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## Prevalence and Associated Factors of Pressure Ulcer among Hospitalized Adults at Debre Markos Referral Hospital, East Gojjam Zone, Ethiopia, 2016: Cross-Sectional study

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### Abstract

**Introduction:** Pressure ulcers (PUs) occur frequently in hospitalized, community-dwelling and nursing home older adults, and serious problems that can lead to sepsis or death. Pressure ulcers are additional co-morbid threat / conditions encountered in hospitalized patients or those requiring long-term institutional care.

**Objective:** To assess prevalence and associated factors of pressure ulcer among hospitalized adults at Debre Markos referral hospital, East Gojjam Zone, Ethiopia, 2016.

**Method:** Institution- based, cross-sectional quantitative study design was conducted on a representative sample of 236 hospitalized adults in the study area from February 15/2016 to April 15/2016. Statistical software, Epi data version 3.1 and SPSS version 23 were used. Univariate, Bivariate and Multivariate logistic regression models were used identifying the association; degree of association was interpreted by using ORs with 95% confidence intervals and P-value  $\leq 0.05$  was considered statistically significant with the outcome variable.

**Result:** A total of 8 pressure ulcer was detected from 236 patients, with the prevalence rate of 3.4%. Majority of respondents 3.0% developed pressure ulcer came from the rural area and 1.3 % ( 3) patients developed ulcer was not educated.

Participants who had constantly moist skin were 3.2 times [95% CI: AOR, 3.202[2.050 -16.067] more risk to develop pressure ulcer than rarely moist skin in moisture, and participants who had been very poor in nutrition were 4.9 times [95% CI: AOR, 4.9(3.837 - 23.326)] at higher risk to develop pressure ulcer than adequate in nutrition.

**Conclusion and Recommendation:** The prevalence of pressure ulcer was slightly high among hospitalized adult patients. They developed pressure ulcer at factors such as bed ridden, moist skin, inadequate in nutrition and who had not got frequent position change service. Therefore, frequent position change service and Braden scale PU risk assessment tool should be applied to prevent & reduce the prevalence of pressure ulcer.

**Keywords:** Pressure ulcer, prevalence & Associated factors.

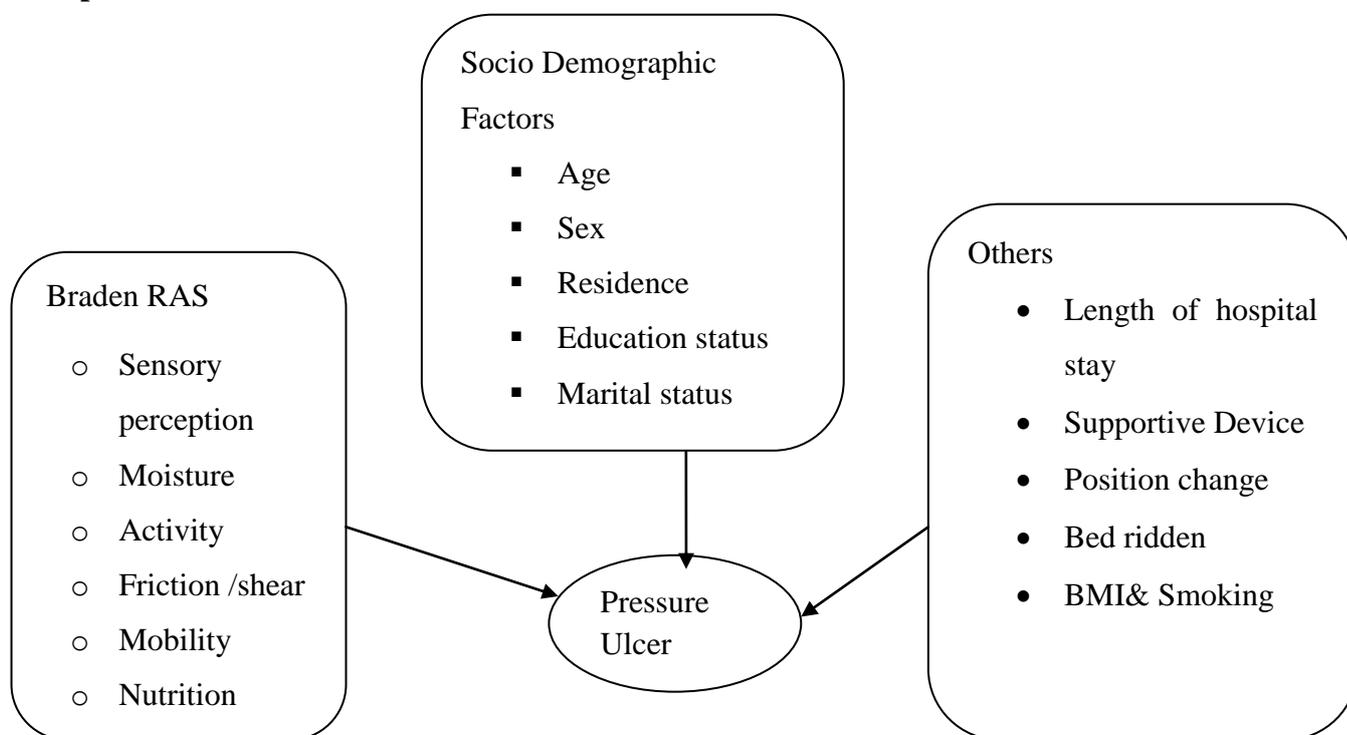
**1. Background**

A pressure ulcer (PU) (also known as pressure sore, pressure injury (PI), decubitus ulcer or bed sore), has previously been defined as “an area of localized damage to the skin and underlying tissue caused by pressure, shear and or a combination of these <sup>(1-4)</sup>. PU leads to ischemia, cell death & tissue necrosis, as capillaries are compressed and the blood flow is restricted, the cutaneous tissues become broken or destroyed, leading to progressive destruction and necrosis of underlying soft tissues. This process results in a painful and slow healing of pressure ulcer <sup>(5)</sup>. The formation of a new pressure ulcer while hospitalized has been defined by the National Quality Forum (NQF) as a hospital-acquired condition (HAC) that is high-cost and high-volume and may be preventable with implementation of evidence-based guidelines <sup>(6)</sup>. Pressure ulcers remain a significant problem in hospitals as well as domestic and community settings. They have been described by both the National Pressure Ulcer

Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP) as “localized injury to the skin and/or underlying tissue usually over a bony prominence as a result of pressure combined with shear and it has long been recognized as a major cause of morbidity, mortality and health care burden globally <sup>(7)</sup>.”

