

PRIMARY HOME CAREGIVER TRAINING AND PRESSURE INJURY PREVENTION KNOWLEDGE AFTER PATIENT DISCHARGE FROM A LEVEL 5 HOSPITAL IN KENYA

Stanley Kiarie Njau^{1*}, Lucy Kawira Gitonga², Anne Kagure Karani³ & Henry M. Nyamu²

Institutional Affiliations:

1. School of Health Sciences, Kirinyaga University
2. Chuka University
3. University of Nairobi (Posthumous)

*Corresponding Author Email: njaust@yahoo.com

Abstract

Introduction

Pressure injuries are wounds on the skin, after hours of sitting, or lying in the same position. The global incidence of home acquired pressure injuries could be as high as 80%, yet home caregivers' pressure injury prevention knowledge is not clearly known. The specific objectives of this study were to assess the socio-demographic characteristics of primary home care givers, and patients at risk of pressure injuries, and to evaluate the effect of primary home caregiver training, on pressure injury prevention knowledge, after their bedridden patients were discharged from hospital.

Methods

The overall sample size was 34 primary home caregivers whereby, 17 of them were randomly assigned into experimental group, and 17 were assigned into the control group. The study was approved by IRB and NACOSTI. Data was collected using a researcher administered questionnaire, developed based on national and international pressure injury prevention guidelines. The pre-training and post training pressure injury prevention knowledge mean scores, in the experimental group, were compared. Data was analysed using SPSS version 27.

Findings

Majority (88.2%) of the primary home caregivers were female, with a mean age of $37.06 \pm 11.5SD$ years, while majority of the patients (76.5%) were female, with a mean age of 78.4 ± 18.7 years. The pre-training pressure injury prevention knowledge mean score was $11.11 \pm 11.11SD$, while the post training pressure injury prevention knowledge mean score was 37.3 ± 10.4 . These two knowledges mean scores were significantly different, at 95% confidence level ($t=10.376$, $df=16$, $p<0.001$).

Conclusions and recommendations

Most of the primary home care givers were youthful females, while most of the patients were old females. Primary home caregiver training significantly improved the knowledge on pressure injury prevention, and more resources should be geared towards capacity building of these primary home caregivers, in readiness for home-based care of patients at risk of pressure injuries.

Key words: Home caregiver, training, pressure injury, prevention, knowledge, patient



INTRODUCTION

Pressure injuries are wounds that develop due to insufficient tissue perfusion, following continuous pressure on bony protuberances, for example the occiput, scapula, elbow, sacrum or coccyx, as well as the heel (Hinkle & Cheever, 2017). The wounds are associated with reduced quality of life, mortality and morbidity. They can be prevented through application of preventive knowledge and skills, which is available through various guidelines, such as National Pressure Injuries Prevention Panel (NPUAP) guidelines (NPUAP, 2019).

In the United States of America, overall costs of managing pressure injuries were well above 28.6 billion US dollars. These costs were incurred mainly because, the human resource was constrained due to the many hours that were spent taking care of these patients (Padula & Delarmente, 2019). This makes prevention of pressure injuries, a more preferable and cost-effective option, especially by leveraging the input of unpaid home care givers.

The global incidence of home acquired pressure injuries could be as high as 80% (Kaur et al., 2018). According to Chen et al., (2020), in developing countries, the incidence of community acquired pressure

injuries among patients with spinal cord injuries was 22%, compared to 27% in developed countries. In Kenya, the burden of pressure injuries has been reported at facility level. For instance, a study done at KNH and Spinal Injuries Hospital placed the prevalence at 5.5% (Nangole, 2010). In Embu County, particularly Embu Level Five Teaching and Referral hospital, 30% of bedridden patients have pressure injuries (Embu Level 5 Hospital Report, 2022- Unpublished). These patients are in the hands of an already constrained work force, and some of them end up acquiring additional pressure injuries.

Hosseini et al., (2021) did a systematic review on guidelines for home caregivers to prevent pressure injuries. As much as they did not get substantive guidelines, the few they found agreed on the areas of focus when it comes to training home caregivers. The areas included knowledge of the risk factors for pressure injuries, pressure injury characteristics, prevention interventions for pressure injuries, clinical features of pressure injuries, nutrition and hydration, complications of pressure injuries such as infections, the use of support surfaces, and use of assistive devices. The authors further argued that, if home caregivers were not given the necessary



attention with regard to training on pressure injury prevention, the incidences of these injuries would continue to increase forever, especially among home-based care patients.

