctions, makes epidermal layers easily separable from the other layers, and decreased nutrition supply and metabolic exchanges in these layers expose the skin to physical damages, raising the risk of pressure ulcers(16). Maklebust and Sieggreen reported that senile chronic diseases, decreased exercise capacity, and sensory organ disorders were associated with the development of pressure ulcers(12).

Those aged 65 or over accounted for 11.0% among the Korean population in 2010 and in 2018 the nation will join the ranks of aging societies, with the rate of the elderly at 14.3%(17). A rise in the aged population leads to an increase in senile diseases; the nation introduced the Long Term Care Insurance System on July 1, 2008 in order to cope with this problem. Care workers introduced along with the System are crucial human resources for long term care who provide the most wide ranging and direct services to long term care beneficiaries(18). According to the 2010 statistic data by the National Health Insurance Corporation, the numbers of long term care institutions and care workers stood at 14,979 and 250,465 people, respectively(19). Continuous increase in the elderly population will raise the number of long term care facilities, leading to a growth in the number of care workers. Therefore, it is considered that they need to obtain a lot of knowledge on pressure ulcer to which patients in these facilities may be subject. Nonetheless, a vast majority of domestic research on pressure ulcer merely deals with the incidence of pressure ulcers and the subjects of most studies examining their degree of knowledge on pressure ulcer are confined to nurses. There is no research on the degree of knowledge care workers who take care of senile patients have on pressure ulcer.

Accordingly, this study intends to examine the level of knowledge care workers at long term care hospitals and nursing homes for the elderly have on pressure ulcer, thereby contributing to the development of appropriate training programs for qualitative improvement in pressure ulcer management.

METHODS

Study Design

This is a cross sectional research designed for context evaluation, aimed at looking at the degree of knowledge on pressure ulcer that care workers working at long term care hospitals and nursing homes for the elderly have.

Subjects and Data Collection

The subjects of this study included a total of care workers consisting of 34 at three long term care hospitals and 47 at one nursing home. Those who consented to the purport and purpose of this study were selected.

Study Tools

This study employed 24 questions obtained by the researcher's revising Lee's 32 questions to measure the degree of knowledge for nursing care of pressure ulcer patients(20), which was a revised and complemented version of Beitz, Fey and O'brien tool(21), to be suitable for the topic of this study. The sub areas included: knowledge on risk factors for pressure ulcer(seven questions); knowledge on the condition of pressure ulcer(five questions); knowledge on pressure ulcer treatment methods(six questions); and knowledge on the prevention of pressure ulcer(six questions). The score of each question was measured on a binary scale, with one point given to a correct answer and zero point given to a wrong answer. The highest and lowest total scores were 24 points and zero point, respectively. The higher the total score of a care workers was, the higher their level of knowledge was considered. Cronbach's was 0.66, 0.72, and 0.62 in research by Beitz and O'brien(20), Lee(21), and Kwon(22), respectively. It was 0.66 in this present study.

Procedure

Data collection was made from October 6 to 21, 2011. The researcher visited three long term care hospitals and one nursing home located in Gyeonggi-do and distributed the questionnaires to care workers there. The survey was made using a self report questionnaire method. A total of 120 questionnaires were distributed but 86 questionnaires were collected, with the recovery rate at 71.6%. The

81 questionnaires were analyzed except for 5 with insincere answers.

Data Analysis

SPSS Version 18.0 program was used for statistical analysis. General characteristics of the subjects, their degree of knowledge on pressure ulcer, and overall and four types in terms of their degree of knowledge on pressure ulcer were clarified by the standards of actual number and percentage, actual number and percentage in the distribution of correct

answerers, and average number of correct answers and average scores, respectively. General characteristics of the subjects and their degree of knowledge on pressure ulcer were compared based on their average numbers of correct answers, average scores, t-test, and one way ANOVA.