Development of pressure ulcers is complex and multi-factorial. In critical care patients, pressure ulcers are an additional co-morbid threat in patients who are already physiologically compromised. In fact, pressure ulcers are one of the most underrated medical problems in critical care patients. Despite advances in medical technology and the use of formalized prevention programs based on clinical practice guidelines, the prevalence of pressure ulcers during hospitalization continues to increase<sup>(8)</sup>. Therefore, enormous effort is required to find effective and reliable techniques for preventing the initiation of ulcers and eliminating them once they develop <sup>(9)</sup>.

**1.1. Conceptual Framework**



**Figure 1:** Diagrammatic representation of a conceptual framework, newly developed had shown the relationship between the outcome variable and independent variables.

**Source:** Supported by different literatures <sup>(5,8,10,16,20-23,25)</sup>.

## 2. Objectives

### 2.1. General objective

To assess prevalence and associated factors of pressure ulcer among hospitalized adults at Debre Markos referral hospital, East Gojjam Zone, 2016.

### 2.2. Specific objectives

To describe prevalence of pressure ulcer among hospitalized adults at Debre Markos referral hospital.

To identify associated factors of pressure ulcer among hospitalized adults at Debre Markos referral hospital.

## 3. Method

Institution- based, cross-sectional quantitative study design was conducted, and the study period was from February 15 to April 15, 2016. The study was conducted at Debre Markos referral hospital, East Gojjam Zone. This Zone is found in the Amhara region that comprises eleven Woredas and 2,152,671 populations <sup>(26)</sup>. Debre Markos is a zonal town which is found 300 km & 260km away from Addis Ababa and Bahir Dar respectively.

Debre Markos Referral Hospital is one of the referral hospitals in the Amhara region in Ethiopia and it is expected to give service for about three million people for the nearby zone & woredas' people and it has different wards. In the study wards, 42 beds are in Medical, 30 in Surgical and 28 in Gyn.Obs. In the hospital, previous study had not been conducted on the issue of prevalence and associated factors of pressure ulcer among hospitalized adults.

### 3.1. Operational Definition

**Braden RAS/ Braden scale scores:** In this study, Patients were vulnerable to pressure ulcer development when Braden score <17 or with a pressure ulcer and **no risk** of pressure ulcer at Braden score  $\geq 17$  <sup>(3)</sup>.

### 3.2. Data Collection Procedures and Quality Control

Data concerning prevalence and determining factors of PU were collected through interview

and physical examination techniques. The Braden scale risk assessment tool was used to assess the risk of PU and comprised the following items: sensory perception, skin moisture, physical activity, mobility, nutrition, and friction/shear. The Braden Scale is a summated rating scale made up of six subscales scored from 1-3 or 4, for total scores that range from 6-22. A lower Braden Scale Score indicates a lower level of functioning and, therefore, a higher level of risk for pressure ulcer development<sup>(27)</sup>. The standardized questionnaire's tool had been prepared in English language and translated into local/Amharic language /in order to standardize the way questions would be asked. After translating it, retranslation back into the original language had been done by language expert.

Two Bsc nurses & one Bsc midwife nurse for data collection and three Health Officers for supervision would be selected from Debre Markos University. Training was given by the principal investigator for data collectors and supervisors. During data collection, the data collectors filled the data from each patient based on the checklists. Inspection for completeness and quality of data had been carried out by principal investigator.

### 3.3. Data Entry and Analysis

The questionnaires that would be filled by the data collectors were going to be checked its completeness and then cleaned, coded & entered into Epi data version 3.1 statistical software and then exported to SPSS version 23 & analyzed. Univariate for descriptive statistics and both bivariate & multivariate logistic regression models for association were used ; degree of association was interpreted by using ORs with 95% confidence intervals and P-value  $\leq 0.05$  was considered statistically significant with the outcome variable.

### 3.4. Ethical consideration

Ethical clearance was obtained and a formal letter of cooperation had been written to Debre Markos referral hospital from Addis Ababa University College of Health Sciences, School of Allied Health Sciences, and Department of Nursing And

Midwifery Ethical Review Board. The purposes and the importance of the study had been explained & oral consent was obtained from each study participants. Information was given that study participants have full right not to participate in the study if they were not willing. To ensure confidentiality, anonymity was explained clearly to the participants. Nursing care was given for those patients who developed pressure ulcer during study period.

