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Original Research

Underweight and its Associated Factors Among Adults with Mental Disorders Attending at Public Health Facilities in Dire Dawa, Eastern Ethiopia

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Abstract

Background: Mental disorder illness seldom increases nutrient requirements, but there are many reasons for high incidence of poor nutrition among mentally ill patients. Despite the high burden of mental disorder and nutritional problems, little research has been done on prevalence and associated factors of nutritional status among mental disorder in Eastern Ethiopia. The objective of this study was to assess underweight status and associated factors among patients with mental disorder in Dire Dawa Health Facilities in 2023.

Methods: Institution-based cross-sectional study design was used to assess the underweight status and associated factors among 364 randomly selected patients. Data was entered and analyzed using SPSS Version 24. Tables, chart graphs, and summary statistics were used to describe characteristics of sample data, while logistic regression was employed to assess factors associated with undernutrition among mental health disorder patients. Bivariate logistic regression was used to identify independent variables that should be incorporated in the multivariable logistic regression at $p<0.25$. Multivariable logistic regression was employed to see the effect of independent variables on dependent variable at $p<0.05$.

Results: Among 364 mental disorder patients, 26.6% (95%CI: 22.20%, 31.50%) of patients were underweight. In the multivariable analysis, being female [AOR = 3.56, 95%CI: 1.19, 7.61], Unable to read and write [AOR = 6.72, 95%CI: 4.74, 11.28], rural residence area [AOR = 3.99, 95%CI: 1.60, 6.63] and low dietary [AOR = 4.49, 95%CI: 2.01, 8.34 and severe sleeping problem [AOR = 10.04 = 95%CI: 2.07, 48.65] were significantly associated with underweight among mental disorder patients.

Conclusion: The prevalence of underweight among adults with mental disorder was found to be higher than the other studies. Prevention of mental disorders is recommended, particularly for those with underweight individuals, especially those from rural areas with severe sleeping problems, and promoting awareness on alcohol use prevention among these patients.

Keywords: Under-Nutrition, Psychiatric Patients, Logistic Regression

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1. Introduction

1.1. Background of the Study

A mental disorder is characterized by a clinically significant disturbance in an individual's cognition, emotional regulation, or behavior. Mental disorder is the most common challenge for both current and future generations [1]. In 2019, 1 in every 8 people, or 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders the most common [2].

Mental disorder is usually associated with distress or impairment in important areas of functioning Food and nutrition have got tremendous impact in preventing disease and reducing the morbidity and mortality of many diseases. The nutritional status of individuals is an essential factor affecting mental health and the development of psychiatric disorders [3]. Psychiatric illnesses involve alterations in the brain or nervous system function and result in altered perception, responses to the environment, and daily functioning, which ultimately diminish the capacity to cope with regular demands of life, including nutritional intake [3, 4].

Malnutrition is commonly described as a state of imbalanced nutrition, varying from over-nutrition to under-nutrition due to a diet that is inappropriate for the individuals' needs. This may lead to changed or decreased body functions [5]. A notable feature of the diets of patients suffering from mental disorders is the severity of deficiency in these nutrients.

1.2. Statement of the problem

Underweight is a common, under-recognized and undertreated condition in hospital patients. People with mental health are being challenged with various barriers to obtain appropriate nutrition and most of these barriers lead to weight gain or weight loss [6]. Patients with mental health are strongly vulnerable to the risks of having involuntary weight gain, weight loss, or deficiency of essential nutrients. Disease-related malnutrition arises due to reduced dietary intake, mal-absorption, increased nutrient losses or altered metabolic demands. Wide-ranging changes in physiological function occur in malnourished patients leading to increased rates of morbidity and mortality. Previous studies have shown that people with mental disorder have on average a higher caloric intake and a lower diet quality (e.g., higher intake of red and processed meats and refined grains and sweets, along with a lower intake of whole grains, vegetables, and fruits) compared to the general population [7].

On the basis of accumulating scientific evidence, an effective therapeutic intervention is emerging, namely nutritional supplement/treatment. Daily supplements of vital nutrients are

often effective in preventing mental disorders, including: depression, bipolar, schizophrenia, anxiety, hyperactivity, autism, and eating disorders. Eating healthy, nutritious foods can help improve mood, reduce stress levels, and increase cognitive functioning, maintaining a balanced diet that includes fresh fruits and vegetables which provide vital vitamins, minerals, and antioxidants that can help to reduce the risk of developing mental health conditions such as depression, anxiety, and bipolar disorder [14].