In her study, Chong (2017) observed that, home caregivers expressed willingness and readiness to learn and apply the preventive measures taught. Therefore, her training program and others of the like are paramount in-home based pressure injuries prevention. According to a prospective study which entailed a pretest as well as a post-test for home caregivers, the performance of caregivers improved drastically in most preventive items. After the training, they scored significantly higher in areas of pressure injury wound dressing, appropriate nutritional intake, maintenance of personal cleanliness, training on incontinence management, and knowledge about pressure injuries. The study concluded that, a training program of that magnitude was highly effective in the prevention and care of pressure injuries at home. Its application would go a long way in reducing the burden of pressure injuries care, both in hospital and home (Eljedi et al., 2015).

According to Kaur et al., (2018), comparison of two training strategies demonstrated different levels of effectiveness. In their

study, informal caregivers were put randomly into either control or experimental groups. Participants who were put in the control group were given self- instruction manual alone but experimental group members were given manuals for self- instruction, training as well as counseling. Both groups were followed up for a period of one year. The study revealed that, training of home care givers led to reduction in the risk of pressure injuries development. Intense training was associated with better results compared to mere distribution of self- instruction manuals whereby, those who received training had better patient care compared to those with only self -instruction manuals.

In Kenya, few studies on pressure injury prevention have been done, with focus on health care providers, especially nurses. For instance, Getanda et al., (2016) assessed the knowledge of nurses on prevention of hospital acquired pressure injuries. The study found a significant association between nurse's level of education, previous training on pressure injuries prevention, and previous involvement in pressure injuries related research, and their levels of knowledge. Little information is available in Kenya, with regard to assessment of home caregivers' knowledge on prevention of pressure injuries,



as well as the impact of training interventions, on pressure injury prevention knowledge.

METHODS

This was a randomized controlled trial, conducted among primary home caregivers, whose bedridden patients had been discharged from Embu Level 5 Teaching and Referral Hospital. It was organized in three phases i.e. baseline, intervention and evaluation. The study was conducted at the hospital and at the patient's homes. The primary site was Embu Level 5 Teaching and Referral Hospital, before the patients and their caregivers went home. At the Hospital, the researcher targeted the medical and surgical wards, where majority of bedridden patients were found.

The sample size was calculated using Chan, (2003) formula:

$$m \text{ (size per group)} = c \times \frac{\pi_1(1 - \pi_1) + \pi_2(1 - \pi_2)}{(\pi_1 - \pi_2)^2}$$

Where:

$c = 7.9$ for 80% power

π_1 and π_2 are the proportion estimates for statistically significant improvement of knowledge, after a training intervention.

These estimates were obtained from a similar study conducted by Karimi et al, (2018) where:

$$n_1 = 0.26$$

$$n_2 = 0.76$$

After factoring attrition rate of 30%, considering the fact that majority of their patients were critically ill, the desired sample size per group was:

$$12.49 \times 1.3 = 16.24 \approx 17 \text{ primary home caregivers.}$$

This study included all the primary home caregivers with bedridden patients who were at high to severe risk for pressure injuries, who were willing to participate in the study, including being followed at home. The primary home care givers had to be at least 18 years of age, and able to speak the national language (Kiswahili). On the other hand, the study excluded primary home care givers, who were not committed to patient care, until the completion of the evaluation phase of the study. Research permit was obtained from NACOSTI (Licence No: NACOSTI/P/22/21760), and the participants signed an informed consent form before taking part in the study.

With the assistance of the nursing officers in charge of the medical and surgical wards, the bedridden patients were identified



purposively. After identifying the patients, consent was sought from their primary home caregivers, before assessing the patients' suitability for inclusion in the study. Patient assessment was done using Braden scale, whereby, those patients who had pressure injury risk scores of ≤ 12 were included in the study, and their primary caregivers, who had consented to participate in the study, were interviewed.