#### 4. Result

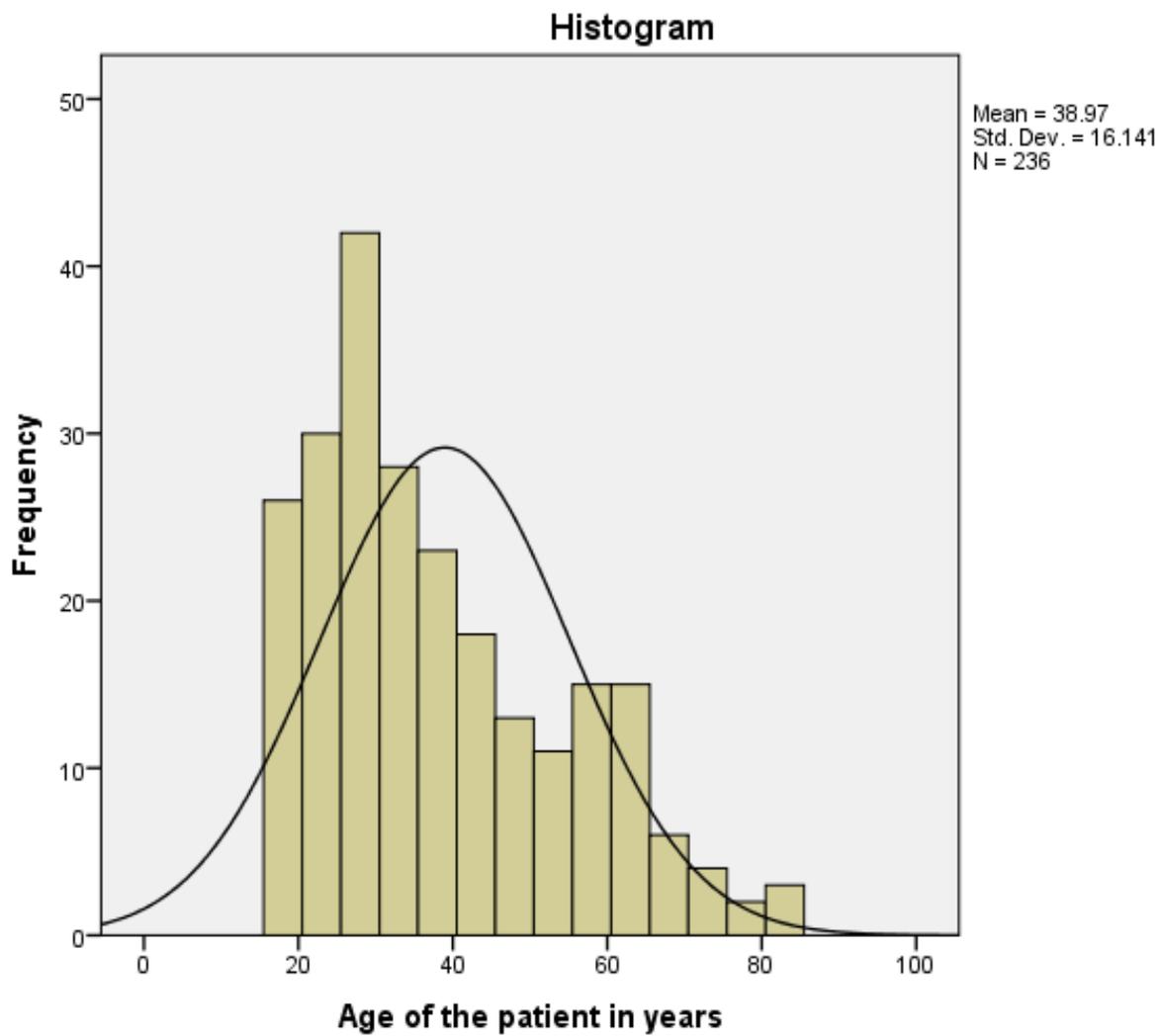
##### 4.1. Socio-Demographic Characteristics

A total of 236 admitted patients at Debre Markos referral hospital were included in this study with the response rate of 100%. Majority of, 82.2% (194) and 59.7% (141) respondents were rural residents and males in sex respectively, and the respondents 76.7% (81) were married. In addition, 25.4% (60) of the respondents were not educated (Table-1).

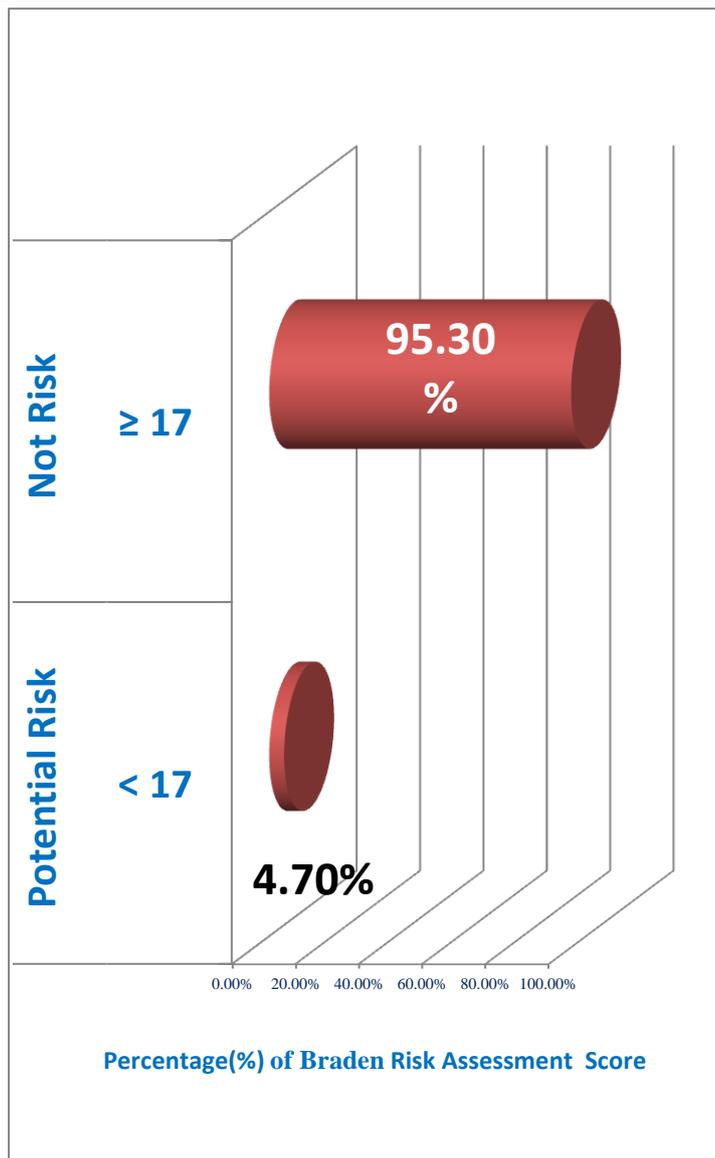
**Table 1:** Socio-demographic Characteristics of the respondents who were admitted at Debre Markos referral hospital, East Gojjam, Ethiopia, 2016 (N=236).

