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Prevalence and Associated Factors of Pressure Ulcer among Hospitalized Patients in Debre Birhan Referal Hospital, North Shoa Zone, Amhara, Debre Birhan, Ethiopia

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Abstract

A pressure ulcer (PU) (also known as bed sore) is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. A number of contributing or confounding factors are also associated with pressure ulcers the significance of this factor is yet to be elucidated. Pressure ulcers are generally defined as restricted cell necrosis areas occurring bony prominence sun protected to pressure for sufficiently long time to cause tissue ischemia. Pressure ulcers are usually happening over bony prominences such as sacrum, shoulders, occiput, ear lobes, elbows, and trochanters depending on patients' position.

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Background

An estimated pressure ulcer incidence rate of 8.3% to 25.1% in developed countries, and 2.1% to 31.3% in developing countries is exhibited [1-3]. 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 [4]. Therefore, enormous effort is required to find effective and reliable techniques for preventing the initiation of ulcers and eliminating them once they develop [5].

Patent with pressure ulcer suffer from additional problem like pain and discomfort, prolong illness, delay rehabilitation, increase patient's hospital stay, and may lead to disability and even death [6].

There are intrinsic factors and extrinsic factors that determine the tolerance of soft tissue to the adverse effects of pressure. Intrinsic risk factors are physiologic factors or disease states that increase the risk for pressure-ulcer development (e.g., age, nutritional status, and decreased arteriolar blood pressure). Extrinsic factors are external factors that damage the skin (e.g., friction and shear, moisture, and urinary or fecal incontinence, or both) [7]. In Ethiopia, based on a study conducted in Wolaita Sodo University Teaching Hospital, among 239 hospitalized patients with the prevalence rate of 13.4% [8].

In the study area there is no any evidenced data that show the prevalence and associated risk factors of pressure ulcer. Therefore, the main aim of this study was to assess the prevalence and associated factors of pressure ulcer among hospitalized patents at Debre Birhan referral hospital.

Study have suggested that pressure ulcer development can be directly affected by the number of nurses and time spent at bedside the Pressure ulcers are challenging to treat, and treatment tends to be lengthy and costly. Pressure ulcer is a common problem in the world and also it is the most common cause of negative health quality indicator of life. Many studies suggest that the assessment of the magnitude of pressure ulcer in hospital admitted patient is very important .It has also a great impact in the health institutions as well as in the individual social life and socio economic status [9, 10].

The study focused on determining the prevalence of pressure ulcer and identifying associated risk factors with ulcer development in Debre Birhan referral hospital.

Therefore, this study will be important:-

- To know the exact magnitude of pressure ulcer in Debre Birhan referral hospital.
- To give scientific information for professional team and take action in prevention measures based on the result and also

for care givers.

- To help the responsible body of policy maker to address health policy issue.
- To have additional source for other researchers to do wider and further research exploration on this issue.

Methodology

Description of the study Area

The study was conducted at Debre Birhan town, Debre Birhan referral hospital. Debre Birhan town is found in Amhara regional state which is found 130 Km way from Addis Ababa, a capital City of Ethiopia and 695 km way from Bihar Dar which is capital city of Amhara region with total population of 103450 and there is 9 urban kebele [11].

In Debre Birhan, there is one governmental Referral Hospital, one private general hospital and three health centers. The study was conducted in Debre Birhan referral hospital, Amhara region. The hospital is expected to give service for greater than 2 millions of people for the nearby zones and Woreda. This hospital has different wards. Among these wards medical, surgical, Pediatrics, gynaecological and obstetrics and ICU wards are important to this research. DBRH have 264 health workers among this Midwifery 26, Pharmacists 32, Lab technician 31, Health officer 1, Specialists 12, General physicians 19, Nurses 143 [12].

Study design and period

Institution based cross-sectional study design was conducted in Debre Birhan referral hospital from April 23, 2018 to May 18, 2018.