The overall sample size was 34 primary home caregivers whereby, 17 primary home caregivers were randomly assigned into experimental group, and 17 were assigned into the control group, using simple random sampling. The researcher used specifically colored cards, including green (intervention) and blue (control), which were placed in a closed box. The box was thoroughly shaken, to ensure that the cards were evenly distributed, before the researcher could pick a card. After a primary home caregiver had given consent to participate in the study, the researcher would reach his hand into the box with colored cards, and pick a card at random, to determine which group the identified patients and caregivers would belong to. Single blind technique was employed whereby, the primary home care givers were not informed which groups, i.e. intervention

or control; they belonged to, in order to prevent Hawthorne effect, on the results of the study. This procedure continued, until the desired sample size was reached.

Data was collected using a researcher administered questionnaire, which had been developed based on national and international pressure injury prevention guidelines. The tool for data collection was pretested on 4 eligible primary home caregivers at Consolata Hospital Kyeni, which yielded a Cronbach's Alpha reliability coefficient of 0.8, and this was deemed adequate, according to the arguments of Taber (2018). The tool was scrutinized by experts in the field of tissue viability, to ascertain the content validity, and their feedback was incorporated in the final tool before the actual data collection. The tool had two sections namely, socio-demographic characteristics of the primary home caregivers and their patients, and the other section tested on pressure injury prevention knowledge. The knowledge section was unstructured, to prevent guess work among the respondents.

Data collection procedure consisted of the following three phases:



Phase one: Baseline survey

Data collection was done at the hospital for all the primary home caregivers in both the control and experimental groups. This took place at the nursing services manager's office, to avoid contamination and eavesdropping from the other participants.

Phase two: Training of primary home care givers

Training was only done for the primary home caregivers in the experimental group. This took place within 5 days, after the patients were discharged from the hospital, to give room for identification of the patients' homes, and work on transport logistics. The training on pressure injury prevention was organized into a lesson of 30 minutes whereby, 5 minutes were spent on introduction to pressure injuries, 20 minutes were spent on specific prevention knowledge, and five minutes were used to recap the lesson. The primary home caregivers were given room to seek clarifications, or ask questions on areas they had not understood after the lesson, depending on individual needs.

A training brochure was used during the teaching, and a copy of the same was left with the primary home caregivers, for reference.

The brochure was done in both English and Kiswahili, the official and national languages in Kenya, respectively. This ensured that all participants would read and understand about pressure injury prevention, regardless of their educational backgrounds. The mobile communication line for the researcher remained open, for any additional consultations after the training, before the evaluation phase.

Phase three: Evaluation of primary home givers

Evaluation was done one week after the training phase, to allow the home caregiver time to internalize the concepts, and do any consultations. The same questionnaire which had been administered during the baseline phase, was re-administered. The pre-training and post training pressure injury prevention knowledge mean scores in the experimental group, were later compared, using one sample T-test, at 95% confidence level.



Demographic characteristics of home caregivers, and patients at risk of pressure injury

Table 1: Demographic characteristics of the primary home caregivers

Caregiver characteristic	Frequency	Percentage
Gender		
• Male	2	11.8
• Female	15	88.2
Total	17	100
Age in years		
• 18-28	3	17.6
• 29-38	7	41.2
• 39-48	4	23.5
• 49-58	2	11.8
• 59-68	1	5.9
Total	17	100
Level of education		
• Primary	4	23.5
• Secondary	9	52.9
• Tertiary	4	23.5
Total	17	100
Marital status		
• Single	5	29.4
• Married	12	70.6
Total	17	100
Relationship with patient		
• Son	4	23.5
• Daughter	9	52.9
• Granddaughter	1	5.9
• Grandson	1	5.9
• Cousin	17	100
Total	17	100
Occupation		
• Formal employment	4	23.5
• Business	9	52.9
• Farmer	1	5.9
• Unemployed	2	11.8
• Student	17	100
Total	17	100

RESULTS

The results are based on the experimental group, that is, 17 patients and 17 primary home caregivers.