However; underweight among mental disorder patients is not given attention even in the sustainable development goals and health sector transformation plan. Prevention, as well as early detection and treatment of under-nutrition among psychiatric patients, is not well addressed [8]. Even though psychiatric patients are known to have greater risk of underweight, yet physical examinations and nutritional assessments seldom take place in psychiatric hospitals all over the world [9]. Consequently, it has been recommended that intensive researches should be done concerning aspects of underweight in psychiatric patients [10].

Despite the high burden of mental disorder and underweight problems, little research has been done regarding the prevalence and associated factors of underweight among mental disorder patients in Ethiopia [11, 12]. Even these little studies don't include some important factors, such as dietary diversity and house hold food security that may have higher effect on nutritional status of MD patients [13]. These studies also measured sleeping, alcohol drinking, smoking and khat chewing behavior of MD patients subjectively, which leads to wrong conclusion [14]. Especially, there is no published study that shows the prevalence and associated factors of underweight of patients with mental disorders in Dire Dawa town. So, this study was designed to assess the nutritional status and associated factors among patients with mental disorder attending Outpatient Departments (OPDs) in Dire Dawa health facilities in 2023.

2. Data and Methodology

2.1. Study Area

The study was conducted at Dire Dawa city, which is the second Federal Administration, located 515 km away from Addis Ababa in East of Ethiopia. It has borders with Eastern Oromia and Somali regional states; moreover, it lies within 300 Km away from Djibouti. Based on Dire Dawa Administration, the town consists of 11 urban (two satellites) and 38 rural Kebeles. There are 17 health facilities in DDA. The current metro area population of Dire Dawa in 2023 is estimated to be 465,000 with a 4.49% increase from 2022, which is nearly similar with the two years increasing rate such as (4.46% increase from 2021 to 2022, and 4.41% increase from 2020 to 2021) [15].

2.2. Study design and period

An institutional-based cross-sectional study design was employed on psychiatry patients in Dire Dawa health facilities from April 01 to April 30/ 2023.

2.3. Eligibility conditions

I this study, all psychiatry patients aged >= 18 years and lived in Dire Dawa for at least six months were included, while pregnant and lactating women (<6 months) were excluded.

2.4. Variables

Response variable: The response variable in this study was under-nutrition.

Explanatory variables: The study included the following independent variables:

Socio-demographic factors (age, sex, educational status, marital status, religion, ethnicity, monthly income, occupational status, and living condition),

Clinical factors (types of visits, main diagnosis, types of drugs taken, treatment duration, acute illness, loss of appetite, and chronic illness)

Behavioral factors (substance use, physical activity, and sleeping disturbance).

2.5. Sample Size Determination and Sampling Procedures

For the first objective (prevalence), sample size was calculated by using single population while sample size for the second objective (factors) was calculated using double proportion formula. After proportionally allocating samples, stratified sampling technique was employed to select study participants. To keep the quality data, one day training was given for data collectors and, the researcher had daily intensive supervision during the data collection time.

2.6. Data Analysis Method

Data was cleaned, coded, and entered directly to Statistical Package for Social Sciences (SPSS) version 26 for analysis. Descriptive statistics was done using frequencies and percentages, charts and graphs for categorical variable while mean and standard deviation was used for continues variables. Bi-variable and multivariable logistic regression analysis was conducted, and those predictor variables with a *P* value less than 0.25 during bi-variable analysis was entered to the final multivariable logistic regression analysis. Adjusted odds ratio (AOR) with 95% confidence interval (CI) and 0.05 *P*-value was used to identify significant associated factors.

2.7. Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of Dire Dawa University and permission letter was obtained from regional health Bureau. The data collectors explained to the participants about the procedures, risks, and benefits of a study. Written consent was obtained from each study participants and their parents (caregivers). Participant's privacy and confidentiality of the information were maintained through the work.

3. Results and Discussion

3.1. Socio-Demographic Characteristics

Among the total respondents, more than half 195 (53.6%) were females. Most respondents 143(39.3%) were aged between 26 and 35 years. Regarding to patients' education level 128(35.2%) of patients had secondary education level. With regard to occupation, 92(25.3%) of patients were merchants. Finally, most patients 149(40.9%) reported that they had ≥4001-birr monthly income (Table 1).

