

Behavioral Risk factors for Non-Communicable Diseases in mentally ill patients at Tertiary hospital Koshi province

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Abstract

Introduction:

NCD and mental illness are comorbid diseases. The precipitating risk factors for NCDs, such as physical inactivity, unhealthy diet, tobacco use and harmful use of alcohol leading to premature mortality in mentally ill people. The burden of NCDs in mentally ill population is increasing especially in low-and middle-income countries (LMICs) like Nepal. This study aimed to assess the behavioral risk factors for NCDs among mentally illness patients attending at Koshi hospital, Morang.

Methods

A Cross-sectional study was conducted among 322 mentally ill patients attending at Koshi hospital, Morang. Non-probability Purposive sampling technique was used to obtain desired sample size. Data entry and analysis were done in SPSS version 16.0. Descriptive statistics like frequency, percentage, mean, standard deviation were used. All estimates were presented with 95% confidence Interval (CI). Findings were presented in tabular form.

Results

There were high prevalence of high blood pressure, blood sugar and cardiovascular disease. Result showed 19.9% had history of raised blood pressure, 10.2% had history of raised blood sugar and 13% had history of raised cholesterol. About one forth (22%) of the respondents were overweight (BMI 25-29.9), 7.1% were obese (BMI ≥ 30) whereas 3.7% were underweight (BMI < 18.5). The median of Total physical activity in minutes of moderate intensity activity (min per day) was 118.92 (34.28–240). Majority (74.2%) of respondents do not meet Physical activity recommendations of WHO and only less than half (41.2%) meet Physical activity recommendations of WHO.

Conclusion

This study concludes that prevalence of increasing tobacco and alcohol, insufficient physical activity, increased blood pressure, blood sugar, cholesterol, overweight, obesity and cardiovascular diseases are the major risk factors for NCDs among mentally ill patients. Increasing prevalence are the result of several behavioral risk factors in this population. Thus, there is need to recognize those unmet need and prioritize for timely screening, prevention and treatment of NCDs.

INTRODUCTION

Background of the study

Noncommunicable diseases (NCDs) are emerging chronic disease conditions globally which is the result of a combination of genetic, physiological, environmental and behavioral factors. WHO has stated NCDs to be leading cause of death globally that accounts for 71% of the total deaths yearly with premature deaths in low- and middle-income countries. Top four killers of NCDs are in current health issues in which the highest is cardiovascular disease (17.9 million), cancers (9.0 million), respiratory disease (3.9 million) and diabetes (1.6 million) annually. The major risk factors of increasing NCDs are unhealthy diets, physical inactivity, alcohol and tobacco use.¹

In NCD, cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), cancer and chronic respiratory diseases are known as the “Big Four.” Common mental Disorders (CMDs) and NCDs are highly co-morbid that easily lead to chronic diseases. Individuals with T2DM are easily vulnerable to develop mental disorder such as depression or anxiety.²

NCD is equally prevalent in South-east Asia regions due to different determinant factors like unhealthy lifestyles, globalization, trade and marketing, demographic and economic transitions low literacy and poverty that leads to behavioral and metabolic risk factors.³

NCD has a huge comorbidity as well as a high-risk factor with mental illness as a result there is increase chance of an individual suffering from one or more chronic illnesses. The precipitating risk factors for NCDs, such as physical inactivity, unhealthy diet, tobacco use and harmful use of alcohol are in trending that leads to poor mental health. SGD goal 3 has combat with its target to reduce premature mortality from NCDs through prevention, early identification, treatment and promotion of mental health and well-being.⁴

In low-and middle-income countries, the rate of comorbidity between NCDs and common mental illness are high such as depression and anxiety, and NCDs such as diabetes and COPD.⁵

NCDs are the leading cause of death in the South-East Asia Region (SEAR), accounting for 55% of all deaths. According to WHO, the burden of NCDs in Nepal is 39% among which 22% by CVD, 7% by cancers, 5% by respiratory diseases and 1.7% by diabetes. The burden of non-communicable diseases has increased in the last few decades in low-and middle-income countries including in Nepal.⁶

The WHO initiative for Mental health (2019–2023) under ‘Universal Health Coverage for Mental Health’ has targeted to reduce one third of premature mortality from NCDs through prevention, treatment and promotion of mental health and wellbeing.⁷

