

Prevalence and risk factors for Pressure ulcers among adult inpatients at a tertiary referral hospital Kenya, 2021

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Abstract

Background: Globally, pressure Ulcers are recognized as one of the most frequent causes of harm to clients. Pressure ulcers primarily occur in bony areas of the body where the potential for pressure and tissue distortion is greatest.

Methods: A cross-sectional study among patients admitted in medical, surgical and gynecological wards. Presence of risk factors for pressure ulcers was examined seventy-two hours after hospitalization. Purposive sampling technique was adopted to select a specific group of clients in danger of pressure ulcers. Chi-square independence test was used to equate the distribution by pressure ulcer phase, location amongst patients admitted from home. Logistic regression exploration was used, straight admission from home being the exposure variable, existence of one or more pressure ulcers on entry to hospital as the product variable.

Results: The prevalence rate of pressure ulcers was 16.66%. Majority of the respondents 113 (52.3%) were females; male respondents were 103 (47.7%). Based on pressure ulcer staging, 13 (36.1%) developed stage I, 10 (27.8%) had stage II, 9 (25%) had stage III and 4 (11.1%) had stage IV pressure ulcers. Underlying medical condition of the respondents and presence of pressure ulcers was found to be significant ($P<0.012$). Incontinence was found to be significant ($p<0.028$). Likewise, Nutritional status, poor support surfaces and Poor mobility were found to be statistically associated with presence of pressure ulcers ($P<0.005$).

Conclusion: The present study demonstrated that the patients most at risk of developing pressure ulcers were the older adults > 60 years of age.

Key words: Pressure ulcer, Prevalence, risk factors, pressure ulcer staging, Kenya

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I. Introduction

Globally, pressure Ulcers are recognized as one of the five most frequent causes of harm to clients¹. Pressure ulcers primarily occur in bony areas of the body where the potential for pressure and tissue distortion is greatest. Pressure ulcers vary in size and severity of damage to the skin, underlying tissues, muscles, and surface area over bony prominence².

Although pressure injuries are mainly preventable problems, it has serious impacts on the health care system³. It extremely threatens the safety of clients by increasing mortality rates, decreasing quality of life, longer hospital stays, and increasing costs for patient care⁴. Likewise, it impacts pain/suffering, disturbance of body image, delayed healing, and overall health outcomes⁵. In addition to its impact on individual and health care systems, it carries a significant economic burden⁶. It has been estimated that the cost of treating pressure ulcers is 2.5 times higher than the cost of preventing ulcers⁷. The total annual cost for the treatment of Pressure Ulcers in the United States in 2018 was 10.2 billion USD and linked to nearly 29,000 hospital deaths⁸.

The identification of associated factors is a significant consideration in decreasing the risk and incidence of Pressure Ulcers⁹. In addition, determining risk factors can be used as yardsticks to design appropriate prevention measures, and to reduce the progression of the disease¹⁰. Moreover, preventive measures are generally divided into four main areas: assessment of pressure ulcer development risk, skincare and initial treatment, use of pressure reducing support surfaces, and education¹¹. Therefore, early detection of patients who are susceptible to Pressure Ulcers is crucial, with the recommendation that an initial skin assessment should be performed within 8 hours of hospital admission¹².

The global prevalence of Pressure ulcers in hospitalized adult patients is estimated at 12.8%¹³. In low-income countries such as Ethiopia, the prevalence of Pressure ulcers is at 16.8%¹⁴. Pressure ulcers represent a significant medical burden with €2.5 billion spent annually and €1.71 to €470.49 per patient on Pressure ulcer treatments in Europe¹⁵.

The scarcity of existing data on pressure injuries in this environment despite morbidity and increased length of hospitalizations necessitate a further look into the factors influencing their occurrence. We carried out a cross-sectional study on hospitalized adults at the referral hospital to determine prevalence and related factors among these patients.

II. Methods

Following ethical approval from Kenyatta National Hospital/University of Nairobi (KNH/UON) ethics committee, a descriptive cross-sectional study was conducted at Kenyatta referral hospital, Nairobi, Kenya. Kenyatta National Hospital is a Referral hospital situated about three kilometers from Nairobi city, Kenya. It is a public, tertiary, referral hospital for the Ministry of Health. It is also the teaching hospital of the University of Nairobi College of Health Sciences. It is the largest hospital in the country and East Africa as well. KNH has different wards which include medical ward, surgical ward and gynecological wards.