Source population

The source populations were all admitted patients in Debre Birhan referral hospital.

Study population

The study populations were those patients who have been admitted in medical, surgical, pediatrics, gynaecological and obstetric wards and ICU in Debre Birhan referral hospital during study period.

Study unit

The selected individual with the K interval in those wards were our study unit.

Inclusion and Exclusion Criteria

Inclusion Criteria: All admitted patients who were staying in hospital greater than or equal to 24 hrs included.

Exclusion criteria: Patients who was admitted for the second time during data collection period, <= 5 years old and Patients who developed pressure ulcer before admission at Debre Birhan Referral hospital were excluded.

Determination of sample size

Sample size was computed based on a single proportion population formula with Margin error(d) is 5%, Confidence level (CI) is 95% and prevalence (p) of PU is 16.8% taken from previous study at Felegehiwot Referral hospital, Bahir Dar(17). A sample size (n) at a Z-value of 1.96 with 95% CI and d of 5%

$$n = \frac{(z\underline{\alpha}'/2)^2)p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 0.168(1-0.168)}{0.05^2}$$

=214.78

Because of the total population size of the study area are less than 10,000, the population correction formula was applied:

By taking number of source of population, 498 and sample size 214.78; Nf=n/ (1+n/N)=214.78/ (1+214.78/498) = 150 Adding non respondent rate of 5% =150×5%=8; then total sample size =150 + 8=158.

Sample and sampling technique

(**Figure 1**)

Study variable

Dependent Variable

- Pressure Ulcer

Independent Variables

- Socio demographic factors (sex, age, marital status, education status and residence)
- Braden scales of PU risk assessment tools:

✓ Sensory perception

✓ Moisture

✓ Activity

✓ Friction/shear

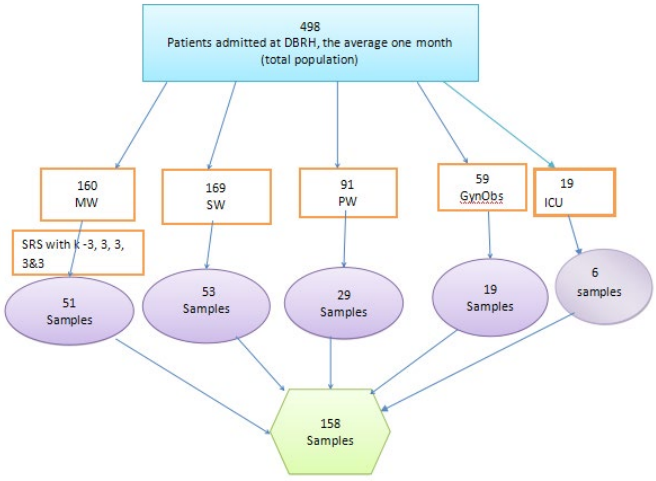

Figure 1 Schematic Presentation of Sampling Technique Assesse the Prevalence of Pressure Ulcer and Associated Factors at Debre Birhan Referral Hospital, 2018.

- ✓ Mobility
- ✓ Nutrition

Others

- ✓ Position change
- ✓ Bed ridden
- ✓ Length of stay in hospital
- ✓ BMI & Smoking

Data collection techniques and tool

Data was collected by face to face interviews using a structured and pretested interviewer administered questionnaire and observational checklist to meet our objective. The data was collected by group members from the selected bed and ask the patent if the patent is not responsive ask the nearest person [13].

Data quality control

A brief orientation about the whole purpose of the research was given for all participants. The questionnaire was translated in to Amharic and back to English. Pretest was done on five percent of the sample in Debre sina primary hospital before the actual data collection take place. Overall activities were supervised by principal investigators. The data was check for completeness and consistency on a daily basis & the data was cleaned [14].

Data processing and Analysis

After the data were checked and cleaned for its completeness, it were entered to Epi data software and exported to SPSS-20 version for analysis. Descriptive, Bivariate and Multivariate data analysis method were applied in the study [15].

