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Prevalence and Associated Factors of Pressure Ulcer among Adult Inpatients in Wolaita Sodo University Teaching Hospital, Southern Ethiopia

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Abstract
Background: Pressure ulcers are areas of localized cellular damage to the skin and underlying tissues, caused by pressure, shearing, and frictional forces. The prevalence of pressure ulcers can range anywhere from 0% to over 38% depending on the sector, from general or University Hospitals to home care to nursing homes.**Objective*:*** To assess prevalence and predictors of pressure ulcer among adult inpatients in Wolaitta Sodo University Teaching Hospital, Southern Ethiopia 2015. **Methods:** Institution based cross-sectional study was conducted from March 1 to April 30, 2015 in Wolaita Sodo University Teaching Hospital. The total of 239 inpatients were selected by using systematic sampling technique from each ward. Data were collected by trained data collector pretested structured questionnaire. Data were entered into Epi Data version 3.1, edited and cleaned for inconsistencies and analyzed by using SPSS version 20.0. Descriptive statistics and bivariate and multiple logistic regression analyses were performed. P-values less than 0.05 and 95% confidence intervals were used to determine associations between independent and dependent variables. **Results:** This study found that 32 inpatients developed pressure ulcer among 239 inpatients, with the prevalence of 13.4%. Application of the multiple logistic regression technique showed that the presence of pressure ulcer were significantly associated with Diabetes (AOR=4.116;95% (CI=2.135,6.884), absence of change of patient position by nurses (AOR=3.20;95%CI=1.34,6.23),bed ridden patients (AOR=3.01;95%CI=1.30,4.456), Anti depressant users (AOR=6.016;95%CI=1.420, 6.652), duration of hospital stay >=21days (AOR=4.67; 95% CI=1.98,12.00), Very limited sensory, perception (AOR=2.773;95%CI=1.244,4.64) activity status (bedbound) (AOR=2.34;95%CI=3.24,4.13) and friction and shear problems (AOR=2.2;95%CI=1.85, 15.79).**Conclusion:** The prevalence of pressure ulcer was high among hospitalized patients. Prolonged length of stay in hospital, problem of sensory perception, activity status, and general condition of the patients, patient's principal diagnosis, and medications in use, change of patient's position and friction and shearing forces were significantly associated with the presence of pressure ulcer.
Keywords: Pressure ulcer, prevalence, adult inpatients, associated factors.

Background

Any lesion caused by excessive non uniform pressure resulting in damage of underlying tissue and skin. Pressure ulcers are areas of localized cellular damage to the skin and underlying tissues, caused by pressure, shearing, and frictional forces. pressure ulcerusually occur over bony prominences such as the sacrum, heels, and hips and are graded according to the amount of tissue damage (1).

Prolonged pressure (from lying or sitting on a specific part of the body) will impede capillary blood supply to an area and thus limit the delivery of oxygen and nutrients to tissue, placing patients at risk for skin breakdown .Expected capillary pressure ranges are between 10 and 30 mmHg. Tissue hypo-perfusion occurs when the interface pressure exceeds capillary pressure thus increasing the likelihood of pressure ulcer development (2).

The usual mechanism of forming a decubitus ulcer is from pressure. Any area of tissue that lies just over a bone is very likely to form a decubitus ulcer: areas include the spine, coccyx or "tailbone," hips, heels, and elbows, to name a few. Prolonged pressure can be experienced internally, between bony prominences and soft tissue, which results in ischemia and necrosis. This tissue then begins to decay from lack of blood circulation. A number of Contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated (clarifying something) (3, 4, 5).

Pressure ulcer stages: are distinct phases or periods in the course of a localized damage to the skin and underlying tissue. Stage I: Intact skin with non-blanch able redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching (to lose color); its color may differ from the

surrounding area. Stage II: Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound Stage III: bed, without slough (deep muddy hole wound). This may also present as an intact or open/ruptured serum-filled blister. Full thickness tissue loss, subcutaneous fat may be visible but bone, tendon or muscles are not exposed. Slough may be present but does not obscure the depth of tissue loss. Stage IV: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling. Unstageable: Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed (6).