Variables	Frequency(n)	Percent (%)
<b>Age</b>	108	45.8
18-32	76	32.2
33-53	52	22.0
≥54		
<b>Sex</b>	95	40.3
Female	141	59.7
Male		
<b>Place of residence</b>	42	17.8
Urban	194	82.2
Rural		
<b>Marital status</b>		
Single	32	13.6
Married	81	76.7
Divorced	11	4.7
Widowed	12	5.1
<b>Educational level</b>		
Unable to read & write	60	25.4
Read & Write	41	17.4
Grade 1-4	20	8.5
Grade 5-6	49	20.8
Grade 7-8	37	15.7
Grade 9-10	29	12.3
Grade 11 and above		

The study participants were found in the age range of 18 - 32 (45.8%) and the median age of the respondents were 35 years with the mean of 38.97, standard deviation of 16.141 and shown a parametric or normal distribution (Fig.3).



**Figure 2:** Age distribution of the participants in years who were admitted at Debre Markos Referral hospital, East Gojjam, 2016.



#### Braden Risk Assessment Scale Score.

Of the respondents 4.7 % ( 11) were potentially at risk to develop pressure ulcer and 95.30% (225) were not at risk in developing pressure ulcer (Fig.4).

**Figure 3:** Braden scale risk assessment score of the patient who were admitted at Debre Markos Referral hospital, East Gojjam, 2016.

## 4.2. Prevalence of pressure ulcer

### 4.2.1 Prevalence of pressure ulcer with socio-demographic variables

A total of 8 pressure ulcer was detected from 236 patients, with the prevalence rate of 3.4%. Majority of respondents 3.0% developed pressure ulcer came from the rural area, and 1.3 % ( 3) patients developed ulcer were not educated (Table 2).

Table 2: Descriptive statistics of socio-demographic variables in pressure ulcer development who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).

Variables	Pressure Ulcer			
	Yes N	%	n	No %
<b>Over all pressure Ulcer</b>	8	3.4	228	96.6
<b>Age</b>				
18–32	1	.4	107	45.3
33–53	2	.8	74	31.4
≥54	5	2.1	47	19.9
<b>Sex</b>				
Female	2	.8	93	39.4
Male	6	2.5	135	57.2
<b>Place of residence</b>				
Urban	1	.4	41	17.4
Rural	7	3.0	187	79.2
<b>Marital status</b>				
Single	1	.4	31	13.1
Married	5	2.1	176	74.6
Divorced	1	.4	10	4.2
widowed	1	.4	11	4.7
<b>Educational status</b>				
Not educated	3	1.3	57	24.2
Read and write	1	.4	40	16.9
Grade 1-4	1	.4	19	8.1
Grade 5-8	1	.4	48	20.3
Grade 9-10	1	.4	36	15.3
≥ grade 11	1	.4	28	11.9

#### 4.2.2. Prevalence of pressure ulcer with other variables.

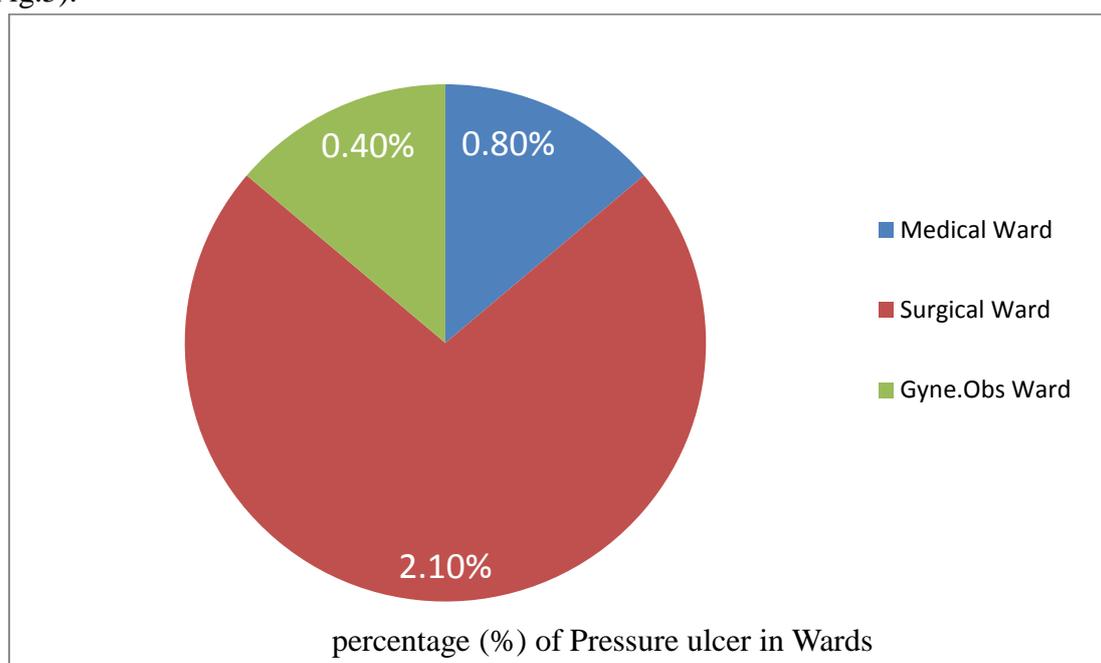
Almost half 48.3% (114) admitted patients at Debre Markos referral hospital had 8 -15 days length of stay in the hospital and 38.5 % (91) patients discharged less than or equal to 7 days, whereas 13.1% (31) patients stay in hospital more than 16 days. 1.7 % ( 4) of respondents who developed pressure ulcer were admitted  $\geq$  16 days. From the total participants who developed pressure ulcer, 0.8% (2) had not used pressure relieving device, 2.1 % (5) with a body mass index of 18.5-24.9 and 1.7% (4) had not been changed their position frequently by nurses (Table 3).