Table 1: Socio-demographic characteristics of respondents with mental disorder in Health facilities, Dire Dawa, 2023

Variables	Category	Frequency	Percent
Sex	Female	195	53.6
	Male	169	46.4
Age	18-25	23	6.30
	26-35	143	39.3
	36-44	118	32.4
	>=45	80	22
Marital status	Married	39	10.7
	Un married	129	35.4
	Divorced	136	37.4
	Windowed	60	16.5
Living condition	With family	201	55.2
	Alone	163	44.8
Education	Unable to read and write Primary	121	33.2
	secondary	76	20.9
	Secondar	128	35.2
	Degree and above	39	10.7
Occupation	Jo job	89	24.5
	Private employee	86	23.6
	Gov't employee	32	8.8
	Farmer	65	17.9
	Merchant	92	25.3
Residence	Rural	113	31
	Urban	251	69
Religion	Orthodox	167	45.9
	Muslim	176	48.4
	Protestant	13	3.6
	Others	8	2.2
Monthly income	<2000	72	19.8
	2001-3000	40	11
	3001-4000	103	28.3
	>=4001	149	40.9

3.2. House hold food security and individual dietary diversity

Household food security was measured using HFIA questionnaires. Most patients (44%) were mildly food in secured while 18.7% were severely food in secured (Fig. 3).

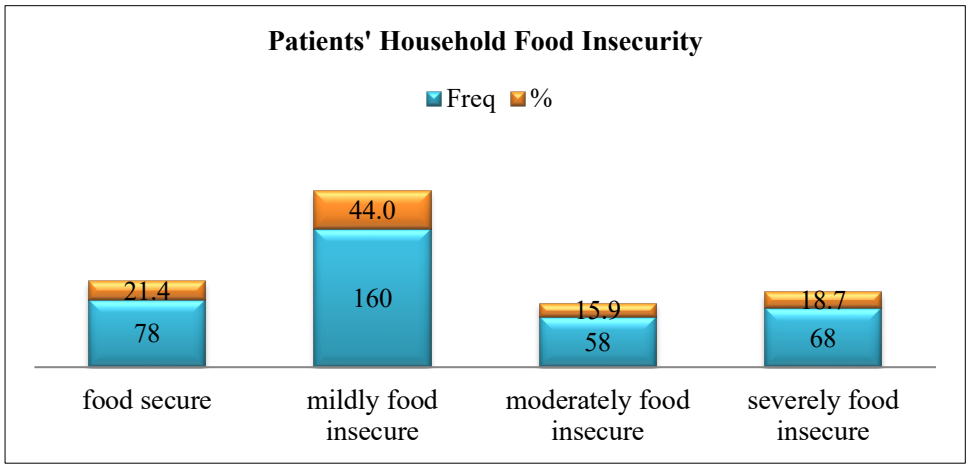

Figure 1: Household Food Insecurity Access distribution among psychiatric patients in healthcare facilities, Dire Dawa, Ethiopia, 2023

Most patients had medium dietary diversity (40.7%) practice followed by high dietary diversity, which waited 34.9% while only 24.45% of patients had low dietary diversity (Fig 4).