Today, much advancements at preventing Pressure ulcers has been documented in the developed nations with the advent of sophisticated equipments such as alternating pressure mattresses/overlays, air fluid beds, low-air-loss beds and devices such as water-filled mattresses, air filled mat-tresses and gel-filled mattresses/overlays among others(7,8).

Pressure ulcer significantly threatens the well-being of patients with limited mobility and is used as a quality indicator of nursing care in health care institutions. (9).

Hospital acquired pressure ulcer (HAPU) rates increased by 63% between 1993 and 2006.

However, hospital admission rates increased only 11% during the same period, and hospital stays for patients over 65 years old increased by 14%, suggesting that the observed increase in HAPU rates are not entirely a function of the patient demographic and also contributes to higher health care costs, increased morbidity and mortality rates (10).

Patients admitted to hospital or otherwise confined to bed, chair, or wheelchair are at risk for the development of pressure ulcers. Pressure ulcers pose a major burden for health care in western countries. In the Netherlands more than 1% of the total budget for health care is spent on prevention and treatment of pressure ulcers or prolonged hospital stay once a pressure ulcer develops (11).

The treatment of patient with pressure ulcer is a major concern and an important wound healing challenge to health care providers working in health care settings. Also it is associated with high morbidity and mortality; especially in frail elderly people with 50% develop severe pressure damage dying within 4 months (12).

Patients confined to bed for long periods, patients with motor or sensory dysfunction and patients who experiences muscular atrophy are prone to pressure ulcer. Aged people are more commonly affected by pressure ulcer..Pressure ulcers are a major problem in health care. For instance; in Dutch health care institutions extra costs associated with decubitus were estimated to be approximately 450 million Euros a year.(13).

Also episodes of Pressure ulcers were common phenomenon in the Nigerian clinic settings.Once pressure ulcer is developed, it can provide wound healing process by change of dressing, continued wound assessment, and proper nutrition. . The cost of treatment of pressure ulcer has been estimated as 2.5 times that of prevention cost. So, implementing a pressure ulcer prevention program remains essential. When the stage of pressure ulcer increases, the cost of treatment also increases.

Pressure ulcers and the risk factors associated with their development have been studied for almost 50 years yet the temporal, pressure ulcer risk factors and pressure ulcer prevalence is still poorly understood (14).

Also there was no study conducted in study area on prevalence and associated factors of pressure ulcer. So the purpose of this study was to assess the prevalence and associated factors of among adult inpatients in Wolaita Sodo University teaching hospital (15).

Methods and Materials

Wolaita Sodo University Teaching Hospital (WSUTH) is found in South Nations Nationalities and People Region States (SNNPRS), Ethiopia. The Teaching Hospital is located in Sodo town of Wolaita Zone, SNNPRS which is 380 km away from the national capital Addis Ababa and 170 km far from the regional capital Hawassa. The teaching hospital was established in 1928 and serving people in catchment area of 2 million people including neighboring Dawuro Zone, Gamo Gofa Zone and Kambata Tambaro Zone.

According to the data obtained from the hospital approximately 48036 people visits outpatient department per year and 5998 people admits inpatient department per year. The hospital has different wards. Among these wards medical wards, surgical wards, and ICU wards have total patient flow per year was 1836, 1452 and 348 respectively (WSUTH Annual report, 2014).

4.2 Study Design

Institution based cross sectional study was conducted from March 1 to April 3, 2015 in Wolaita Sodo University Teaching Hospital south Ethiopia.The hospital established in 1928 and serving 2 milion people . It has the total capacity of about 195 inpatient beds.

Sample size determination
Sample size was calculated using Epi Info version 7 software using the single population proportion formula. prevalence (p) of pressure ulcer 16.8%, a confidence level of 95%,a 0.04 margin of error,and a 10% non-response rate, the final sample size was 239.

Sampling Technique
Systematic sampling technique was used to select samples from each ward. The sample size was allocated for each ward proportionally to the sample size (95 from surgical wards, 121 from medical wards and 23 patients from ICU wards .

Data collection and quality assurance
A structured questionnaire was produced in English and translated from English to the local language. Another translator then translated the local version back into English to check for consistency of meaning. The study variables were adopted from the relevant literature. face to face interview and physical examination (observation) conducted.

Three trained BSc Nurses out of hospital were recruited for data collection and one MSc Nurse assigned for supervision. The questionnaires were pre- tested in another similar hospital to assess clarity, sequence, consistency, understandability and for total time it takes before the actual data collection. Finally necessary comments and feedback were incorporated for the final instrument.