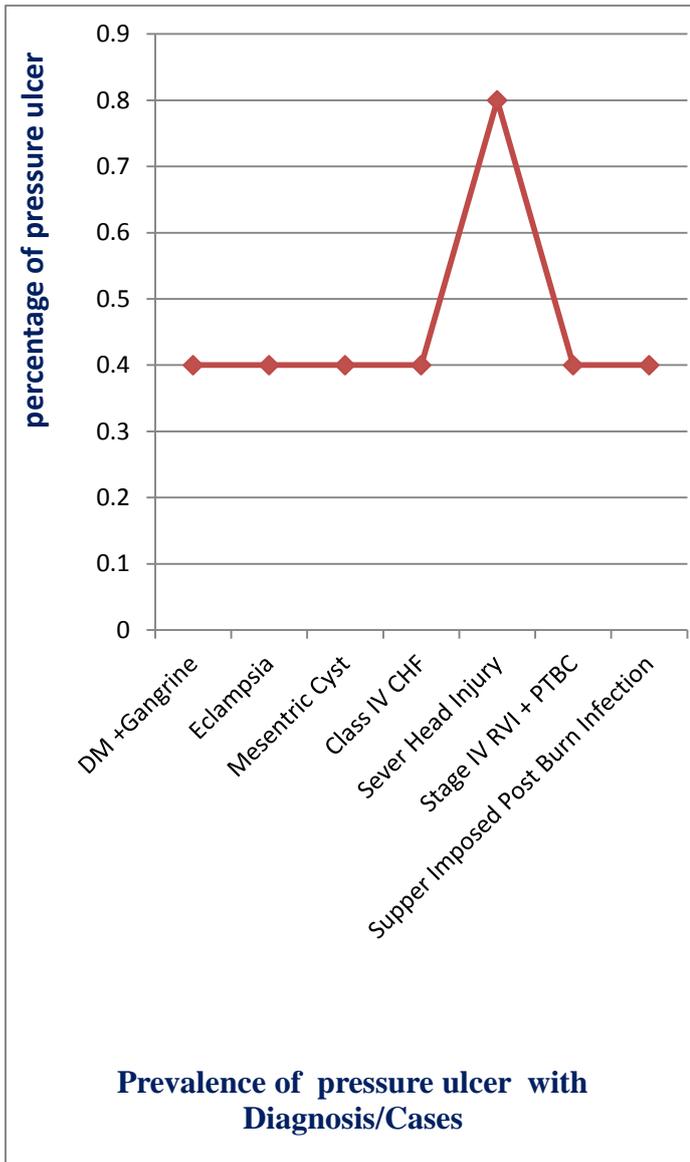
**Table 3:** Descriptive statistics of other variables in pressure ulcer development who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).

Variables	Pressure Ulcer			
	Yes N	%	No n	%
<b>BMI</b>				
<18.5	1	.4	9	3.8
18.5-24.9	5	2.1	206	87.3
25.0-29.9	1	.4	11	4.7
>=30	1	.4	2	.8
<b>Smoking</b>				
Currently smoking	1	.4	0	0
Previous smoking	1	.4	4	1.7
No smoking	6	2.5	224	94.9
<b>Length of stay</b>				
≤7days	1	.4	90	38.1
8-15 days	3	1.3	111	47.0
≥ 16days	4	1.7	27	11.4
<b>Bed ridden</b>				
Yes	3	1.3	2	.8
No	5	2.5	226	95.8
<b>Change of position</b>				
Yes	4	1.7	227	96.2
No	4	1.7	1	.4
<b>Supportive device</b>				
Yes	6	2.5	223	94.5
No	2	.8	5	2.5

#### 4.2.3. Prevalence of pressure ulcer with wards

The prevalence of pressure ulcer in terms of wards was identified, surgical ward ulcer prevalence was 2.1% (5) (Fig.5).

**Figure 4:** Pressure Ulcer with Wards of the respondents who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).



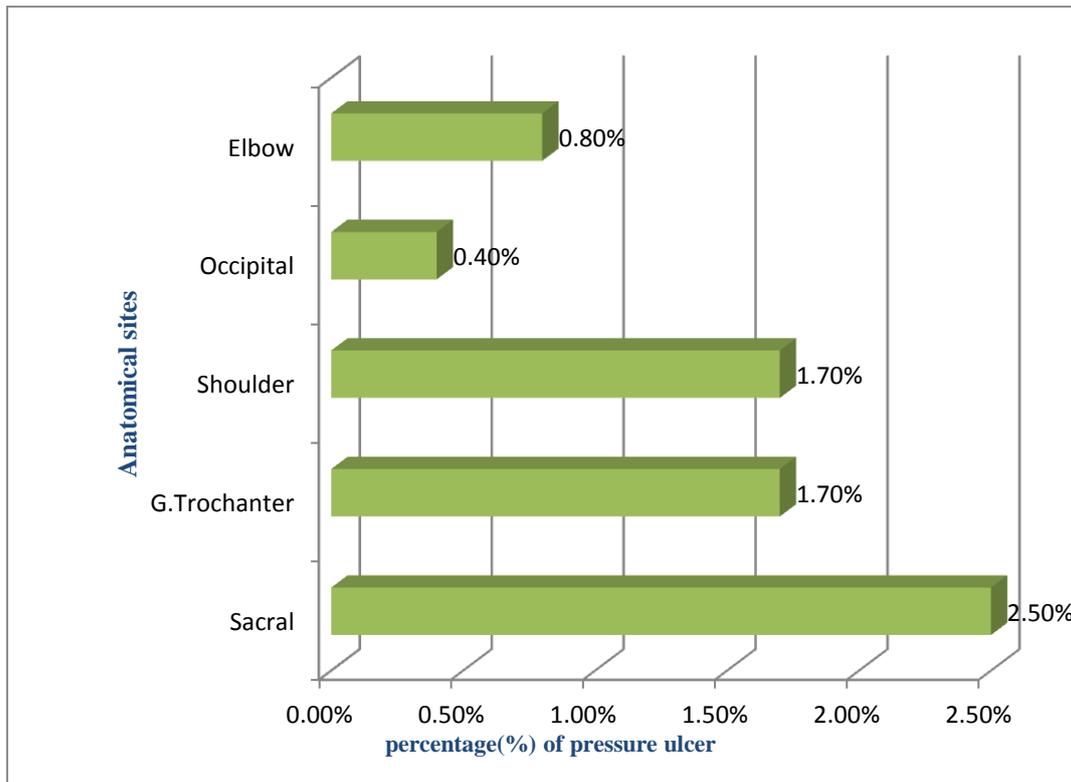
**4.2.4. Prevalence of Pressure ulcer with Diagnosis/Cases**

The prevalence of pressure ulcer based on the patients’ cases were also identified, then from the total prevalence of pressure ulcer, the patients who had severe head injury comprised 0.8%(2),and the rest each accounted 0.4%(1)(Fig.6).