The Lancet Psychiatry Commission revealed that mental illnesses are associated with a risk of obesity, diabetes, and cardiovascular diseases which is 1.4-2.0 times higher than in the general population. There is prevailing premature mortality of people with mental illness because of lack of health equalities in people with mental illness compared to general population throughout the life course.⁸

Government of Nepal, MoHP with support of WHO has formulated Multi-Sectoral Action Plan (MSAP) for the prevention and control of NCDs (2014–2020) in the country. WHO has estimated 18% of the NCD burden is due to mental illness. The National Health policy 2019 has emphasized prevention and control of NCDs in Nepal through multi-sectoral collaboration. There is a limited study done to assess the behavioral risk factors of non-communicable diseases among the mental illness population in Nepal. Hence, there is an urgent need of actions to tackle increasing burden of NCDs in Nepal.¹⁰ This study aims to assess the risk factors of non-communicable diseases among mentally ill patients.

METHODOLOGY

Quantitative Cross-sectional Analytical study was used. Study population was mentally ill patients attending at Psychiatric OPD of Koshi hospital. Non-probability purposive sampling technique was used. Sampling size was calculated using Cochran formula, z^2pq/d^2 $P = 39\%$, [taking 'P' from Prevalence of non-communicable diseases which was 39% of the country's disease burden derived from study of burden of NCDs and determinants in Nepal, 2014–2020⁴] The required sample size was $322 + 32 = 354$ (added 10% non-response rate). The data was collected using part of WHO NCDs STEPS questionnaire version 3.2. used in STEPS survey 2019, Nepal.³¹ The questionnaire consists of core, expanded and country specific questions that was modified according to need. Nepal included household asset module in consultation with WHO Regional office South-east Asia. Tools were translated into Nepali language after consulting with experts. Tools were divided into two distinct parts: Part I: Demographic information (age, sex, ethnicity, education, marital status, occupation, income), Part II: Behavioral Measurement (information related to smoking, alcohol consumption, tobacco use, physical activity, salt intake in diet and intake of fruits and vegetables).

Before data collection ethical approval was taken from Institutional Research Board (IRB) of Tribhuvan University Institute of Medicine (TU IOM), Kathmandu, Nepal. Approval was taken from Koshi hospital administration. Data was collected through face-to-face interview using standardized questions from WHO STEPS questionnaire version 3.2 and translated in Nepali language. Verbal and written informed consent were obtained from each participant before data collection. The elements of informed consent were explained to respondents such as purpose and methods, expected duration of the participation, payment /reimbursement, voluntary participation/ withdrawal along with the potential risks and benefits. Respondents would participate voluntarily without forcing them to participate in the study. They would be given freedom to discontinue their participation at any point if they would not wish during the data collection period. 25–30 minutes was given to each respondent for obtaining information. Collected data were checked for completeness on the same day. Data entry and analysis was done in SPSS version 16.0. Descriptive statistics like mean, proportion and standard deviation were used. Estimations were presented with 95% confidence Interval. The findings were presented in tabular form.

Ethical safety/Safety issues

Ethical clearance was taken from Institutional Review Board of Institute of Medicine, TU, Kathmandu. Written permission for the approval of data collection was taken from Biratnagar Nursing Campus. Ethical approval was obtained from Ethical Review Board (ERB) of Tribhuvan University Institute of Medicine, Kathmandu. Written informed consent was obtained from each participant after explaining components of Participant information sheet. Administrative approval was taken from Koshi hospital administration. The confidentiality of the information was maintained throughout the study.

Written informed consent was taken from each respondent. The elements of informed consent were thoroughly explained to respondents such as purpose and methods, expected duration of the participation, payment /reimbursement, voluntary participation/withdrawal along with the potential risks and benefits. Privacy, confidentiality of information of all the respondents were maintained. For this unique code no. was given in questionnaire sheet while collecting information. Respondents were clarified that the information would be used for research purpose only and would not get disclosed. Respondents would participate voluntarily would be given freedom to discontinue if they find themselves uncomfortable or inappropriate at any point during the data collection period.