Result

Socio-Demographic Characteristics

A total of 158 admitted patients at Debre Birhan referral hospital were included in this study with the response rate of 100%. Majority of 61.4% (97) and 50.6% (80) respondents were rural residents and males in sex respectively and the respondents 60.8% (96) were married. In addition 49% (31) of the respondents were not educated (**Table 1**).

Prevalence of pressure ulcer

A total of 40 pressure ulcer was detected from 158 patients with the prevalence rate of 25.3%. Majority of respondents 14.55% developed pressure ulcer came from the rural area and 8.22% patients developed ulcer was not educated (**Table 2**).

Almost all 89.87% (142) admitted patients at Debre Birhan referral hospital had ≤7 day's length of stay in the hospitals. All participants those who included in this study had not used pressure relieving device and 6.96% [11] had not been changed their position frequently by nurses. BMI for <19 years old was calculated & classified by WHO AnthroPlus software (**Table 3**).

The prevalence of pressure ulcer in terms of wards was identified that medical ward ulcer Prevalence was 10.12% [16] (**Figure 2**).

Table 1. Socio-demographic Characteristics of the respondents who were admitted at Debre Birhan referral hospital, North Shoa zone, Ethiopia, 2018(N=158).

Variables	Frequency	Percent
Sex		
Male	80	50.6
Females	78	49.4
Place of residence		
Urban	61	38.6
Rural	97	61.4
Marital status		
Single	59	37.3
Marred	96	60.8
Divorced	2	1.3
Widowed	1	0.6
Educational level		
Not educated	49	31
Read & write	25	15.8
Grade 1-4	31	19.6
Grade 5-8	27	17.1
Grade 9-10	16	10.1
Grade 11& above	10	6.3

Table 2. Descriptive statistics of socio-demographic variables in pressure ulcer development who were admitted at Debre Birhan Referral Hospital, North shoa, Ethiopia, 2018 (n=158).

Variables	Pressure ulcer			
	Yes	%	No	No%
Over all pressure ulcer	**40**	**25.3**	**118**	**74.7**
Age				
Jun-18	7	4.43	29	18.35
19-31	13	8.22	35	22.15
32-43	6	3.79	14	8.86
44-55	7	4.43	11	6.96
>=56	7	4.43	29	18.35
Sex				
Male	16	10.12	64	40.5
Female	24	15.18	54	34.17
Residence				
Urban	17	10.75	44	27.84
Rural	23	14.55	74	46.83
Marital status				
Single	12	7.59	47	29.74
Married	27	17.08	69	43.67
Divorced	1		1	
Widowed	0		1	
Educational status				
NOT Educated	13	8.22	36	22.78
Read and Write	4		21	13.29
Grade1-4	9		22	13.92
Grade5-8	9		18	11.39
Grade9-10	2		14	8.86
Grade11orGreater	3		7	

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 DM accounts 3.17% (5), CHF 1.9% (3), SBO1.9% (3), SCAP1.9% (3), Anaemia 1.26% (2), ACS 1.26% (2), G. peritonitis 1.26% (2) the rest each accounted 12.65% [17].

From those who developed pressure ulcer in terms of anatomical location most of the participants 11.39% [18] developed ulcer

Table 3. Descriptive statistics of other variables in pressure ulcer development who were admitted at Debre Birhan Referral Hospital, North shoa, Ethiopia, 2018 (n=158).