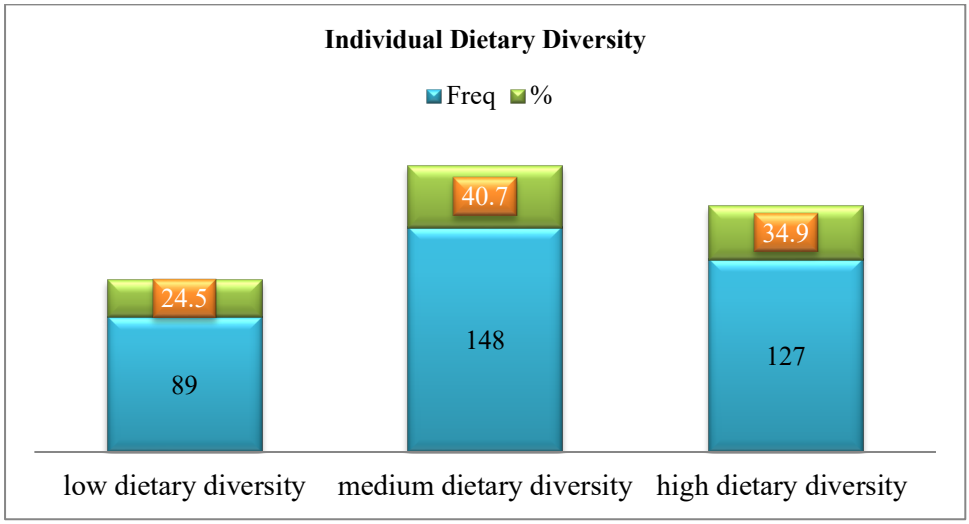

Figure 2: Individual dietary diversity distribution among psychiatric patients in healthcare facilities, Dire Dawa, Ethiopia, 2023

3.3. Behavioral Factors

With regard to behavioral characteristics, 29.7% of patients had ever chewed Khat while 28.6% reported that they were chewing in the last 30 days. Among currently chewing respondents, 113 (51.4%) reported that they chew 1-2 days per week and 43.2% responded that they sit <= 60 minutes per day. Regarding to smoking, 54.1% of respondents responded that they had ever

smoked, of which 73.1% smoked >= 1year and 32.4% of respondents also reported that they were currently smoking (Table 4).

Table 4: Behavioral characteristics of mental disorder patients in healthcare facilities, Dire Dawa, Ethiopia, 2023

Measurement items	**Yes**	**No**
Ckating behaviors		
Ever chewed khat	108(29.7%)	256(70.3%)
Chew ckat in the last 30 days	104(28.6%)	260(71.4%)
Number of days chewing per week 1-2 days >=3 days	 113(51.4%) 10(48.6%)	 -
Number of minutes for chewing per day <60 minutes >= 60 minutes	 95(43.2%) 125(56.8%)	 -
Smoking behaviors		
Ever smoked tobacco	197(54.1%)	167(45.9%)
Currently using tobacco products	216(59.3%)	148(40.7%)
smoke or use tobacco daily < 1 year >= 1 year	 118(32.4%) 148(40.7%)	 -
Alcohol consumption behaviors		
Ever consumed alcohol	115(31.6%)	249 (68.4%)
Alcohol consumption in the last 30 days	99(27.2%)	265(72.8%)
Number of standards per day in the past 7 days? < 3 bottles >=3 bottles	 83(31.9%) 177(68.1%)	
Physical activities on average		
Do physical activities	135(37.1%)	229(62.9%)
Number of days doing physical activities per week 1-3 days >=4	 36(35.3%) 66(64.7%)	 -
Number of minutes doing physical activities per day <60 minutes >=60 minutes	 42(41.2%) 60(58.8%)	 -

Sleeping behaviors of patients was assessed using Sleeping Quality Scale (SQS) questionnaire which was used to measure the quality of sleeping behavior of individuals using nine questions. As it can be seen in the pie chart below, 23.9% of patients had severe sleeping problem while 40.4% had some sleeping problem.

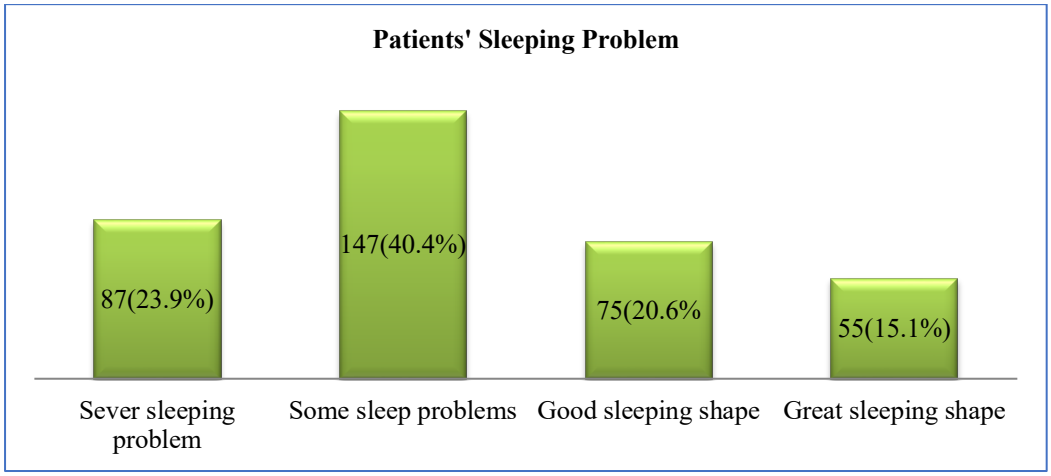

Figure 3: Sleeping behaviors of mental disorder patients in healthcare facilities, Dire Dawa, Ethiopia, 2023

3.4. Magnitude of under nutrition

The magnitude of patients who were underweight was estimated to be 26.6% (95%CI: 22.20%, 31.50%) while magnitude of patients who were overweight was estimated to be 29.12% [24.5%, 34.1%].