RESULTS

Table 1: Demographic characteristics

n=322

Variables	Frequency (f)	Percentage (%)
Age in completed years		
≤20	35	10.9
21-40	139	43.2
41-60	98	30.4
>60	50	15.5
Median (Interquartile range) = 38.50(53-27)		
Sex		
Male	162	50.3
Female	160	49.7
Level of education		
1. No formal schooling	49	15.2
2. Less than primary school	30	9.3
3. Primary school completed		
4. Secondary school completed	35	10.9
5. High school completed	77	23.9
6. Bachelor's level completed		
7. Postgraduate degree and above	80	24.8
8. Refused	38	11.8
	8	2.5
	5	1.5
Ethnicity		
Dalit	32	9.9
Relatively disadvantaged Janajati	15	4.7
Madhesi	76	23.6
Religious minorities	21	6.5
Relatively advantaged Janajati	56	17.4
Upper caste group	117	36.3
Not want to respond	5	1.6
Marital status		
Married	217	67.4

Unmarried	72	22.4
Separate	10	3.1
Divorced	1	0.3
Widow/widower	17	5.3
Not want to respond	5	1.6
Occupation		
Government	31	9.6
Non-government	37	11.5
Self employed	49	15.2
Student	46	14.6
Homemakers	115	35.7
Retired	16	5.0
Unemployed	4	1.2
Refused	3	0.9
Family members >15 years		
1-5	241	74.8
>5	81	25.2
Family members less than 15 years		
Up to 2	201	90.4
>2	31	9.6
Income		
≤25000	95	29.5
25000-50000	167	51.9
>50000	60	18.6

Table 1 illustrates the distribution of socio- demographic characteristics of respondents in which median was 38.50. Among 322 respondents, majority was 21-40 years age (43.2%), 10.9% was below 20 years and 15.5% was above 60 years age. Male participant was more (50.3%) than female (49.7%). On basis

of level of study, 15.2% respondents had no formal education while 23.9% completed secondary school and 24.8% completed higher secondary school. On the basis of ethnicity, one third of the respondents (36.3%) were upper caste group followed by Madhesi (23.6%), 17.4% was relatively advantaged Janajati, 9.9% was dalit, 6.5% was religious minorities and 4.7% was relatively disadvantaged Janajati. According to marital status, 67.4% was married while 22.4% were unmarried, 5.3% were widow/widower, 3.1% were separate and 0.3% were divorced. Regarding occupation, majority of the respondents were Homemaker i.e., 35.7%, second was self-employed (15.2%), third student (14.6%) and fourth nongovernment employee (11.5%). With regards to family members 74.8% had family members 1-5 while 25.2% had family members more than 5. Similarly, when asked about family members less 15 years 90.4% respondents had up to 2 members while 9.6% had more than 2 members. Likewise, nearly half (51.9%) respondents had monthly income between 25000 to 50,000 while 18.6% had income >50,000 and 29.5% had income below 25000.

Table 2: Tobacco use status of the respondents **n=322**

Variable	Frequency (f)	Percentage (%)
Currently used smoked tobacco		
Yes	66	20.5
No	256	79.5
Current daily tobacco smoking status		
Yes	48	49.9
No	274	85.1
Age when first started smoking n= 66		
< 20 years	30	45.5
>20 years	36	54.5
Don't know		
Duration of smoking (n=66)		
<5 years	51	77.3
>5 years	15	22.7
Tobacco smoking product n= 66		
Manufactured cigarette	66	21.1
Bidi	2	0.6
Hand rolled cigarette	7	2.1
A pipe full of tobacco	2	0.6
Cigar	3	0.9
Hukkas	2	0.6
Others	2	0.6
Cessation of smoking	27	40.9
Continuation of smoking	39	59.1
Duration of time tried to quit smoking (n=27)		
≤2 times	13	48.1
3 and more	14	51.9

Table 2 revealed that 20.5% of the respondents currently used smoked tobacco and nearly half (49.9%) used currently daily tobacco smoking. Among the users, 45.5% started smoking before 20 years of age and 22.7% had duration of smoking more than five years long. Regarding types of tobacco smoking product; maximum respondents (21.1%) used manufactured cigarette, 2.1% used hand rolled cigarette, 0.9% used cigar, 0.6% used bidi, 0.6% used pipe full of tobacco, and another 0.6% used hukka. Among the users, only 40.9% could cease smoking. More than half (51.9%) of the smokers tried to quit smoke for three times or more.