Variables	Pressure ulcer			
	Yes	%	%	no
BMI >=19				
underweight	1	0.63	12	7.59
normal	23	14.55	75	47.46
overweight	5	3.16	6	3.79
BMI<19				
Sever under weight	2	1.26	2	1.26
underweight	1	0.63	3	1.89
Normal	7	4.43	13	8.22
	1			
overweight	0	0.63	3	1.89
Obese			4	2.53
Cigarette smoke	1			
Currently smoking	1	0.63	0	
Previously smoking	38	0.63	2	1.26
No smoking		24.05	116	73.41
Length of stay	33			
<=7 day	7	20.88	109	68.98
8-15 day		4.43	9	5.69
Supportive device	40			
No		25.31	118	74.68
Position change service				
Yes	33			
No	7	20.88	114	72.15
		4.43	4	2.53
Patient bedridden	32			
Yes	8	20.25	68	43.03
No		5.06	50	31.64

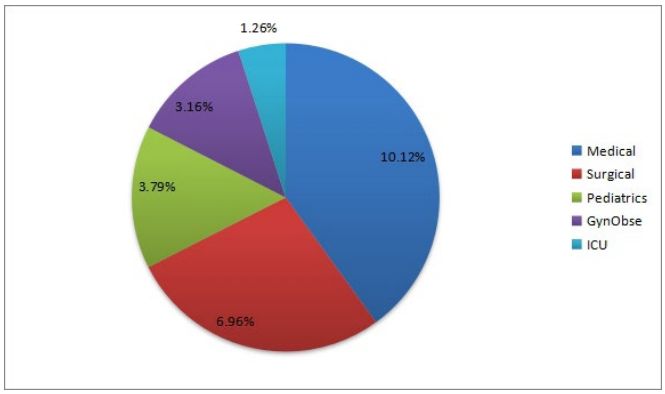

Figure 2 Pressure Ulcer with Wards of the respondents who were admitted at Debre Birhan Referral Hospital, North shoa zone, Ethiopia, 2018 (n=158).

on Greater trochanter area and 0.63% (1) patients developed pressure ulcer at Occipital area (**Figure 3**).

Among pressure ulcer developed participants, 17.08% (27) develop stage I pressure ulcer (**Figure 4**).

Most of respondents 59.5% (94) had slightly limited in sensory perception and from the total respondents 5.1% (8) were

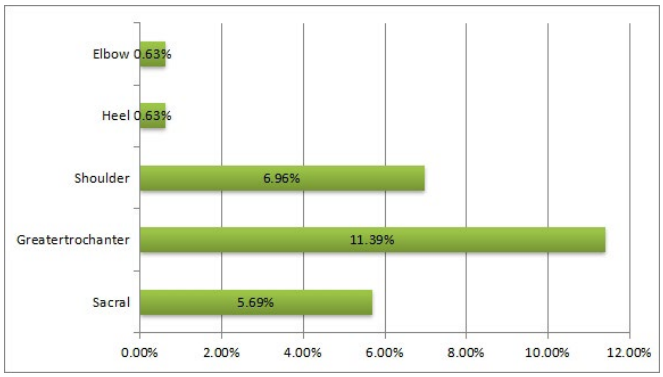

Figure 3 Anatomical location of pressure ulcer in patients who were admitted at Debre Birhan Referral Hospital, North shoa, Ethiopia, 2018 (n=158).

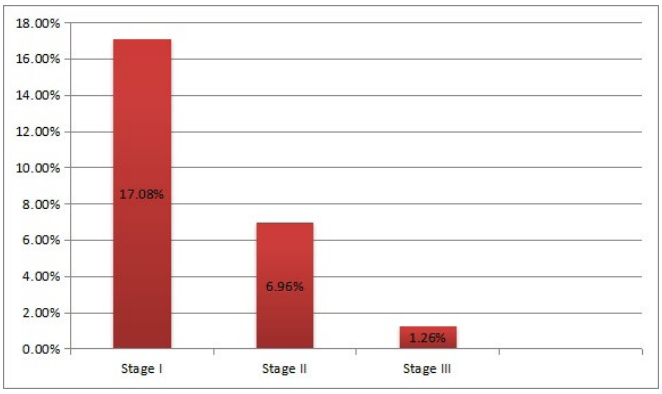

Figure 4 Stages of pressure ulcer in patients who were admitted at Debre Birhan Referral Hospital, North shoa, Ethiopia, 2018 (n=158).

completely immobile. 60.1% (95) participants were probable inadequate in nutrition and 55.7% (88) of the patients had potential problem in Friction & Shear (**Table 4**).