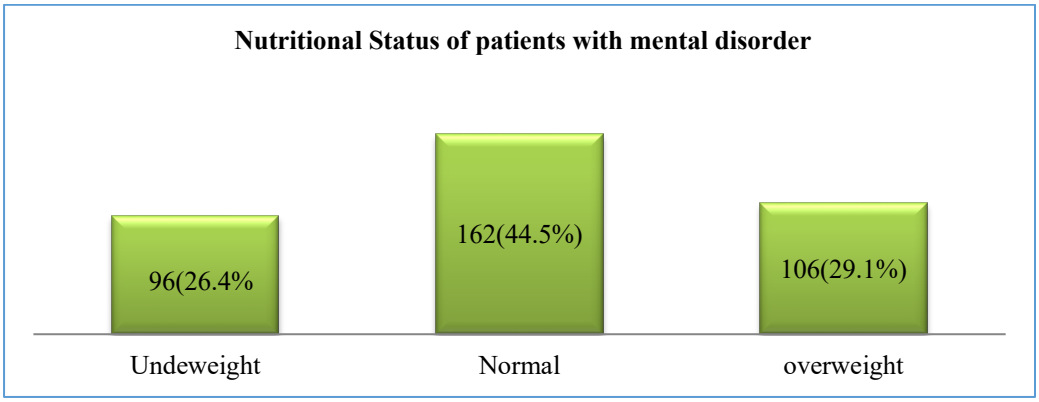

Figure 4: A bar graph describing the prevalence of nutrition status of mental disorder patients in healthcare facilities, Dire Dawa, Ethiopia, 2023

Household food security and dietary diversity are major factors of nutrition status. So, in this study 54.9% female were food insecure while 62.9% of females had poor dietary diversity.

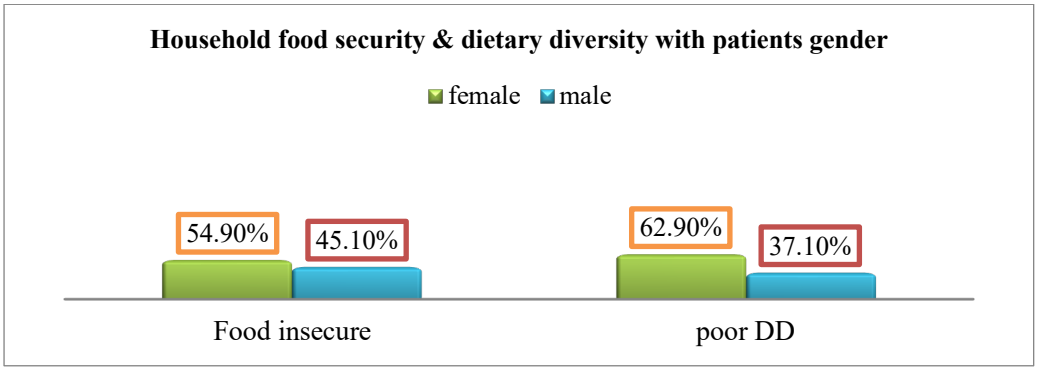

Figure 5: Household food security & dietary diversity with patients' gender

3.5. Associated factors of nutritional status among mental disorder patients

In the bi-variable analysis, sex, marital status, education level, occupation, Residence, income, treatment length, individual dietary diversity, currently chewing, currently smoking, history of alcohol usage, and sleeping problem were significantly associated with underweight among mental disorder patients in Dire Dawa town with 25% significance level. But, in the multivariable analysis, sex, education level, residence, individual dietary diversity, and sleeping problem were significantly associated with underweight among mental disorder patients in Dire Dawa town at 5% significance level.