**Figure 5:** Pressure Ulcer based on diagnosis of the respondents who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).

**4.2.5. Prevalence of pressure ulcer with Anatomical location**

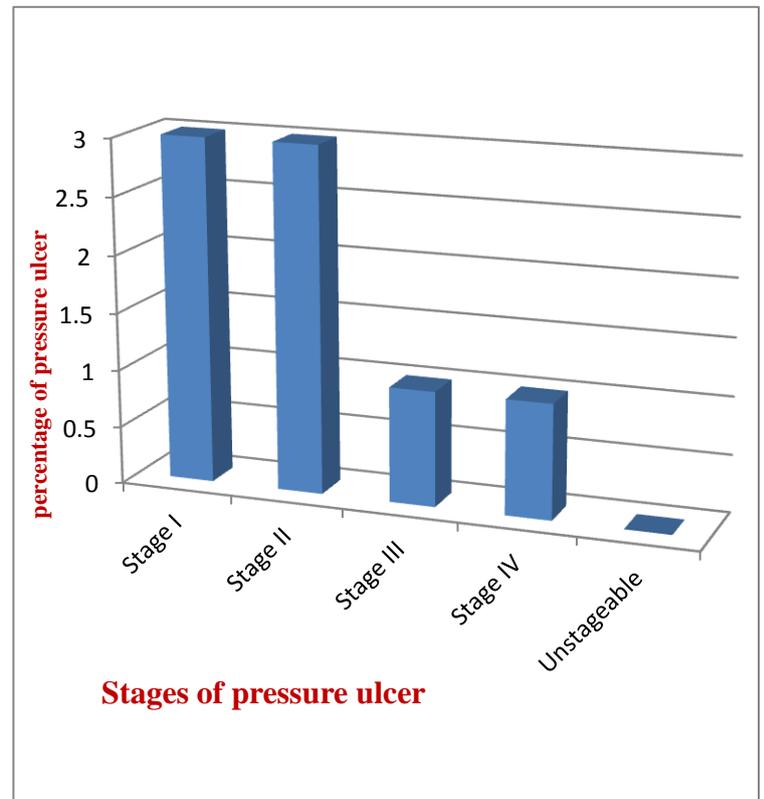
Of those who developed pressure ulcer, most of the participants 2.50% (5) developed ulcer on sacral area and 0.40% (1) patients developed pressure ulcer at Occipital area (Fig-7).



**Figure 6:** Anatomical location of pressure ulcer in patients who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).

4.2.6. Prevalence of pressure ulcer with EPUAP stages of ulcer

Among pressure ulcer developed participants, 0.4% (1) comprised the advanced stage (stage IV) of pressure ulcer (Fig.8).



**Figure 7 :** Stages of pressure ulcer in patients who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (n=236).

### 4.3. Braden Scale Pressure Ulcer Risk Assessment

Majority of respondents 96.2% (227) had no impairment in sensory perception, and from the total respondents, 2.5 % (6) were completely

immobile. 11.9 % ( 28) participants were probable inadequate in nutrition, and 5.1 % (12) of the patients had potential problem in Friction & Shear (Table-4).

**Table 4:** Braden Scale Pressure Ulcer Risk Assessment characteristics of the respondents who were admitted at Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016(N=236).

Variables	Frequency	%
<b>Sensory perception</b>		
Completely limited	2	.8
Very limited	5	2.1
Slightly limited	2	.8
No impairment	227	96.2
<b>Moisture</b>		
Constantly moist	2	.8
Very moist	5	2.1
Occasionally moist	2	.8
Rarely moist	227	96.2
<b>Activity</b>		
Bed fast	3	1.3
Chair fast	7	3.0
Walks occasionally	5	2.1
Walks frequently	221	93.6
<b>Mobility</b>		
Completely immobile	6	2.5
Very limited	5	2.1
Slightly limited	6	2.5
No limitation	219	92.8
<b>Nutrition</b>		
Very poor	6	2.5
Probably inadequate	28	11.9
Adequate	202	85.6
<b>Friction and shear</b>		
Problem	2	.8
Potential problem	12	5.1
No apparent problem	222	94.1

### 4.4. Factors of association with pressure ulcer

#### 4.4.1. Socio-demographic and other variables

Eleven independent variables were analyzed in logistic regression with outcome variable to know their association. Those variables which were significant at  $P < 1.000$  entered into multivariate logistic regressions. This multivariate analysis had identified that patient's age, bedridden, and position change had significantly associated with pressure ulcer.

Those respondents whose age were in between 18-32 yrs had 0.45 times [95% CI: AOR, 0.451[0.008 - 0.750] less likely to develop pressure ulcer than those who age were  $\geq 54$  years. Patients who were bedridden had 13.8 times [95% CI: AOR, 13.844 (11.480 - 31.101)] more possibly to develop pressure ulcer than those who were not bedridden, and those who had got position change service were 0.3 times [95% CI: AOR, 0.30 (0.000 - 0.906)] less likely to develop pressure ulcer than who did not get the service (Table 5).

**Table 5:** Factors of association variables with pressure ulcer of the respondents who were admitted at Debre Markos referral hospital, East Gojjam, Ethiopia, 2016 (n=236).