Table 3. Tobacco cessation of the respondents

n=27

Variables	Frequency (f)	Percentage (%)
Reason to quit smoking in the past 12 months	-	-
Health concern (self)	20	71.4
concern for health shown by family	16	57.1
Suggestion from others	10	35.7
Family conflict	8	28.6
Ban tobacco use at the workplace or public place	4	14.3
Social commitment	1	3.6
Others	1	3.6
Measures taken to try or stop smoking		
Try to quit without an assistant (willpower)	23	82.1
Support from family	8	28.6
Behavioral therapy	5	17.9
Medicine therapy (Nicotine replacement therapy, traditional Medicine)	1	3.6
Factors motivated to initiation of smoking again	-	-
Feeling lonely	11	3.4
Stress	11	3.4
Negative thinking	10	3.1
Peer influence	10	3.1
At the time of alcohol intake	5	1.6
Recreational time	5	1.6
Positive thinking	2	0.6
Feeling tired	2	0.6
Others	1	0.3
Health workers advised to quit smoking in the past 12 months		
Yes	24	85.7
No	4	14.3

Table 3 shows that among the respondents who attempted to quit smoking, majority of the participants adopted reasons for quitting smoking in the past 12 months were health concerns (71.4%), followed by health concerns shown by family (57.1%), suggestion from others (35.7%), family conflict (28.8%), ban tobacco use at the workplace or public place (14.3%), and social commitment (3.6%). In addition, respondents attempted to quit tobacco smoking using different measures like; tried to quit without assistance by their willpower by 82.1%, while support from family by 28.6%, using behavioral therapy including nicotine replacement therapy and traditional medicine by 17.9%. In addition, the factors that motivated respondents to initiate smoking again were because of feeling lonely (3.4%), stress (3.4%), negative thinking (3.1%), peer influence (3.1%), at the time of alcohol intake (1.6%), recreational time (1.6%), feeling tired (0.6%) and positive thinking (0.6%).

With regards to advice from health workers, more than three-quarter (85.7%) of the current smokers who attempted to quit smoking got advice from health workers whereas 14.3% of the respondents had no visit during the past 12 months.

Table 4. Smokeless Tobacco user status of the respondents **n=322**

Variables	Frequency (f)	Percentage (%)
Past smokeless tobacco users	58	18.0
Current tobacco users	57	17.7
Frequency of smokeless tobacco use (n=57)		
Daily	26	8.1
Weekly	31	91.9
Use of smokeless tobacco product (n=57)		
Khaini /surti	23	40.4
Use of Gul by mouth	10	17.5
Guthka	18	31.6
Jarda pan	19	33.3
Bitel	17	29.8
During the past 30 days, Someone smokes in your home in your presence	83	25.8
During the past 30 days, someone smoked near you	110	34.2
In the last 30 days, seen any advertisements or signs promoting cigarettes, bidis, or any other smokeless tobacco products	119	37
During the past 30 days, noticed information about the dangers of smoking cigarettes, bidis, or other tobacco products that encourage quitting	70	21.7
Prevalence of tobacco use	82	25.5

Table 4 shows smokeless tobacco user status where less than one-third of the respondents (18%) were ex- smokeless tobacco users where 17.7% of the respondents were current smokeless tobacco users. Among them, 8.1% of the respondents were using daily while 91.9% were using weekly. Among the current smokeless tobacco users, majority (40.4%) were using Khaini/Surti, followed by using Jarda Pan (33.3%), Guthka (31.6%), Bitel (29.8%) and use of Gul by mouth (17.5%). Similarly, nearly one-third (25.8%) were exposed to secondhand smoke at their home, and 34.2% were exposed nearby secondhand smoke in past 30 days. About 21.7% of the respondents noticed information about the dangers of smoking cigarettes, bidis, or other tobacco products that encourage quitting during the past 30 days. Similarly, more than one-third (37%) of the respondents had seen any advertisements or signs promoting cigarettes, bidis, or any other smokeless tobacco products in the last 30 days. The overall prevalence of tobacco use was 25.5%.