Data processing and analysis
Data were entered into EpiData version 3.1 and exported to SPSS version 20.0 for further analysis. The frequency distribution of all the variables was examined to check for data entry errors. Each study was described using descriptive statistics. Odds ratios (AOR) and 95% confidence intervals were calculated to test for associations between independent variables and the presence of pressure ulcer, using the multiple logistic regression technique. All explanatory variables which have association in simple logistic analysis with P-value less than 0.25 was entered into multiple logistic regression model in order to assess the independent associated factors of pressure ulcer among adult inpatients in WSUTH. P-value of less than 0.05 was taken as statistical significance. Results were summarized and presented by tables and charts.

Ethical Consideration
Ethical approval was obtained from Jimma University College of Health Sciences Ethical Review Board. The participants were informed about the purpose of the study and written consent was obtained from each study participant prior to conducting the interview.

Results
Socio demographic Characteristics
A total of 239 admitted patients were included in this study with the response rate of 100%. Overall, 144(60.3 %) come from rural and rest were urban residents and109 (45.7 %) were protestants and 6(2.5 %) were Muslim. Proportions of males were 127(53%). Thirty four percent of the study participants were in the age range of 29-39.The mean age of the respondents was 34 years. Majority of the respondents 152(63.6 %) were married. About 96 (40.2 %) of the respondents were not educated and 52(22.2 %) respondents were above secondary levels (Table 1).

Prevalence and Stages of Pressure Ulcer
A total of 32(13.4%) pressure ulcer were detected in 239 patients. Based on EPUAP grading scale; 14 (43.75 %) and 9(28.125%) patients developed stage II and stage III pressure ulcer respectively. Among ulcer developed patients, 3(9.375%) constituted advanced stage (stage IV) of pressure ulcer. Of those who developed pressure ulcer, 18(56.25%) and 12(37.5%) developed at buttock and sacral area respectively.

Length of Stay in hospital and Change of Patient's Position
Almost greater than half of admitted patients146 (61.1 %) had <=6 days length of stay in the hospital, whereas 36(15.1%) patients stayed in hospital for more than 21 days. The mean hospital length of stay was 8 (inter quartile range of 4–13) days. From pressure ulcer developed individuals, 26(81.25) have not used pressure relieving device; Only 6(18.75%) of patients used airings pressure relieving device.

Factors associated with of pressure ulcer
Independent variables were analyzed in simple logistic regression with dependent variable of pressure ulcer to know their association. Those variables which were significant at p≤ 0.25 entered into multiple logistic

regressions.

Multivariable regression was performed for significant variables in bivariate analysis to produce a final model for pressure ulcer. Accordingly length of stay in hospital, sensory perception, medication, activity status, general condition of the patient, patient's principal diagnosis, change of patient's position by nurses, and friction and shear had significant association with pressure ulcer.

The patients who had stayed in hospital ≥21 days were 4 times (95% CI: 1.98, 12.00) more likely to develop pressure ulcer than those participants who had stayed ≤6 days. patients who had very limited sensory perception were 3 times more likely to develop pressure ulcer than no impairment in sensory perception (95% CI: 1.244, 4.64).

Patients with diabetes mellitus as principal medical diagnosis were 4times (95%CI: 2.135, 6.884) more likely to develop pressure ulcer than those who had pneumonia. patients whose general condition bed ridden were 3times (95%CI: 1.30, 4.456) more likely to develop pressure ulcer than that of whose general condition were satisfactory.

Patients who had problem in friction and shearing forces were 2.2 times (95% CI: 1.85, 15.79) at high risk of developing pressure ulcer than those who had no apparent problems. In patients whose position were not changed by nurses were 3.2 times (95%CI: 1.34, 6.23) more likely to develop pressure ulcer than changed by nurses.

Those patients whose activity were bedbound was 2.3 times (95%CI: 3.24, 4.13) at higher risk of developing pressure ulcer than those who walk occasionally. patients who used antidepressant medications were 6 times more likely (95%CI: 1.420, 6.652) to develop pressure ulcer than those who uses antibiotic medications (Table 2).