Of the respondents 63.9% (101) were potentially at risk to develop pressure ulcer and 36.1% (57) were not at risk in developing pressure ulcer (**Figure 5**).

Factors Associated with pressure ulcer

Those respondents whose BMI underweight had 68.1times [95% CI: AOR, 68.191(3.055-1522.261)] more likely to develop pressure ulcer than those who are overweight and those who had got position change service were 34.2 times [95% CI: AOR, 34.205 (3.955-295.866] more likely to develop pressure ulcer than who did not get the service (Table 5).

Discussion

In this study the overall prevalence of pressure ulcer was 25.3%. This result was higher than studies conducted in Debre Markos, Wolaita Sodo University Teaching Hospital, Felege Hiwot Hospital (Bahir Dar) 3.4%, 13.4% 16.8% respectivly [19-21]. Higher prevalence in this study might be due to inappropriate nursing care, inadequate feeding habit and no resource of pressure relieving devices and also different study population.

Table 4. Braden Scale Pressure Ulcer Risk Assessment characteristics of the respondents Who were admitted at Debre Birhan Referral Hospital, North shoa, Ethiopia 2018(N=158).

Variables	Frequency	%
1.Sensery perception		
Completely limited	3	1.9
Very limited	29	18.4
Slightly limited	94	59.5
No impairment	32	20.3
2.Moisture		
Constantly moist	2	1.3
Very moist	51	32.3
Occasionally	60	38
Rarely moist	45	28.5
3.Activity		
Bedfast	71	44.9
Chair fast	31	19.6
Walks occasionally	49	31
Walks frequently	7	4.4
4.Mobilty		
Completely immobile	8	5.1
Very limited	47	29.7
Slightly limited	92	58.2
No limitation	11	7
5.Nutrition		
Very poor	26	16.5
Probably inadequate	95	60.1
Adequate	37	23.4
6. SHEAR Friction and shear		
Problem	15	9.5
Potential problem	88	55.7
No apparent problem	55	34.8

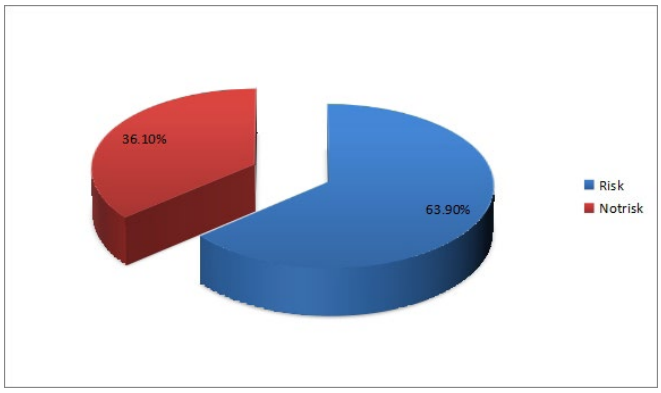

Figure 5 Braden scale risk assessment score of the patients who were admitted at Debre Birhan Referral hospital, North shoa Zone, Ethiopia 2018.

It was also found that the prevalence rate was lower than a study conducted in Germany 26.5% and Canada (Ontario) 25.7% [22, 23]. This discrepancy might be due to different environmental condition, characteristics of participants, disease condition of patients and also the variation of study period & length of stay in hospital.