Variables	Pressure Ulcer		P-Value	COR (95%CI)	AOR (95%CI)
	Yes	NO			
<b>Age</b>			0.048		
18-32	1	107		0.383 (0.294- 0.920)**	0.451[0.008 -0.750]**
33-53	2	74		0.136(0.034 - 0.821)**	0.009[0.001 - 0.298]**
≥54	5	47		1	1
<b>Sex</b>			0.380		
Male	2	93		2.067(.408 – 10.463)	4.165[.502 -34.569]
Female	6	135		1	1
<b>Place of residence</b>			0.692		
Urban	1	41		1.535(.184 - 12.817)	.210[.16 – 2.689]
rural	7	187		1	1
<b>Educational status</b>			0.960		
Unable to read and write	3	57		2.105(.211 - 20.977)	1.706[.148 – 19.620]
Read and write	1	40		1.000(.98 - 10.196)	.207[.013 – 3.318]
Grade 1-4	1	19		2.526(.254 - 25.085)	.832[.060 – 11.632]
Grade 5-8	1	48		1.895(.190 - 18.923)	.661[.048 – 9.134]
Grade 9-10	1	36		1.474(.147 - 14.816)	.208[.011 – 3.861]
>= grade 11	1	28		1	1
<b>Marital status</b>			0.576		
Single	1	31		1.135(.128 - 10.052)	17.776[.366 – 857.808]
Married	5	176		.323(.018 - 5.644)	3.369[.038 – 302.106]
Divorced	1	10		.355(.020 - 6.171)	2.490[.031 – 201.588]
widowed	1	11		1	1
<b>Length of stay</b>			0.024		
≤ 7 days	2	105		.411(.042 - 4.020)	7.276[.400 – 132.354]
8-15 days	5	86		.075(.008 - .700)	4.211[.002 -87.213]
≥ 16 days	1	37		1	1
<b>BMI</b>			1.175		
<18.5	1	9		4.578(.483 – 43.363)	
18.5-24.9	5	206		1.222(.067 – 22.40)	
25.0-29.9	1	11		.222(.009 – 5.275)	
≥30	1	2		1	
<b>Smoking</b>			1.173		
Currently smoking	1	0		.000(.000 -.001 )	
Previous smoking	1	4		.107(.010 – 1.108)	
No smoking	6	224		1	
<b>Bed ridden</b>			0.000		
Yes	3	2		67.8(9.207 – 99.289)**	13.844[11.480 – 31.101]**
No	5	226		1	1
<b>Change position</b>			0.000		
Yes	4	227		.40(.000 -0 .49)**	.30[.000 - 0.906]**
No	4	1		1	1
<b>Supportive device</b>			0.004		
Yes	6	223		1.067(.011 - .419)	.473[.014 – 15.456]
No	2	5		1	1

NB: \* =p< 1.000, \*\*=p≤0.05

Logistic Regression Method ‘ENTER’ Was Used For Multivariate Analysis.

**4.4.2. Braden Scale Pressure Ulcer Risk Assessment**

Six predictors were analyzed in logistic regression with dependent variable of pressure ulcer to know their association, and those variables which were significant at  $P < 1.000$  entered in to multivariate logistic regressions. Respondents who had constantly moist skin were 3.2 times [95% CI:

AOR, 3.202[2.050 -16.067] more risk to develop pressure ulcer than rarely moist skin in moisture. Those participants who had been very poor in nutrition were 4.9 times [95% CI: AOR, 4.906(3.837 - 23.326)] at higher risk to develop pressure ulcer than adequate in nutrition (Table-6).

**Table 6:** Factors Associated With Braden Scale Pressure Ulcer Risk Assessment Variables And Pressure Ulcer of the Respondents Who Were Admitted At Debre Markos Referral Hospital, East Gojjam, Ethiopia, 2016 (N=236).

Variables	Pressure Ulcer		P-Value	COR (95%CI)	AOR (95%CI)
	Yes	NO			
<b>Sensory perception</b>			1.000		
Completely limited	1	0		.000 [.000-.]	
Very limited	4	0		.000 [.000-.]	
Slightly limited	1	1		.045 [.003-.579]	
No impairment	2	223		1	
<b>Moisture</b>			.000		
Constantly moist	2	0		8.005[2.090 -78.074]**	3.202[2.050 - 16.067]**
Very moist	4	1		4.008[1.001 - 45.082]**	3.060[1.000 - 17 .081]**
Occasionally moist	1	1		2.009[1.000 - 39.205]**	2.021[1.001 - 22 .740]**
Rarely moist	1	226		1	1
<b>Activity</b>			1.000		
Bed fast	2	0		.000 [.000-.]	
Chair fast	4	4		.000 [.000-.]	
Walks occasionally	1	3		.000 [.000-.]	
Walks frequently	1	221		1	
<b>Mobility</b>			1.053		
Completely immobile	6	0		.000[.000 -.]	
Very limited	1	4		.023[.001 -.429]	
Slightly limited	1	5		.042[.002 -.728]	
No limitation	0	219		1	
<b>Nutrition</b>			.000		
Very poor	5	4		8.125[2.592 -56.721]**	4.906[3.837-23.326]**
Probably inadequate	2	23		4.750[2.917 -44.614]**	2.161[1.506 - 16.270]**
Adequate	1	201		1	1
<b>Friction and shear</b>			.000		
Problem	1	1		.357 [.033 – 3.916]	.495[.029-8.341]
Potential problem	4	8		10.048[.925 -109.125]	.433[.017-11.110]
No apparent problem	3	219		1	1

NB: \* $p < 1.000$ , \*\*= $p \leq 0.05$

Logistic Regression Method 'ENTER' Was Used For Multivariate Analysis.

## Discussion

### 5.1. Prevalence of pressure ulcer

#### 5.1.1. Overall prevalence of pressure ulcer

In this study, the overall prevalence of pressure ulcer was 3.4%. This result was slightly higher than studies conducted in China and Nigeria with prevalence of 1.58%, 3.22% respectively<sup>(3, 9)</sup>. Higher prevalence in this study might be due to inappropriate nursing care, inadequate & very poor feeding habit and limited resource of pressure relieving devices.