Demographic characteristics of the primary home caregivers

Majority of the primary home caregivers were female (88.2%, n=15), and most of them (41.2%, n=7) were aged 29-38 years. The mean age of the primary home caregivers was 37.06±11.5SD, which ranged from 20 to 60 years. Majority (52.9%, n=9) had secondary level of education and majority (70.6%, n=12) were married. As for the relationship between caregiver and the patient, majority (52.9%, n=9) were granddaughters of the patients, and concerning occupations, majority (52.9%, n=9) were small scale farmers.

Demographic characteristics of the patients

Majority of the patients were female (76.5%, n=13) and most of them (41.2%, n=7) were aged between 69-78 years of age. The mean age in years was 78.4±18.7, with a range of 19-110. Majority (64.7%, n=11) had no formal education and majority (52.9%, n=9) were widowed. Majority (82.4%, n=14) were small scale farmers before they were taken ill. As for pressure injury risk, majority (52.9%,

Table 2: Demographic characteristics of the patients



Patient characteristic	Frequency	Percentage
Gender		
• Male	4	23.5
• Female	13	76.5
Total	17	100
Age in years		
• 18-28	1	5.9
• 69-78	7	41.2
• 79-88	6	35.3
• 89-98	1	5.9
• >99	2	11.8
Total	17	100
Level of education		
• No formal education	11	64.7
• Primary	5	29.4
• Secondary	1	5.9
Total	17	100
Marital status		
• Single	2	11.8
• Married	6	35.8
• Widowed	9	52.9
Total	17	100
Occupation		
• Unemployed	1	5.9
• Retired	1	5.9
• Farmer	14	82.4
• Student	1	5.9
Total	17	100
Payment mode		
• Cash	13	76.5
• NHIF	4	23.5
Total	17	100
Medical diagnosis		
• CVA	8	47.1
• Hemiplegia	2	11.8
• Others	7	41.1
Total	17	100
Braden scale score		
• High risk	8	47.1
• Severe risk	9	52.9
Total	17	100

n=9) had severe risk and concerning the medical diagnosis, most of the patients (47.1%, n=8) had cardiovascular accidents

(CVA) secondary to hypertension. Concerning the mode of payment for hospital bills, 76.5% (n=13) were paying in cash.

Effect of training on pressure injury prevention knowledge

Knowledge on prevention of pressure injuries focused on nine areas which included regular skin assessment of the patient at risk, incontinence care to ensure that patients do not remain wet after passing urine or stool, providing pressure redistribution surfaces such as ripple mattresses, change of sitting position every 20 minutes if the patient is confined in a wheel chair, application of barrier creams on the body areas that are prone to pressure injuries, turning the patient after every two hours if bedridden, adequate nutrition and hydration to ensure adequate muscle mass and normal skin turgor, ensuring the head of the bed is not inclined for more than 30 degrees, to reduce the risk of skin breakdown due to shearing, and ensuring the bed sheets are straightened to reduce shearing. The highest improvement in pressure injury prevention knowledge after training was on two hourly turning of the patients whereby, the knowledge increased from a mean score of $6 \pm 24.3SD$ to $100 \pm 0SD$. This was a net improvement of 94%.



Table 3: Knowledge on pressure injury prevention

Knowledge item	Pre-training knowledge		Post training knowledge		Net improvement
	Correct response n(%)	Mean±SD	Correct response n(%)	Mean±SD	Mean
Skin assessment	0(0)	0±0	1(5.9)	6±24.3	6%
Incontinence care	9(52.9)	53±51.4	10(58.8)	59±50.7	6%
Ripple mattress	1(5.9)	6±24.3	7(41.2)	41±50.7	35%
Change of wheelchair position	0(0)	0±0	0(0)	0±0	0%
Barrier cream	4(23.5)	24±43.7	9(52.9)	53±51.4	29%
2 hourly turning	1(5.9)	6±24.3	17(100)	100±0	94%
Nutrition and hydration	2(11.8)	12±33.2	9(52.9)	53±51.4	41%
≤30 degrees inclination of bed	0(0)	0±0	3(17.6)	18±39.3	18%
Straightening creased bed sheets	0(0)	0±0	0(0)	0±0	0%
	Overall mean	11.1±11.1	Overall mean	37.3±10.4	

The overall mean scores on knowledge of prevention of pressure injuries for the pretest and post-test were compared using one sample T-test. The pre-training knowledge mean score on prevention of pressure injuries was 11.1±11.1SD, while the post training

knowledge mean score was 37.3±10.4. These two mean scores were significantly different at 95% confidence level (t=10.376, df=16, p<0.001).