Table 5: Alcohol consumption of the respondents**n=322**

Variables	Frequency (f)	Percentage (%)
Consumed alcohol		
Yes	85	26.4
No	237	73.6
Consumed alcohol in past 12 months		
Yes	62	19.3
No	260	80.7
Left alcohol use in the past 12 months	23	7.1
Consumed alcohol in last 1 month		
Yes	35	10.9
No	287	89.1
Consumed alcohol in last 7 days		
Yes	27	8.7
No	295	91.6
Felt need to decrease alcohol		
Yes	37	11.5
No	285	88.5
Feeling of irritation while somebody criticizes about your drinking		
Yes	25	7.8
No	297	92.2
Feeling of guilty towards alcohol intake habit		
Yes	24	92.5
No	298	7.5
Need of alcohol early in the morning		
Yes	18	5.6
No	304	94.4

In table 5, regarding use of alcohol, about one-third (26.4%) of the respondents used alcohol among whom 19.3% consumed alcohol in past 12 months and 7.1% left alcohol. Similarly, among alcohol users, 10.9% of the users consumed alcohol in last one month while 8.7% found to consume alcohol in last

seven days, however only 11.5% felt need to decrease alcohol. Among alcohol users, 7.8% expressed feeling of irritation while somebody criticizes about their drinking habit while 92.5% felt guilty towards their drinking habit and 5.6% felt need of alcohol early in the morning.

Table 6. Dietary habit of respondents **n=322**

Statements	Frequency (f)	Percentage (%)
Fruit intake per week		
0-3 days	247	76.6
4-7 days	75	23.3
Average intake of fruits per week	1.98	
Servings of Fruit intake per day		
< 5 servings	322	100
>5 servings	-	-
Average servings of fruit intake	0.45	
Servings of vegetable intake per week		
0-3 days	73	22.7
3-7 days	249	77.3
Average intake of vegetable per week	5.12	
Servings of vegetable intake per day		
< 5 servings	321	99.7
>5 servings	1	0.3
Average servings of vegetable intake	1.33	
Add salt to your food right before you eat it or as you eating it		
Always	21	6.5
Often	36	11.2
Sometimes	107	33.2
Rarely	81	25.2
Never	69	21.4
Don't want to answer	8	2.5
Add salt to your food while cooking		
Always	241	74.8
Often	56	17.4
Sometimes	23	7.1
Less often	1	0.3

Never	1	0.3
Eat processed food high in salt		
Always	19	5.9
Often	50	15.5
Sometimes	142	44.1
Rarely	93	28.9
Never	17	5.3
Don't want to answer	1	0.3
How much salt do you think you consumed		
too much	6	1.9
much	17	5.3
exact	233	72.4
low	46	14.3
very low	6	1.9
Don't know	14	4.3
How important is it to you to lower salt in your diet		
Very important	242	75.2
Somewhat important	46	14.3
Not at all important	4	1.2
Don't know	30	9.3
Too much salt in your diet can do harm to your health		
Yes	275	85.4
No	25	7.8
Don't know	22	6.8
To control salt intake		
Avoid/minimize consumption of processed foods such as achaar or papad	126	39.1
Look at the salt and sodium content in food label	94	29.2
Buy low salt/sodium alternatives	208	64.6
Use spices other than salt when cooking	288	89.4

Avoid eating foods prepared outside of home	102	31.7
Eat meals without adding extra salt at the table	11	3.4
Others	2	0.6
Type of Salt used		
Dhike nun	14	4.3
Dhulo nun	44	13.7
Aayo Nun (2 children logo)	264	82.0
Others		
Type of oil most often used for meals preparation		
Mustard oil	258	80.1
Refined vegetable oil	58	18.0
Butter ghee	5	1.6
Others	1	0.3
I kg sugar consumed in (average)	10 days	

Table 6 shows dietary habit of the respondents. Regarding fruit intake per week, more than three-quarter (76.6%) of the respondents took fruits less than 3 days per week while 23.3% took 4 to 7 days weekly. Similarly, regarding serving of fruit intake per day almost all respondents had less than 5 servings. Similarly, regarding intake of vegetable per week 77.3% of the respondents had vegetable intake for 3-7 days per week while 2.7% took less than 3 days in a week. Similarly, maximum (99.7%) of the respondents had less than 5 servings of vegetables per day and only 0.3% had more than 5 servings.