Female mental disorder patients were 3.56 times more likely to be underweighted than male mental disorder patients [AOR = 3.56, 95%CI: 1.19, 7.61]. The odd of underweighted for

mental disorder patients who were unable to read and write was 6.72 times higher than patients who have degree and above [AOR = 6.72, 95%CI: 4.74, 11.28]. Patients who reside in rural area were 3.99 times more likely to be underweighted compared to those patients who reside in urban area [AOR = 3.99, 95%CI: 1.60, 6.63]. In this study, the odd of being underweight among patients who had low dietary diversity was 4.49 times high as compared to those patients who had high dietary diversity [AOR = 4.49, 95%CI: 2.01, 8.34]. The odd of being underweighted for patients who had severe sleeping problem was 10.04 times higher compared to those patients who have great sleeping problem [AOR = 10.04 = 95%CI: 2.07, 48.65].

Table 2: Bi-variable and Multivariable analyses of factors associated with undernourishment among mental disorder patients at Dire Dawa town, Eastern Ethiopia, N=364

Variables	**BMI**		**COR (95%CI)**	**AOR (95%CI)**
	<18.5 kg/m2 UW	**=18.5 kg/m2 Normal**		
Sex				
Female	62[31.8%]	133[68.2%]	2.54[1.33, 2.88] *	**3.56[1.92, 7.61]** **
Male	34[20.1%]	135[79.9%]	1	1
Age				
18-25	0[0%]	23[100%]	0.99[0.42, 8.42]	4.31[0.21, 8.56]
26-35	5[3.5%]	138[96.5%]	4.76[2.51, 6.23] *	2.24[0.11, 2.98]
36-44	13[11.0%]	105[89.0%]	3.15[2.64, 14.26] *	1.23[0.32, 2.29]
>=45	78[97.5%]	2[2.5%]	1	1
Marital status				
Married	13[25%]	39[75%]	1	1
Un married	44[27.5%]	116[72.5%]	21.76[4.76, 99.19] *	5.16[0.35, 8.96]
Divorced	33[34%]	64[66%]	5.65[3.07, 10.38] *	6.51[0.41, 11.16]
Windowed	6[10.9%]	49[89.1%]	2.21[1.09, 3.44] *	10.21[0.82, 17.19]
Living condition				
With family	3[1.5%]	199[98.5%]	8.41[27.42, 29.50] *	4.21[1.09, 16.23]
Alone	93[57.4%]	69[42.6%]	1	1
Education				
Unable to RW	39[40.6%]	89[33.2%]	4.08[2.02, 7.281] *	**6.72[4.74, 11.28]** **
Primary	27[28.1%]	94[35.1%]	2.14[0.04, 5.51] *	6.17[0.75, 51.09]
Secondary	17[17.7%]	59[22%]	2.58[0.55, 12.07]	2.19[0.22, 21.90]
Degree and above	13[13.5%]	26[9.7%]	1	1
Occupation				
Jo job	2[2.2%]	87[97.8%]	3.41[2.45, 8.84] *	4.34[0.18, 21.61]
Private employee	4[4.7%]	82[95.3%]	6.23[1.45, 19.32] *	2.26[0.29, 17.32]
Gov't employee	4[12.5%]	28[87.5%]	2.27[1.038, 70.48] *	4.21[0.4, 4.56]
Farmer	16[24.6%]	49[75.4%]	9.74[4.6520.429]	2.46[0.32, 3.54]
Merchant	70[76.1%]	22[23.9%]	1	1
Residence				
Rural	15[13.3%]	98[86.7%]	3.11[1.70, 5.64] *	**3.99[1.60, 6.63]** **
Urban	81[32.3%]	170[67.7%]	1	1
Monthly income				
<2000	2(2.8%)	70(97.2%)	39.50[9.34, 17.04] *	0.52[0.07, 4.08]
2001-3000	5(12.5%)	35(87.5%)	7.90[2.93, 21.28] *	0.43[0.02, 8.84]
3001-4000	10(9.7%)	93(90.3%)	10.50[5.07, 21.72] *	1.28[0.25, 6.62]
>=4001	79(53.0)	70(43.0%)	1	1
Somatoform				
No	90[27.4%]	238[72.6%]	1.49[0.90, 2.47]	2.15[0.46, 10.15]
Yes	6[16.7%]	30[83.3%]	1	1