In this study prevalence of pressure ulcer due to anatomical location was higher (Greater trochanter 11.39%, Occipital 0.63% & sacral 5.69%) than a study conducted in Debre Markos (Sacral, G. Trochanter & Elbow 2.5%, 1.7% & 0.8% respectively). It was also found that the prevalence rate was lower than a study conducted in Brazil, Sacral (82.5%), Trochanteric37.5%, Calcaneal (27.5%), Lumbar (6.3%) and Elbow (3.7%) [24, 25] This difference might be due to the disease condition of patients and variation of study area, study population, & length of stay in hospital.

Table 5. Factors of association variables with pressure ulcer of the respondents who were admitted at Debre Birhan referral hospital, North shoa, Ethiopia, 2018 (n=158).

Variables	Pressure ulcer		COR	AOR
			(95%CI)	(95%CI)
	Yes	No		
Age				
Jun-18	7	29	1.000(.311-3.213)	.355(.068-1.841)
19-31	13	35	.650(.229-1.843)	.543(.114-2.575)
32-43	6	14	.563(.159-1.992)	.367(.059-2.297)
44-55	7	11	.379(.108-1.333)*	.418(.072-2.414)
>=56	7	29	1	1
Sex				
Male	16	64	1.778(.858-3.685)*	2.288 (.768-6.811)
Female	24	54	1	1
Residence				
Urban	17	44	.804(.388-1.669)	
Rural	23	74	1	
Marital status				
Single	12	47	.000(.000-.)	
Marred	27	69	.000(.000-.)	
Divorced	1	1	.000(.000-.)	
Widowed	0	1	1	
Educational status				
Not educated	13	36	1.187(.266-5.286)	
Read &write	4	21	2.250(.401-12.617)	
Grade 1-4	9	22	1.048(.220-4.981)	
Grade 5-8	9	18	.857(.178-4.126)	
Grade 9-10	2	14	3.000(.404-22.303)	
Grade 11&grater	3	7	1	
Length of stay				
<=7day	33	109	2.569(.889-7.428)*	3.481(.747-16.211)
Aug-15	7	9	1	1
BMI<19				
Sever under wt	2	2	.000(.000-.)	
Under weight	1	3	.000(.000-.)	
Normal	7	13	.000(.000-.)	
Over weight	1	3	.000(.000-.)	
Obese	0	4	1	
BMI>=19				
Under weight	1	12	10.000(.944-105.921)*	68.191(3.055-1522.261)**
Normal	23	75	2.717(.759-9.729)*	9.701(1.751-53.736)**
Over weight	5	6	1	1
Cigarette smoke				
Currently smoke	1	0	.000(.000-.)	
Previously smoke	1	2	.655(.058-7.429)	
No smoke	38	116	1	
Position change				
Yes	33	114	6.045(1.667-21.921)*	34.205(3.955-295.866)**
No	7	4	1	1
Patient bedridden				
Yes	32	68	.340(.144-.801)*	.169(.021-1.378
No	8	50	1	1
Supportive device				
Yes	0			
No	40	118	2.95	
Risk status				
Risk	31	70	.423(.185-.969)*	1.221(.169-8.801)
Not Risk	9	48	1	1

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In this study prevalence of pressure ulcer in stages I, II & III were17.08, 6.96 & 1.26 lower than a study conducted in Brazil stage I (30.3%), stage II (32.4%) and stage III (22.8%) [19]. this difference was due to hospital factors like nursing care & study participants.

This study showed that pressure ulcer was significantly associated with position change (p<0.017) this is almost similar with study conducted in Jimma medical centre [18]. In these study BMI >=19 had significantly associated with pressure ulcer (p<0.008 and 0.010) this value almost similar with study conducted in Norway [15, 26].

Conclusion

Majority of patents admitted in Debre Birhan Referral hospital had less than seven day stay of length and all of admitted patent have no supportive device. In this study the highly prevalent stage is stage I and in terms of anatomical location Grater trochanter is more observed area.

The prevalence of pressure ulcer was slightly high among hospitalized patients especially when compare to study contacted in Ethiopia. Patients were more liable to develop pressure ulcer when they are underweight and not change their position frequently.

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