The target populations were all admitted patients in Kenyatta referral hospital. The study populations were those patients who had been admitted in medical, surgical, and gynecological wards during the study period. Presence of risk factors for pressure sores was examined seventy-two hours after hospitalization. Patients without risk factors for bed sore formation and patients that fail to give informed consent were excluded from the study.

Purposive sampling technique was adopted to select a specific group of clients in danger of compression sore formation. The sample size was determined by using a single population proportion formula considering the following assumptions: prevalence (p) of pressure ulcer 16.8% based on a study done in Ethiopia¹⁴. Z, standard normal distribution value at 95% confidence level of $Z^2 \alpha/2 = 1.96$, and margin of error (w) = 5%. This gave a sample size of 216 admitted patients.

Qualified research assistants ascertained the occurrence or lack of pressure sores by executing a comprehensive optical skin examination 72 hours after entry to the hospital ward. The reason for choosing Day 3 is associated with the purpose of the inquiry, which is to recognize danger features for pressure sores promptly during hospitalization. Four bases of data were utilized to distinguish compression sores that are present in advance of patient hospitalization. Respective pressure sore was categorized as certainly hospital attained, probably hospital developed, or preexistent. With these guidelines, a pressure sore was taken to be preexistent if at slightest, one source described that it was existing at patient entry and no source stated that it was lacking.

Occurrence of established pressure ulcers was assessed by dividing the number of patients with one or more pressure ulcers on entry to the hospital by the total number of patients. Chi-square independence test was used to equate the distribution by pressure sore phase, location amongst patients admitted from home and those admitted from other facilities. Logistic regression exploration was used, straight admission from home being the exposure variable, existence of one or more pressure sores on entry to hospital as the product variable. A confounder was determined to be an attribute whose addition alters the odds ratio for the relationship among pressure sores and admission from home.

III. Results

According to socio-demographic characteristics fifty-two-point three percent (52.3%, n=113) were females while 47.7% (n=103) males. The respondent age was reported as Mean (SD) of 59.52 (18.37) with a Median (IQR) of 65 (47-73) ranging from 17 to 89. Most of the participants were 60 and above years (36.6%), followed by 23.1% (n=50) aged 50 to 59 years, 20.4% (n=44) aged 40 to 49, 7.4% (n=16) aged below 30 years and 12.5% (n=27) aged 30 to 39 years. According to the study, 48% (n=103) had tertiary as the highest level of education, 42% (n=91) secondary and 10% (n=22) primary. On responding to area of residence, findings indicated that 53.2% (n=115) live in rural areas and 46.8% (n=101) urban areas (Table 1).

A total of 36 pressure ulcers were detected in 216 patients, with the prevalence rate of 16.66%. The prevalence of pressure ulcer was higher in male respondents (22) than in female respondents (14). Based on pressure ulcer staging, 13 (36.1%) developed stage I, 10 (27.8%) had stage II, 9 (25%) had stage III and 4 (11.1%) had stage IV pressure ulcers. According to anatomical position, 14 (38.9%) developed lower back/buttocks area and 7 (19.4%) patients developed pressure ulcer at the back heel (Figure 1).

We sought to establish the presence of pressure ulcers based on evident risk factors. Findings revealed that, of the 96 patients with underlying medical condition, 8 (8.3%) had pressure ulcers with 88 (91.7%) having no signs of pressure ulcers. Fifty seven patients who had incontinence risk factor with 11 (19.3%) having pressure ulcers. Poor nutritional status (n=49) with 6 (12.2%) having pressure ulcers; poor Support surfaces (n=9) with 7 (77.8%) having pressure ulcers; Poor mobility (n=5) with 4 (80%) having pressure ulcers as indicated in (Table 2). Underlying medical condition of the respondents and presence of pressure ulcers was found to be significant ($P < 0.012$). Incontinence was found to be significant ($p < 0.028$). Likewise, Nutritional status, poor support surfaces and Poor mobility were found to be statistically associated with presence of pressure ulcers ($P < 0.005$).

The odds of developing pressure ulcers among patients aged over 60 years was 2.19 times more likely than those other categories below 60 years. Bedridden patients were 3.29 times more likely to develop pressure ulcers than those that are not bed-ridden. Patient's pre-existing medical conditions was significantly associated with pressure ulcers. Those patients with diabetes are 6.19 times more likely to develop pressure ulcers than those with other conditions (Table 3.)