BPD				
Yes	63[28.8%]	156[71.2%]	0.73[0.45, 1.19]	0.59[0.21, 1.63]
No	33[22.8%]	112[77.2%]	1	1
Treatment Length				
<3 months	76[67.3%]	37[32.7%]	3.74[1.11, 657] *	3.24[0.62, 4.57]
3-8 months	11[9.7%]	102[90.3%]	4.34[1.72, 5.2] *	2.54[0.17, 10.24]
9-27 months	7[6.6%]	99[93.4%]	2.54[1.02, 3.24] *	5.33[0.8, 11.37]
>= 28 months	2[6.2%]	30[93.8%]	1	1
HFIA				
Food secured	8[11.9%]	59[88.1%]	0.32[0.2, 0.64] *	0.32[0.01, 0.45]
MiFI	33[59%]	120[67%]	0.52[0.18, 3.58] *	0.12[0.03, 2.35]
MoFI	14[23.3%]	46[76.7%]	0.89[0.19, 19.81] *	0.01[0.04, 1.66]
SiFI	15[25.9%]	43[74.1%]	1	1
IDDS				
Low DD	85[95.5%]	4[4.5%]	2.48[1.27, 4.85] *	**4.49[2.01, 8.34]** **
Medium DD	7[4.7%]	141[95.3%]	12.17[7.06, 20.98] *	1.79[0.52, 6.13]
High DD	4[3.1%]	123[96.9%]	1	1
Currently chew				
Yes	87[83.7%]	17[16.3%]	2.07[3.03, 7.02] *	4.38[0.05, 7.18]
No	9[3.5%]	251[96.5%]	1	1
Currently smoke				
Yes	89[33.2%]	179[66.8%]	2.09[1.050, 6.15] *	3.21[0.75, 9.54]
No	7[7.3%]	89[92.7%]	1	1
Ever use alcohol				
Yes	84(84.8%)	15(15.2%)	4.15, [2.50, 6.87] *	2.16[0.12, 6.47]
No	12(4.5%)	253(95.5%)	1	1
Sleeping problem				
SSP	56[60.2%]	37[39.8%]	**3.14[1.03, 7.55]** *	**10.04[2.07, 48.65]****
PSP	27[27.6%]	71[72.4%]	2.513[1.46, 7.82] *	16.10[0.62, 71.68]
GSS	2[2.6%]	75[97.4%]	3.94[2.40, 4.19]	7.86[0.79, 34.38]
GrSS	11[11.5%]	85[88.5%]	1	1

$* \boldsymbol{P \leq 0.25}$, $** \boldsymbol{P \leq 0.05}$

4. Discussion

The result of this study revealed that the prevalence of under-nutrition among patients was 26.6 % (95%CI: 22.20%, 31.50%). This result is nearly similar with studies done in Bangladesh 22% [16], Dessie referral hospital 23.4% (95% CI: 19.80-27.00) [17], Ethiopia 21.9% [18], and Southern part of Ethiopia 23.7% [19]. The similarity in the prevalence might be due to socio-demographic and economic similarities between the study areas and the comparability may be because in this study also the majority of respondent's similar types of mental illness like schizophrenia, bipolar disorder and psychosis in common [20].

But this result was lower than the global one 46% [21], South East Asia 35% [22, 23], Sub-Saharan Africa 48% [7], Kenya 59.5% , Felege-Hiwot Comprehensive Specialized Hospital (FHCSH) and Debre Markos Referral Hospital (DMRH) 28.5% (95% CI: 23.7%, 33.4%) [24], Gondar Teaching Hospital and Bahir, Dar Felege Hiwot Referral Hospital 31.4% [95% CI: 27.2‑36.0] [25]. This discrepancy could probably be attributed to participant's mode of treatment being all outpatients and the respondents having common mental disorders in Gondar

while in this study almost half of the study participants were inpatient, and with severe type of mental health problem and the sample size being higher in this study [25].

In this study gender was significantly associated with under-nutrition indicating that females were 3.56 time more likely to be underweighted than males [AOR = 3.56, 95%CI: 1.19, 7.61]. This result was concord with a studies done in Kenya [26], Felege Hiwot referral Hospital (FHCSH) and Debre Markos Referral Hospital (DMRH), Northwest Ethiopia (AOR = 2.48, 95% CI:1.20, 3.96] [25], Dessie Referral Hospital, Northeast Ethiopia , indicating that female were more likely to be under-nutrition [AOR: 2.39, 95% CI: 1.28-4.47] [27]. The possible reason might be due to the fact that 54.9% of females were food insecure while 62.9% of females had poor dietary diversity in this study area.