Discussion

The researcher characterized the sample of 239 patients, determined the prevalence of pressure ulcer at WSUTH and identified the factors associated with ulcer development.

The prevalence of pressure ulcer found in the present study 13.4% which is inconsistent with previously reported rates in German and Netherland (16).Similar study conducted in Ethiopia Felege Hiwot Referral Hospital revealed the prevalence of pressure ulcer was 16.8%. our study some what slightly lower than study conducted in Felege Hiwot Referral Hospital (17). This discrepancy might be due to difference in characteristics of patients, disease condition of patients, and the variation of length of stay in hospital. Study conducted in Thailand showed that presence of pressure ulcer was significantly associated with the use of pressure ulcer preventive devices (18); nevertheless, in this study 26(81.25%) of pressure ulcer developed patients did not apply pressure relieving devices. The reason might be inadequacy of materials in the hospital or work overload of nurses in applying pressure relieving devices or may be due to poor awareness on the importance, nurses' workload or overlooking the problem.

According to the current study patients' total hospitalization time were associated with the occurrence of pressure ulcer. As the length of stay in hospital increased, the development of pressure ulcer also increased. More days of hospitalization were significantly associated with pressure ulcer. This finding was in agreement with the study conducted in the 3 Irish hospitals, more hospitalization stay of the patients strongly associated with development of pressure ulcer (19).This might be due to prolonged pressure and decrease of blood circulation in particular area.

Patients' ability to respond appropriately to pressure or pain stimuli was clearly related to the formation of Pressure ulcer in this study. All pressure ulcer developed patients had complained of a 'diminished level' of sensation in this study and the majority of cases had 'very limited' sensory perception. This finding was in agreement with the study conducted in Sweden; pressure ulcers were most developed in patients who had very limitation in sensory perception (20). The possible reason might be that most of respondents participating in this study had very limited sensory perception.

The predictor of Braden sub element associated with developed pressure ulcer in hospitalized patients in this study was the problem of friction and shearing forces. This sub-item of the Braden element was revealed to be significantly related to pressure ulcer. This result was in agreement with the study conducted in Brazil (21).

In this study, the activity status was related to development of pressure ulcer. Most of admitted patients risk for the development of pressure in this finding was bed bound; the patients in my study had variation in activity levels. A finding Consistent with the results of study conducted in Thailand (22).The possible reason might be that patients with completely limited activity (bed bound) cannot perform activities and change their position without assistant and they are sliding down from the bed.

In this study, absence of change of patient's position by the nurse was associated with the development of pressure ulcer. A similar study was conducted in Taiwan, which revealed that occurrence of pressure ulcer was associated with the absence of change of patient's position by nurses (23). The possible reason might be that not reducing or eliminating high interface pressures, not improving patient positioning, and not reducing or

eliminating areas that are always at risk for pressure ulcer formation and lack of nurses awareness on turning patients regularly every two hours turning.

In this finding immobile, bedridden patients were significantly associated with the development of pressure ulcer. A similar study conducted in Nigeria showed that bedridden patients were dependent on caregivers for both repositioning and transfers, increasing the risk for exposure to the forces of friction/shear and subsequent development of pressure ulcers (24). The possible reason might be that lack of advocates of safe patient handling procedures, the use of glide sheets and patient transfer devices to reduce the deleterious effects of friction/shear on the skin.

Endocrine disease (diabetes mellitus) was the only co-morbid condition was a predictor of pressure ulcer. The study conducted in German revealed that most of patients had endocrine disease developed pressure ulcer (25).

In this study, antidepressants were the only medication that was a significant predictor for pressure ulcer. A finding consistent with the result of study conducted in Greek . (26).

Limitation of this study

Limitation of the study was

- Use of a single study site that diminishes the generalizability of the study findings.
- Inter observer bias and misclassification bias.

Conclusion

The prevalence of pressure ulcer was high among hospitalized patients. Prolonged length of stay in hospital, problem of sensory perception, activity status, and general condition of the patients, patient's principal diagnosis, and medications in use, change of patient's position by nurses and friction and shearing forces were significantly associated with the presence of pressure ulcer. Patients who had stayed in hospital for more than twenty one days, had friction and shear were more liable to develop pressure ulcer.