RESULTS

General Characteristics of the Subjects

Table 1. General characteristics of the subjects

n=81

Characteristics	Classification	Actual number	Percentage(%)
Gender	Male	14	17.3
	Female	67	82.7
Marriage status	Unmarried	4	4.9
	Married	68	84.0
Age	30s	5	6.2
	40s	11	13.6
	50s	46	56.8
	60s	9	11.1
	60s or over	6	7.4
Final education	Elementary school graduate	4	4.9
	Middle-school graduate	18	22.2
	High-school graduate	42	51.9
	College graduate	11	13.6
	University graduate	1	1.2
Working experience at the current workplace(number of months)		34.58±35.246	
Working experience as a care worker (number of months)		34.89±26.819	
Education on pressure ulcer	Training only	30	37.0
	Data or books only	7	8.6
	Training, data, and books	29	35.8
	No use of any	9	11.1
Number of trainings on pressure ulcer		3.36±3.189	
Pressure ulcer	Yes	71	87.7
Management experience	No	9	11.1
Number of hours spent for pressure ulcer management	One hour or longer	25	30.9
	between 30 minutes and less than one hour	14	17.3
	Less than 30 minutes	21	25.9
	Almost none	15	18.5

As shown by Table 1, males accounted for 17.3% and females accounted for 82.7%, suggesting that more number of women work as care workers. Those in their 30s, 40s, 50s, 60s, and 70s and over made up 6.2%, 13.6%, 56.8%, 11.1%, and 7.4% of the total, respectively, with those in their 50s accounting for the largest portion. As for their final education, high school graduates ranked first at 51.9%. Their working experience at the current workplace and in the job greatly varied among the subjects with a large standard deviation. Their average numbers of months were about 35 months in both questions. With regard to education on pressure ulcer, 37% utilized training only, 8.6% employed data or books only, 35.8% used training, data, and books, and 11.1% did not make use of any; a majority of the subjects used training, data, and books in order to learn about pressure ulcer. 87.7% answered that they had dealt with pressure ulcer before, suggesting care

workers were able to access pressure ulcer with ease.

The Subject's Knowledge on Pressure Ulcer

Table 2 shows the subjects' knowledge on pressure ulcer. The question whose number of correct answers was smallest was <#7>, one of questions on risk factors for pressure ulcer (It is good to apply a donut cushion to the skin tissue in order to reduce pressure around a pressure ulcer); Only 9.9% among the 81 subjects answered correctly. The question whose number of correct answers was largest was <#14>, one of questions on knowledge on the prevention of pressure ulcer (a patient who cannot move lying on the bed should change their position every two hours in order to prevent a pressure ulcer), with the rate of correct answers at 92.6%.

Table 2. The Distribution of correct answerers by each question regarding their knowledge on pressure ulcer
n=81

No	Question content	Correct answer rate(%)	Wrong answer rate(%)	Rate of confused responses(%)	Mean ± SD
1	Those in a confused state are likely to develop a pressure ulcer.	65 (80.2)	11 (13.6)	4 (4.9)	.81 ± .39
2	Elderly people or those in a malnutrition state are more likely to develop a pressure ulcer than others.	58 (71.6)	18 (22.2)	2 (2.5)	.74 ± .44
3	The reddening of the skin is always related with a pressure ulcer.	51 (63.0)	23 (28.4)	2 (2.5)	.67 ± .47
4	Vesicles on the heel are pressure ulcers.	38 (46.9)	32 (39.5)	4 (5.4)	.51 ± .50
5	An erythema on the sacrum is not a pressure ulcer although it appears for 24 hours.	35 (43.2)	27 (33.3)	7 (8.6)	.51 ± .50
6	The major cause of pressure ulcer is skin friction.	20 (24.7)	57 (70.4)	0 (0.0)	.26 ± .44
7	It is good to use a donut cushion on the skin tissue in order to reduce pressure around a pressure ulcer.	8 (9.9)	70 (86.4)	1 (1.2)	.10 ± .30
8	Massaging the area of rubor may promote cure of a pressure ulcer.	21 (25.9)	49 (60.5)	5 (6.2)	.28 ± .45
9	Holding up a patient with a single-layered quilt may reduce friction and shearing force.	60 (74.1)	14 (17.3)	2 (2.5)	.79 ± .41
10	A split or cast on a fracture patient may result in a pressure ulcer.	38 (46.9)	27 (33.3)	11 (13.6)	.50 ± .50
11	Disinfectant solutions like betadine, hibitan, and alcohol are safe for a pressure ulcer.	19 (23.5)	41 (50.6)	16 (21.1)	.25 ± .44