Table 4: Comparison between pre-training and post training knowledge mean scores

Prevention knowledge	N	Mean±SD	Mean difference	Std Error	T	Df	Sig	95% CI of the difference	
								lower	upper
Pretest	17	11.1±11.1	0.001	2.695	0.000	16	1.000	-5.07	5.07
Posttest	17	37.3±10.4	26.171	2.522	10.376	16	0.000	20.82	31.52

Discussion

Demographic characteristics of the primary home care givers

Majority of the primary home caregivers were female which meant that, caring for bedridden patients was mostly done by females. This could be due to the natural instinct of females to nurture and care for those in need. This finding was similar to what was reported by (García-Sánchez et al., 2019) whereby, male home caregivers had the notion that, care of bedridden patients is a preserve of female gender. Most of the primary home caregivers were aged 29-38 years with a mean age of $37.06 \pm 11.5SD$. This finding was similar to what was reported by Tharu et al., (2018) who found that, the average age for care providers in Bangladesh was thirty eight years. However, this finding was different from that of Lee & Lee (2022) whereby, the average age of the caregivers in Korea, was 64 years.

The different ages of the caregivers could be due to different employment levels in different countries. For instance, if there is high rate of unemployment, we would expect relatively young caregivers, and if the rate of unemployment is low, we would expect mostly retirees to take care of the bed ridden

patients. Majority had secondary level of education which could be due to Kenya's Governments' efforts to subsidize primary and secondary education. This finding was different from that of (García-Sánchez et al., 2019) who found that, majority of the primary home caregivers had primary level of education. As for marital status, majority were married, which meant that they had other family responsibilities besides taking care of the bedridden patients, and this finding was in agreement with that of Tharu et al., (2018). As for the relationship between caregiver and the patient, all of them had a blood relationship, where majority were granddaughters of the patients. This was different from the findings of Tharu et al., 2018, and Garcia-Sanchez et al., (2019) who reported that, majority rather than all; home caregivers had blood relationship with the patient. Concerning occupations, majority of the primary home caregivers were small scale farmers, which could be due to the agricultural nature of Embu County, which was the primary study area.

Demographic characteristics of the patients

Majority of the patients were female which agreed with the findings of Matos et al., (2017). Most of the patients were aged between 69-78 years, with a mean age of



78.4±18.7, which means that they were old. This finding agreed with the findings of Jaul et al., (2018) who reported that, pressure injuries were a major concern among the elderly patients, due a variety of reasons e.g. senility, loss of bladder and bowel control, metabolic derangements, loss of skin turgor and immobility. Majority had no formal education, probably because they were born in the colonial error, when Africans had limited access to education opportunities. The finding agreed with that of Matos et al., (2017) whereby, most patients did not have any formal education. Majority were widowed, probably due to higher life expectancy among females in Kenya, compared to their male counterparts. Majority were small scale farmers, maybe due to the agricultural nature of their environments. Majority had severe risk for pressure injury development, due to the nature and severity of their illnesses whereby, most of the respondents had cardiovascular accidents, which interfered with mobility. Concerning the mode of payment for hospital bills, majority were paying in cash, which meant that, majority could not afford health care, probably due to low socio-economic status.

Impact of training on pressure injury prevention knowledge

The pre-training and post training knowledge mean scores on prevention of pressure injuries were significantly different, which meant that, training intervention of home caregivers had a positive outcome. This finding was similar to that of Chong (2017) who reported that, significant improvement in both pressure injury prevention knowledge and practice was observed, after a training intervention. These findings were also in agreement with those of Eljedi et al., (2015), and those of Kaur et al., (2018), who reported better knowledge in the post tests on pressure injury prevention, compared to the pretests, following intense training of the respondents, in the experimental groups.

Conclusion and recommendation

The primary home care givers were mostly youths, while the patients were old. The primary home caregivers had poor knowledge of pressure injury prevention, for both pre-training and post training phases. However, training of primary care givers significantly improved their pressure injury prevention knowledge. Continuous training of primary care givers, coupled with regular follow up at home for supportive supervision is recommended.



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