Recommendation

Based on the study findings we recommend;

Using pressure ulcer preventive devices was highly recommended. Nurses should practice change of patient's position every 2hours. Health care professionals should be more informed about secondary conditions (risk factors for pressure ulcer development) that may occur in the course of patient's stay in the hospital rather than emphasis only on primary condition that warranted admission. Patient's relatives should be informed about the risk factors for the development of pressure ulcers. Training for health care workers concerning risk factors of pressure ulcer should be encouraged. Prospective (follow up) study encouraged to investigate prevalence and associated factors of pressure ulcer for hospitalized patients.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MM,TB and AM; conception and design of the study and data analysis. AS:analyzed the data and interpreted the findings. MM & AS: conducted and supervised data collection and management. All the authors read and approved the final manuscript.

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References

1. National Pressure Ulcer Advisory Panel and European Pressure Ulcer Advisory Panel. Prevention and

Treatment of Pressure Ulcers: Clinical Practice Guideline. Washington, DC; 2009
2. Guyton A.C. and Hall J.C. Textbook of Medical Physiology, London, 2011
3. Schultz, G., Mozingo, D., Romanelli, M., & Claxton, K. Wound bed preparation: a systemic approach to wound management and wound repair and regent; 2009, 11:1-28
4. .National Pressure Ulcer Advisory Panel. Updated staging System: pressure ulcer stages revised by NPUAP. 2007.
5. Shahin ES, Pressure ulcer prevalence in intensive care patients: a cross-sectional study. JEval Clin Prac. 2008; 14:563-568
6. Bluestein D, Javaheri A. Pressure ulcers: prevention, evaluation, and management. AmFAMPhysician. 2008; 78(10):1186-94.
7. AdejumoP.O and Ingwu J.A Nurses' use of water-filled gloves in preventing heel pressure ulcer in the University College Hospital, Ibadan, Nigeria and International Wound Journal, 2010, 7: 472-479.
8. Thomas DR. Prevention and treatment of pressure ulcers: What works? What doesn't? Cleve Clin J Med 2009; 68:704–722
9. Gunning berg L, Lindholm C, Carlson M, Sodden P-O. Risk, prevention and treatment of pressure ulcers - nursing staff knowledge and documentation. Scand J Caring Sci 2006; 15:25763
10. Russo, C. A., & Elixhauser, A. Hospitalizations related to pressure sores and Rockville, MD: Agency for Healthcare Research and Quality 2008; HCUP Statistical Brief # 3.
11. Health Council of the Netherlands: pressure ulcers. Report, 2009**.**
12. Fried Gray, J. A. M., TR, MOR V. Frailty and hospitalization of long-term stay nursing home residents. J Am Geriat Gray, J. A. M., rics Soc. 1997; 45:2659
13. Haalboom et al. J.R.E. Richtlijn Decubitus. Van Zuiden Communications, 2011.
14. Anthony D, Papanikolaou P, Parboteeah S, Sahel M. Do risk assessment scales for pressure ulcers work? J Tissue Viability.2010; 19(4):132-126
15. Ikechukwu E. Prevalence and factors associated with healing outcomes of hospital-acquired pressure ulcers among patients with spinal cord injury, Journal of Public Health and Epidemiology, 2012; vol. 4 (2), 4447.
16. Capon A, Pavoni N, Mastromattei A, Di Lallo D. Pressure ulcer risk in long-term units: prevalence and associated factors. J Adv Nurs. 2007; 58(3):263-72
17. Haileyesus G.etal, Prevalence and associated factors of pressure ulcer among hospitalized Patients at Felege hiwot referral hospital, Bahir Dar, Ethiopia, 2013.
18. J. Black, C. Berks, and G. Urzendowski, "Pressure ulcer in Thailand, incidence and progression in critically ill subjects: influence of low air loss mattress versus a powered air pressure redistribution mattress," *Journal of Wound Ostomy & Continence Nursing*, vol.39, no. 3, pp. 267–273, 2012.
19. Sib Bald R, Norton L, & Woo K. Optimized skin care can prevent pressure Ulcers. Adv Skin Wound Care 2009; 22:392.
20. Clark M and Watts S. The incidence of pressure sores in a National Health Service Trust hospital during 2008 in Sweden. Journal of Advanced Nursing. 2004; 20: 33-36**.**
21. C. Iglesias, Jenison, G.Cranny et al., "Pressure relieving support surfaces (PRESSURE) trial: cost effectiveness analysis," British Medical Journal, vol. 332, no. 7555, pp. 1416–1418, 2009
22. .S. Sayar, S. Turgut, H. Dorgan et al., in "Incidence of pressure ulcers in intensive care unit patients at risk according to the Water low scale and factors influencing the development of pressure ulcers," Thailand Journal of Clinical *Nursing*, vol. 18, no. 5, pp.765–774, 2011.
23. Braden, B.J., Bryant, R., 1990. Innovations to prevent and treat pressure ulcers. Geriatric Nursing 11, 182-186
24. Dealey, C., 2008. Mattresses and beds. A guide to systems available for relieving and reducing pressure. Journal of Wound Care 4, 409-412.
25. Wound Ostomy and Continence Nurses Society. Wound, Ostomy and Continence Nurses Society position statement on avoidable versus unavoidable pressure ulcers. J Wound, Ostomy Continence Nurs.2009; 36(4):378-381.
26. Theaker C, Mann an M, Ives N, Soni N. Risk factors for pressure sores in the critically ill. Anaesthesia.2007; 55:221-224.