IV. Discussion

The purpose of this study was to identify risk factors and prevalence for pressure ulcer development among hospitalized adult patients. Identifying risk factors is useful to improve our understanding and care planning for patients considered high risk and to recognize factors that are potentially modifiable.

Majority of the patients in our study with advanced age greater than 60 years developed pressure ulcers. Age is a factor that affects the structure and renewal of the skin. As age progresses, the fragility of the skin increases and Pressure Ulcers can develop more easily¹⁶. Age had an effect on the development of Pressure Ulcers in all patients in our study, as in many other studies¹⁶.

The prevalence of PUs was 16.66% in our study of hospitalized patients. Prevalence studies of PUs have been conducted in many different countries, and the prevalence in the literature varies widely from 8.1% to 16.8%¹⁷. These results might be due to different patient populations and health care conditions in different countries. Systematic review studies also show a wide range of PU prevalence rates among hospitalized patients: 3.1% to 30.0% in the United States, 1% to 54% in Europe, 6% in Australia, and 2.7% to 16.8% in Asia¹⁸.

Poor nutritional status, immobility, incontinence, underlying medical condition, poor support surfaces were evident risk factors for development of PU in our study. Degrees of mobility, perfusion and skin status have been identified as the most common independent risk factors for the development of Pressure Ulcers¹⁹. Moreover, factors such as pain, urination problems, nutritional and general health status have been associated with PUs risk²⁰. Nevertheless, no single factor can explain PUs risk; instead, there is a complex interplay of factors that increase the probability of PUs development²¹.

The strongest predictors for hospital acquired pressure ulcer were age greater than 60 years old, bedridden patients and comorbidities. In our study, the odds of developing PU among patients aged 60 years and above were 2.19 times more likely than other age groups. Similar findings have been described by Koivunen et al in a study done in Finland¹⁶. Other studies found that skin irritation was the strongest predictor of hospital acquired PU and a potentially modifiable risk factor²².

The current study is not free from limitations. First the sample size was small due to the limited study period of 3 months. Secondly the study design was cross sectional where participants were examined at one point in time as opposed to follow-up study. Lack of published literature in Kenya on the subject matter limits comparisons of results. Nevertheless this study has implications for clinical practice. This finding would serve as benchmarks for health care providers to establishing robust preventive measures for averting PUs in hospitals.

V. Conclusion

The present study demonstrated that the patients most at risk of developing pressure ulcers were the older adults > 60 years of age. Although PUs has been given substantial consideration within hospitals, they remain a significant problem. A summary of the risk factors and a risk predictive model will help to give a direction of prevention interventions for immobile patients and provide the basis for PUs prediction system construction.

Competing interests

The authors declare no competing interest.

Authors' contributions

Conception and design of the study: Marylyne Margai, Peter Kiteywo Sisimwo, Evans Obaigwa, Annastacia Mbatha, Alphonse Mutua, Winnie Atieno. Testing the feasibility of the study: Marylyne Margai, Peter Kiteywo Sisimwo, Evans Obaigwa, Annastacia Mbatha, Alphonse Mutua, Winnie Atieno. Acquisition of data: Marylyne Margai. Analysis and interpretation of data: Vincent Chagara. Drafting the manuscript: Peter Kiteywo Sisimwo. All authors approved the final version of the manuscript.

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Table 1: socio demographic characteristics of the respondents

Variable	Frequency n)	Percent (%)
Gender		
Male	103	47.7
Female	113	52.3
Marital status		
Married	187	86.6
Single	16	7.4
Divorced	6	2.8
Separated	3	1.4
Widowed	4	1.8
Age		
Below 30 years	16	7.4
30 to 39	27	12.5
40 to 49	44	20.4
50 to 59	50	23.1
60 and above	79	36.6
Highest level of education		
Primary	22	10
Secondary	91	42
Tertiary	103	48