12	Febricity, rubor, edema, and pain on the affected area suggests an infection.	61 (75.3)	13 (16.0)	3 (3.7)	.79±.41
13	In a patient in a side-lying position, the angle should be maintained at 90 degrees in order to prevent a pressure ulcer.	35 (43.2)	35 (43.2)	2 (2.5)	.49±.50
14	A patient who cannot move lying on the bed should change his or her position every two hours in order to prevent a pressure ulcer	75 (92.6)	6 (7.4)	0 (0.0)	.93±.26
15	Adequate nutrition supply is essential for a pressure ulcer patient.	63 (77.8)	14 (17.3)	2 (2.5)	.80±.40
16	It is good to maintain a patient's head on the pillow at 45 degrees in order to prevent a pressure ulcer.	50 (61.7)	21 (25.9)	5 (6.2)	.66±.48
17	It is necessary to examine the entire skin of a patient at high risk of a pressure ulcer at least once per day.	68 (84.0)	11 (13.6)	0 (0.0)	.86±.35
18	A patient who is sitting or on a wheelchair does not need to change his or her position every two hours.	34 (42.0)	45 (55.6)	1 (1.2)	.43±.50
19	In order to reduce the development of pressure ulcers, the skin should be maintained in a dry condition and the humidity should be at 40 percent or lower.	15 (18.5)	52 (64.2)	10 (12.3)	.19±.40
20	The formation of a black crust means the pressure ulcer is being cured.	53 (65.4)	22 (27.2)	1 (1.2)	.70±.46
21	The fourth stage of pressure ulcer development refers to the damage to the epidermis, dermis, and hypodermis.	13 (16.0)	54 (66.7)	8 (9.9)	.17±.38
22	During the third stage of pressure ulcer development, the tissue is damaged and forms cavity and secretion increases.	57 (70.4)	13 (16.0)	5 (6.2)	.76±.43
23	During the second stage of pressure ulcer development, vesicles are formed and the epidermis is peeled off; Due to the exposure of nerve terminals, pain is severe.	61 (75.3)	9 (11.1)	7 (8.6)	.79±.41
24	The rate of a pressure ulcer resulting from scatacratia is higher than that caused by urinary incontinence.	42 (51.9)	18 (22.2)	15 (18.5)	.56±.50

1) Knowledge on risk factors for pressure ulcers: #1,2,5,7,9,10,13
 Knowledge on the condition of pressure ulcer: #3,4,21,22,23
 Knowledge on pressure ulcer treatment methods: #6,11,12,19,20,24
 Knowledge on the prevention of pressure ulcers: #8,14,15,16,17,18

2) Those who did not answer were not included.

Degree of Knowledge on Pressure Ulcer in the Sub areas of Evaluation

Table 3 shows the respondents mean numbers of correct answers and mean scores in the subareas of their knowledge on pressure ulcer. Regarding their overall level of knowledge about pressure ulcer, they

scored 53,5 points on average by answering an average of 12,84 questions correctly among a total of 24 questions. Their knowledge on pressure ulcer treatment methods ranked last at 43,21 points on average and that on the prevention of pressure ulcer ranked highest at 64 points on average.

Table 3. Comparison of the subareas of knowledge on pressure ulcer (n=81)

Knowledge on pressure ulcer	Number of questions	Number of correct answers	Mean±SD
Knowledge on risk factors of pressure ulcer	7	3.69	52.73±24.56
Knowledge on the condition of pressure ulcer	5	2.71	54.32±23.94
Knowledge on pressure ulcer treatment methods	6	2.59	43.21±24.25
Knowledge on the prevention of pressure ulcer	6	3.85	64.00±25.87
Overall knowledge on pressure ulcer	24	12.84	53.50±24.23

General Characteristics and Levels of Knowledge on Pressure Ulcer

Table 4 displays the subject's levels of knowledge according to their general characteristics. Their level of knowledge on pressure ulcer statistically significantly varied according to education on pressure

ulcer($F=5.74$, $p=.00$). Those who utilized all of training, data, and books(15.07) had the highest level of knowledge on pressure ulcer($p<.05$). Those who had dealt with pressure ulcers had more knowledge about pressure ulcer(12.94) than those who had not(11.89), which was not statistically significant differences.