Table 1.The Socio demographic characteristics of inpatients in Wolaita Sodo university Hospital southern Ethiopia from 2015 (n=239).

	Variables	Frequency	Percentage (%)
Age	18-28	80	33.47
	29-39	82	34.37
	40-49	57	23.8
	>50	20	8.36
Sex	Males	127	53.1
	Females	112	46.9
Marital status	Married	152	63.6
	Single	63	26.4
	Divorce	19	7.9
	Widowed	5	2.1
Ethnicity	Wolaitta	141	59
	Gurage	39	16.3
	Dawuro	25	10.5
	Amhara	24	10
	Tigray	10	4.2
Level of education	Illiterate	96	40.2
	Primary school	22	9.2
	Secondary school	68	28.5
	Above2ndry school	53	22.2
Religion	Protestant	109	45.7
	Orthodox	89	37.2
	Catholic	35	14.6
	Muslim	6	2.5
Occupational status	Farmer	76	31.8
	Merchant	64	26.8
	House wife	54	22.6
	Gov't employ	29	12.1
	Daily Labor	16	6.7
Residence	Rural	144	60.3
	Urban	95	39.7
Estimated income in Birr	≤1170	177	74.1
	>1170	62	25.9

Table 2: Multiple logistic regression predicting pressure ulcer in adult inpatients in Wolaita Sodo University Teaching Hospital, Southern, Ethiopia, 2015 (n = 239).

Variables		***Pressure Ulcer***		***AOR(95%CI)***
		Yes	***No***	
Patients principal diagnosis	Diabetes	10	61	4.116(2.135,6.884) *
	Chronic renal failure	7	64	0.260(0.021,3.253)
	Acquired brain injuries	9	62	4.640(0.242,8.001)
	Pneumonia	6	20	1
Change of patients position by nurses	Yes	7	72	1
	No	25	135	3.20 (1.34, 6.23) *
General condition of patients	Critically ill	12	71	0.386(0.055.2.706)
	Bedridden	9	44	3.01(1.30,4.456) *
	Satisfactory	11	92	1
Medication in use	Antidepressants	8	64	6.016(1.420,6.652) *
	Sedatives	7	52	3.315(0.569,13.329)
	Vaosopressors	8	30	0.910(0.90,9.253)
	Antibiotics	9	61	1
Duration of hospital stay	<=6days	14	132	1
	7-20days	11	46	2.72 (0.8, 5.9)
	=>21days	7	29	4.67 (1.98, 12.00) *
Sensory perception	Completely limited	10	45	1.673(0.244,3.656)
	Very limited	13	86	2.773(1.244,4.64) *
	No impairment	9	76	1
Activity	Bed bound	12	56	2.34 (3.24, 4.13) *
	Chair bound	7	25	1.34 (0.12, 1.43)
	Walks occasionally	13	126	1
Friction and shear	Problem	11	49	2.28 (1.85, 15.79) *
	Potential problem	13	50	1.89 (0.79, 4.54)
	No apparent problem	8	108	1

AOR= adjusted odd ratio, 95%CI= confidence interval.
Note: * Represents variables having statistically significant association P<0.05.