It was also found that the prevalence rate was lower than a study conducted in Brazil 16.9%, Germany 26.5%, Sweden 22.9%, Canada (Ontario) 25.7%, and Felege Hiwot hospital (Bahir Dar) 16.8%<sup>(12, 17, 18, 9, 7)</sup>. This discrepancy might be due to different characteristics of participants, disease condition of patients and also the variation of study period & length of stay in hospital.

#### 5.1.2. Prevalence of pressure ulcer with anatomical location.

In this study, prevalence of pressure ulcer due to anatomical location was lower (Sacral, G. Trochanter & Elbow 2.5%, 1.7% & 0.8% respectively) than a study conducted in China (Sacral, G. Trochanter & Elbow 60.52%, 6.34% & 0.79%), in Brazil (Sacral, G. Trochanter & Elbow 82.5%, 37.5% & 3.7%) in Bahir Dar (Sacral, & Elbow 70.4%, & 7%). This difference might be due to the disease condition of patients and variation of study area & length of stay in hospital.

#### 5.1.3. Prevalence of pressure ulcer with stage

In this study, prevalence of pressure ulcer in stages I, II & IV were 2.5%, 2.5% & 0.4% respectively. This finding was lower than a study conducted in China 28.68%, 35.82%, 12.99%, in Brazil 30.3%, 32.4% 13.9%, in Ahmadu Bello University (Nigeria), and in Bahir Dar (Felege Hiwot hospital) 62%, 26.8%, 2.8% (3, 12, 20, 7). This discrepancy might be due to different characteristics of participants, disease condition of patients and sample size the participants.

### 5.2. Association of variables with pressure ulcer

#### 5.2.1. Association of demographic variables with pressure ulcer.

This study depicted that pressure ulcer was significantly associated ( $p < 0.048$ ) with age, it was in line with a study conducted by Bergstron & Braden<sup>(25)</sup>; but not supported by a survey conducted in the city of Belo Horizonte (Brazil), China, Nigeria and Bahir Dar (Felege Hiwot hospital)<sup>(25, 3, 9, 7)</sup>. The reason not in lined to other studies might be the disease condition of patients and length of stay in hospital.

#### 5.2.2. Association of other variables with pressure ulcer

Bed ridden and change in position were strongly associated ( $p = 0.000$ ) with the presence of pressure ulcer as shown in this study. Bed ridden association with pressure ulcer was in line with a study conducted in Brazil<sup>(12)</sup>, and change in position was also in line with a survey did in Bahir Dar, Felege Hiwot hospital<sup>(7)</sup>.

### 5.3. Association of Braden RAS variables with pressure ulcer

The Braden RAS tool with development of pressure ulcer in this study was identified; moisture and nutrition were the major predictors for pressure ulcer development, due to the fact that constantly moist skin and very poor in nutrition predispose patients to develop pressure ulcer.

The findings indicated that moist skin and very poor in nutrition were strongly & significantly associated ( $p = 0.000$ ) with presence of pressure ulcer. These results were consistent with previous studies or in agreement with different studies conducted across 26 hospitals in Belgium, Italy, Portugal, Sweden & UK (18), Brazil<sup>(12)</sup>, and a survey that was done by Richard A. Benoit, Jr.<sup>(21)</sup>, but not supported by a study conducted in Bahir Dar, Felege Hiwot hospital<sup>(7)</sup>. The possible explanation that was not supported by Felege Hiwot hospital might be the disease condition, and different characteristics of participants.

## 6. Conclusion

The prevalence of pressure ulcer was slightly high among hospitalized adult patients. In this study, age, bedridden, position change, moisture and nutrition were significantly associated with the presence of pressure ulcer. So, Patients were more liable to develop pressure ulcer when they were in bed ridden, moist skin & inadequate nutrition and had not been changed their position frequently.

## Appendix

Braden scale pressure ulcer risk assessment

**Sensory perception:** sensory perception measures the individual ability to feel and report discomfort.

**Completely limited:** unresponsive (does not moan, flinch or grasp) to painful stimuli, due to diminished level of consciousness or sedation or limited ability to feel pain over most of the body.

**Very limited:** responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness or has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.

**Slightly limited:** respond to verbal commands, but cannot always communicate discomfort or the need to be turned or has some sensory impairment which limits ability to feel pain or discomfort in one or two extremities.

**No impairment:** responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.

**Moisture:** moisture measures the degree to which the skin is exposed to moisture.

**Constantly moist:** skin is kept moist almost constantly by perspiration, urine, etc. dampness is detected every time patient is moved or turned.

**Very moist:** skin is often, but not always moist. Linen must be changed at least once a shift.

**Occasionally moist:** skin is occasionally moist, requiring an extra linen change approximately once a day.

**Rarely moist:** skin is usually dry; linen only requires changing at routine intervals.

**Activity:** degree of physical activity.

**Bed fast:** confined to bed.

**Chair fast:** ability to walk severely limited or non-existent. Cannot bear own weight and /or must be assisted in to chair or wheelchair.

**Walks occasionally:** walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.

**Walks frequently:** walks outside room at least twice a day and inside room at least once every 2hours during waking hours.

**Mobility:** ability to change and control body position.

**Completely immobile:** does not make even slight changes in body or extremity position without assistance.

**Very limited:** makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.

**Slightly limited:** makes frequent through slight changes in body or extremity position independently.

**No limitation:** makes major and frequent changes in position without assistance.

**Nutrition:** nutrition reflects the food intake pattern of the assessed person, as well as liquid supplements.

**Very poor:** never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluid poorly. Does not take a liquid dietary supplement or is NPO and / or maintained on clear liquids or IVs for more than 5 days.

**Probably inadequate:** rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products of per day. Occasionally will take a dietary supplement or receives less than optimum amount of liquid diet or tube feeding.

**Adequate:** eats over half of most feels. Eats a total of 4 servings of protein (meat, dairy products) per day. Occasionally will refuse a meal, but will usually take a supplement when offered or is on a tube feeding.

**Friction /shear:** friction and shear assess the person's ability to keep the skin free from contact with the wrinkle area.

**Problem:** requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction.

**Potential problem:** moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of time but occasionally slides down.

**No apparent problem:** moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.

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