Table 4. The subject's general characteristics and levels of knowledge on pressure ulcer

Item	Classification	Number of correct answers	Average	F/t	p
Gender	Male	12.14	50.60±14.14	.31	.40
	Female	12.99	54.10±14.22		
Age	30s	12.40	51.67±16.82	1.78	.14
	40s	13.18	54.93±7.87		
	50s	13.13	54.70±15.19		
	60s	10.11	42.13±11.68		
	70s and over	14.00	58.33±12.91		
Final education	Elementary-school	13.50	56.25±26.11	.12	.98
	Elementary-school graduates	12.94	53.94±14.61		
	Middle-school graduates	12.74	53.08±14.32		
	High-school graduates	13.45	55.30±13.96		
	College graduates university graduates	17.00	70.83±0.00		
Education on pressure ulcer	Training only	11.32	47.21±14.87	5.74	.00*
	Data or books only	10.86	45.24±6.99		
	All of training, data, and books	15.07	62.93±10.53		
	No use of training, data, and books at all	12.00	48.61±12.50		
Experience on pressure ulcer management	Yes	12.94	53.93±14.53	.41	.39
	No	11.89	49.54±11.87		

*: $p<.05$

DISCUSSION

This study was conducted in order to look at the degree of knowledge of care workers working at long

term care hospitals and nursing homes on pressure ulcer. The subjects scored 12.84 points on average ($SD=3.40$) out of 24 points, which was converted into 53.50 points($SD=24.23$) out of 100 points. The result of a study by Lee of hospital nurses was 53.5 points(21,

which was similar to that of this study, but in other studies the results were lower than that of this study at 70.2 points in Pieper and Mattern(23) on intensive care unit nurses, 77.8 points in Beitz et al.(20), 66.7 points in Kim(24), 74.8 points in Park(25), and 75.7 points in Jin(26). As these prior studies show, a majority of research on pressure ulcer knowledge concerned nurses and there is no research on care workers knowledge on pressure ulcer.

As for correct answer rates of the subareas, knowledge on risk factors for pressure ulcers ranked first at 64.00 points(SD=25.87), followed by 54.32 points(SD=23.94) in knowledge on the condition of pressure ulcer, 52.73 points(SD=24.56) in knowledge on pressure ulcer treatment methods, and 43.21 points(SD=24.25) in knowledge on the prevention of pressure ulcers. The results obtained by Kim(27) and Lee(3) did not significantly differ in the sub areas of knowledge on pressure ulcer. Kwon(22) obtained the same result as that of this study in knowledge on pressure ulcer treatment methods at 48.3 points. The subject's knowledge on the prevention of pressure ulcer averaged a high score at 64 points, which is similar to the results obtained by Piper and Mattern(23) and Jin(26) that care workers have certain level of knowledge on its prevention but do not know well how to treat the condition. This result suggests that inclusion of the most recent knowledge on pressure ulcer will be necessary in developing training programs on pressure ulcer for evidence-based management of pressure ulcers.

The question whose correct answer rate was highest was "Those in a confused state are more likely to develop pressure ulcers than those not" at 80.2%, which was lower than the results by Lee at 96.3%(21), Kwon at 98.3%(22), and Jin at 98.4%(26), however. The question whose correct answer rate was lowest was "It is good to use a donut cushion in order to reduce pressure around a pressure ulcer" at 9.9%, which was consistent with the results by Kim(27), Park(25), and Jin(26). Using a donut cushion may reduce pressure on the area of pressure ulcer but greatly increased pressure on the tissue around the cushion may cause venous blood stagnation and edema. Therefore a donut cushion should not be applied to a pressure ulcer patient. Rather, using a cushion that can disperse pressure from the fibula to the ankle is recommended as an appropriate method(1, 28). Care workers are likely to use donut cushions without precise knowledge and therefore training on the most recent information about pressure ulcer and its management trends is considered necessary.

The correct answer rate of the question "The fourth stage of pressure ulcer development refers to the damage to the epidermis, dermis, and hypodermis" was 16.0%, which was lower than those in the study results by Kim at 37.9%(27) and Park at 27.5%(25) the subjects had low level of detailed knowledge related with each stage of pressure ulcer.