This showed that the odd of underweight for patients who were unable to read and write was 6.72 times higher than patients who have degree and above [AOR = 6.72, 95%CI: 4.74, 11.28]. This result is similar with studies done in Felege-Hiwot Comprehensive Specialized Hospital (FHCSH) and Debre Markos Referral Hospital (DMRH) in Northwest Ethiopia (AOR=2.86, 95% CI:1.01, 8.07, p = 0.047), in Meskan and Marako District (Butajira), Ethiopia, illiterates (AOR=1.91, 95%CI 1.04,2.29). This might be as Illiteracy is an important determinant of under-nutrition because it is associated with poverty, food insecurity and low levels of health literacy to make a choice of healthy diets [28].

Patients who reside in rural area were 3.99 times more likely to be underweight as compared to those patients who reside in urban area [AOR = 3.99, 95%CI: 1.60, 6.63). This finding was in line with the finding reported from Nepal [16], Dessie Referral Hospital North east Ethiopia [39]. This could be due to the fact that patients coming from rural area were engaged in high energy expending activities as compared to urban dwellers. Moreover, those study subjects from rural area might not be aware of healthy eating due to poor educational status or might not get the required amount of diet due to low income [28]. Rural people are mostly farmers who are excessively engaged in labor work. Poverty and food insecurity are common challenges for the rural communities in Ethiopia [36]. All these could increase the likelihood of being undernourished due to low access to sufficient amount and quality of food to meet dietary needs [30].

This study, the odd of being under-nutrition among patients who had low dietary diversity was 4.49 times high as compared to those patients who had high dietary diversity [AOR = 4.49, 95%CI: 2.01, 8.34]. This result was similar with studies done at University of Gondar (UOG)

Teaching Hospital and Bahir Dar Felege Hiwot Referral Hospital [37] and Felege-Hiwot Comprehensive Specialized Hospital (FHCSH) and Debre Markos Referral Hospital (DMRH) in Northwest Ethiopia [36]. The main reason for this similarity might be due to the fact that patients with low dietary diversity might not get nutrients which might help them build their body. Finally, the odd of being underweighted for patients who had great sleeping shape was 10.04 times less as compared to those patients who have great sleeping problem [AOR = 10.04[2.07, 48.65].

5. Conclusion and Recommendation

5.1. Conclusion

The prevalence of underweight was found to be high in this study area. Our study revealed that the 26.6% of mental disorder patients were under-nutrition, which is higher level of health problem in the study area. Our study also showed that sex, education level, residence, individual dietary diversity and sleeping problem were significantly associated with underweight among mental disorder patients in Dire Dawa town at 5% level of significance.

5.2. Recommendation

As female patients are more exposed than male patients to be under-nutrition, they need special follow up and treatment**.** Those patients who are unable to read and write should be supported as their illiteracy is risk of under-nutrition**.** Patients who are rural resident should be aware that they are more vulnerable to under-nutrition**.** Patients should be aware that sleeping problem has significant impact on their nutritional status and try to have appropriate sleeping time. Healthcare professional should advice their patients: on importance of taking the ten food groups as per the WHO recommendation, impact of sleeping problem on their nutritional status and they should have appropriate sleeping time & risk of smoking and drinking alcohol on their nutritional status.

Acronyms

AOR = Adjusted Odd Ratio, BFP = Body Fat percentage, BMI = Body Mass Index, CI = Confidence Interval, COR = Crude Odd Ratio, CSFT = Central Skin Fold Thickness, DDHB = Dire Dawa Health bureau, FANTA = Food and Nutrition Technical Assistant, GPAQ = Global Physical Activity Questionnaire, GrSS = Great sleeping shape, GSS = Good Sleeping Shape, HHFAS = Household Food Insecurity Access Score, ICD = International Classification of Disease, LMICs = Lower-Middle-Income Countries, OPDs = Outpatient Departments, PSFT = Peripheral Skin Fold Thickness, PSP = Proper sleeping problem, SGAE = Study of

Global Aging and Adult Health, SSP = Sever sleeping problem, TC = Total Cholesterol, WHO=World Health Organization

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