Area of residence		
Rural	115	53.2
Urban	101	46.8

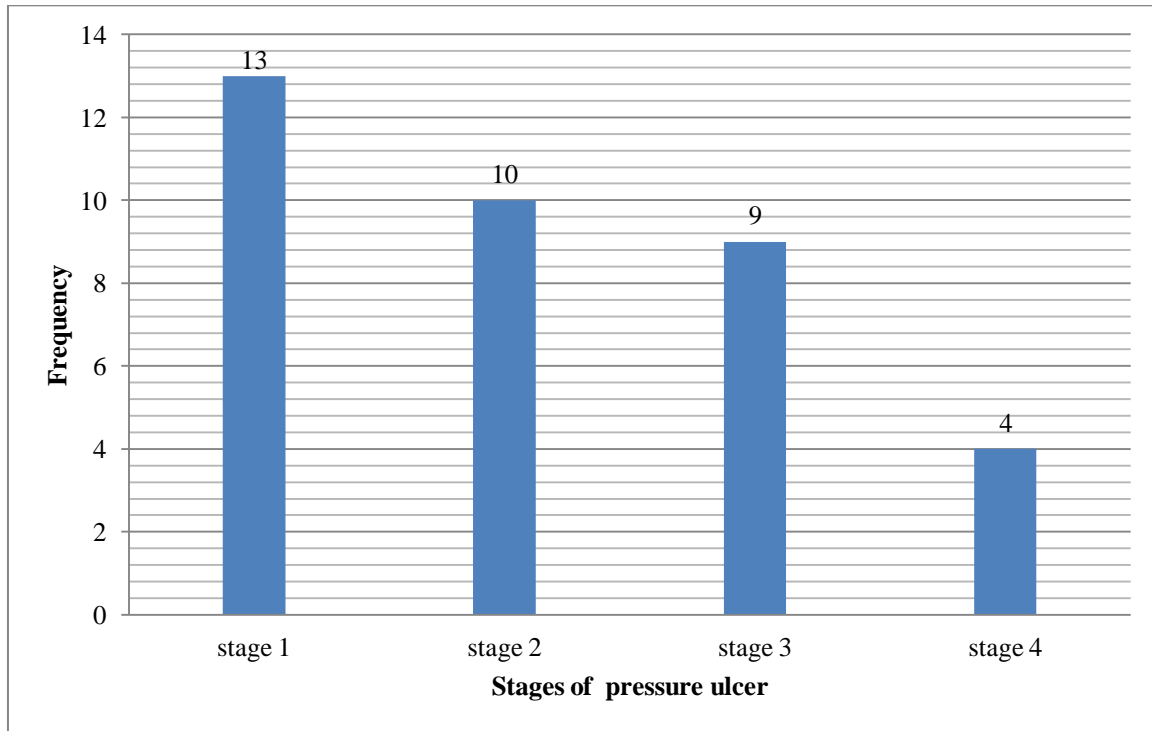


Figure 1: Pressure ulcer staging

Risk factor	N (%)	Pressure ulcers		Chi-Square	P-Value
		Present n (%)	Absent n (%)		
Medical condition	96(44.4)	8 (8.3%)	88 (91.7%)	0.914	0.012
Incontinence	57(26.4)	11 (19.3%)	46 (80.7%)	4.812	0.028
Nutritional status	49(22.7)	6 (12.2%)	43 (87.8%)	0.997	0.000
Support surfaces	9(4.2)	7 (77.8%)	2 (22.2%)	4.988	0.026
Poor mobility	5(2.3)	4 (80%)	1 (20%)	5.621	0.018

Variable	Pressure ulcers		Odds Ratio	Sign.	95% C.I	
	Present	Absent			Lower	Lower
Age						
Below 30 years	1	15	1			
30 to 39	2	25	0.56	0.31	0.18	1.73
40 to 49	3	41	1.80	0.38	0.48	6.71
50 to 59	7	43	1.37	0.73	0.23	8.10
60 and above	23	56	2.19	0.57	0.45	4.22
Gender						
Male	22	81	.189	0.493	0.381	1.795
Female	14	99	0.229	0.632	0.18	1.73
Education level						
Primary	2	20	1			
Secondary	18	73	0.97	0.211	0.48	1.94

Table 3: predictors of pressure ulcers among hospitalized patients

Variable	Pressure ulcers		Odds Ratio	Sign.	95% C.I	
	Present	Absent			Lower	Lower
Tertiary	16	87	0.98	0.411	0.138	2.34
Area of residence						
Rural	20	95	2.4	0.333	0.92	6.23
Urban	16	85	1			
Patient bedridden						
Yes	23	170	3.29	0.198	1.8	7.9
No	13	10	1			
Co-morbidities						
Diabetes mellitus	16	74	6.19	0.107	0.36	5.32
Malnutrition	4	18	5.44	0.602	0.59	4.16
Peripheral vascular	6	10	2.8	0.464	1.39	7.75
Anemia	6	32	2.1	0.52	0.13	1.43
Others	4	46	1	0.711	0.09	1.17

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