Their level of knowledge on pressure ulcer treatment methods was low. The question "Febricity, rubor, edema, and pain on the affected area suggests an infection" resulted in a correct answer rate of 75.3%, whereas the subjects' correct answer rate of the question "The major cause of pressure ulcer is skin friction" was low at 24.7%, which was consistent with the results of studies by Kim(27) and Kwon(22) on nurses. It is regarded that care workers do not know the basic concept of pressure ulcer well. Moreover, the question "In order to reduce the development of pressure ulcers, the skin should be maintained in a dry condition and the humidity should be at 40 percent or lower" also resulted in a low correct answer rate at 18.5%. This result was consistent with low correct answer rates obtained by Kim(27) and Lee(3). Although it is a practice known correct in the past but proven wrong, care workers still habitually conduct it; improvement by educating new information or trend is not being made and delivery of new information through education is considered urgent.

The question "A patient who cannot move lying on the bed should change their position every two hours in order to prevent a pressure ulcer" recorded the highest correct answer rate at 92.6% among the questions on knowledge on the prevention of pressure ulcers, which was consistent with the result by Jin(26). The correct answer rate of the question "Massaging the area of rubor may promote cure of a pressure ulcer" was low at 25.9%. There is no scientific evidence established that massaging is good for the prevention of pressure ulcers. Even there are arguments that areas where the bones are protruding may be subject to deep tissue damage and therefore directly massaging such areas should be avoided (1, 29).

Regarding the subject's knowledge on pressure ulcer according to general characteristics, their knowledge was not associated with their age or educational level, which was similar to prior study results(20, 21, 22, 30). Those who used training, data, and books obtained higher scores at 62.93 points(SD=10.53) than the other groups; using training, data, and books is necessary to improve care workers knowledge on pressure ulcer.

Those who had dealt with pressure ulcers had

more knowledge about pressure ulcer(12.94) than those who had not(11.89), which was consistent with the study result by Kwon(22); Clinical experience as well as training is important in order to obtain theoretical knowledge on pressure ulcer.

A pressure ulcer is an important health problem not only at the present but also in the future due to drastically increasing accidents and the aging population. It is a skin disease that may be prevented and cured. At this moment when long term care facilities are rapidly on the rise, care workers high level of knowledge on and good management of pressure ulcers is crucial.

CONCLUSION

In a reality where the growth in the elderly population leads to an increase in long term care hospitals and nursing homes for the aged, care workers knowledge on pressure ulcer is important. Accordingly, this study conducted a cross-sectional research designed for context evaluation of care workers knowledge on pressure ulcer.

This study employed 24 questions obtained by the researcher's revising Lee's 32 questions to measure the degree of knowledge for nursing care of pressure ulcer patients(21), which was a revised and complemented version of Beitz, Fey & O'Brien tool(20), to be suitable for the topic of this study. This study tool's internal consistency reliability was 0.66, as measured by Cronbach's alpha coefficient.

The subjects were care workers at three long term care hospitals and one nursing home located in Gyeonggi-do. A total of 120 questionnaires were distributed and 81 questionnaires collected were analyzed.

The respondents scored 53.5 points in their overall knowledge on pressure ulcer, which was lower than the results of different studies on nurses. Among their knowledge on risk factors for pressure ulcer, the condition of pressure ulcer, pressure ulcer treatment methods, and the prevention of pressure ulcer (six questions), their level of knowledge on pressure ulcer treatment methods was lowest at 48.3 points. Regarding the subject's level of knowledge on pressure ulcer according to general characteristics, their knowledge degree was not associated with their age or educational level. Those who used all of training, data, and books had significantly higher levels of knowledge on pressure ulcer than the other groups.

Those who had dealt with pressure ulcers had

slightly more knowledge about pressure ulcer than those who had not, which was not statistically significant, however.

This study was based on convenient sampling; it concerned only three long term care hospitals and one nursing home. As a result, it has limits in that it cannot apply its result to care workers as a whole.

According to this study result, care workers were lacking in their overall knowledge on pressure ulcer. Therefore, practical training programs related with pressure ulcer including the most recent relevant knowledge are considered necessary.

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