Regarding addition of salt to food right before they eat, 6.5% of the respondents stated they always add salt to their food before eating followed by 21.4% never add salt while eating. Likewise, majority (74.8%) of the respondents always add salts in their food while cooking. While asking about eat processed food high in salt 44.1% of the respondents stated sometimes and 5.3% stated never. When asked about amount of salt they think they consumed nearly three quarter (72.4%) stated exact amount and 14.3% stated low amount. While asked about importance of lowering salt in their diet, more than three-quarter (75.2%) stated it is very important while 1.2% responded it not important at all.

With regards to the statement too much salt in their diet can do harm to their health, more than three quarter (85.4%) said yes. Similarly, regarding measures to control salt intake, maximum said (89.4%) of the respondents stated to buy low salt/sodium alternatives while 64.6% stated they looked at the salt content in food label followed by 39.1% avoided /minimize consumption of processed foods such as

achaar or papad. Regarding type of salt used, majority of the respondents used Aayo nun (2 Children logo) followed by dhulo nun by 13.7%. While asked about type of oil they use most often for meals preparation, maximum (80.1%) used mustard oil followed by refined vegetable oil by 18% while only 1.6% used butter ghee. The average consumption of 1 kg sugar was 10 days.

Table 7: Physical activity of the respondents **n=322**

Physical activity	Average	Median	Interquartile range (Q1-Q3)
Vigorous physical activity (minute per day)	22.35	0.00	0-32.67
Moderate Intensity physical Activity (minute per day)	72.25	42.85	12.85-120
Walking Physical Activity (minute per day)	39.56	21.42	0-60
Time spent on sedentary activity	103.38	60	0-180
Total Physical activity in minutes of moderate intensity activity (min per day)	156.52	118.92	34.28-240

Table 7 illustrates physical activity of the respondents in which median moderate intensity physical Activity (minute per day) was 42.85(12.85-120) followed by walking Physical Activity (minute per day) was 60 (0-180). Likewise, median of time spent on sedentary activity was 60(0-180). The median of Total physical activity in minutes of moderate intensity activity (min per day) was 118.92 (34.28-240).

Table 8: Physical activity by WHO recommendations **n=322**

Physical activity	Frequency (f)	Percentage (%)
Meeting PA recommendations of WHO	239	74.2
Not meeting recommendations of WHO	83	25.8

Table 8 depicts the physical activity according to WHO recommendations among respondents in which more than there-quarter (74.2%) respondents do not meet Physical activity recommendations of WHO and less than half (41.2%) meet Physical activity recommendations of WHO.

Table 9. Prevalence of high blood pressure, blood sugar and cardiovascular disease

n=322

Variables	Yes f (%)	No f (%)
Checked blood pressure ever	280(87)	42(13.0)
History of raised blood pressure	64(19.9)	258(80.1)
History of raised blood pressure in last 12 months	52(16.1)	270(83.9)
Intake of antihypertensive drug	21(6.5%)	301(93.5)
Checked blood sugar	207(64.3)	115(35.7)
History of raised blood sugar	33(10.2)	289(89.8)
Checked cholesterol	180(55.9)	142(44.1)
History of raised cholesterol	42(13)	280(87)
History of Cardiovascular disease	9(2.8)	313(97.2)

Table 9 showed prevalence of high blood pressure, blood sugar and cardiovascular disease. Status showed that more than three quarter (87%) of the respondents had their blood pressure checked ever in which 19.9% had history of raised blood pressure and 16.1% had history of raised blood pressure in last 12 months. Among them, 6.5% were currently taking antihypertensive drugs. Similarly, more than half (64.3%) of the respondents had their blood sugar checked and 10.2% had history of raised blood sugar. Similarly, more than half (55.9%) of the respondents had checked their cholesterol among which 13% had history of raised cholesterol detected. Study showed only 2.8% of the respondents had history of cardiovascular disease.

Table 10: Lifestyle advice from doctors and other Health Workers

n= 322

Statements	Frequency (f)	Percentage (%)
Quit using tobacco or don't start	42	13.0
Reduce fat in your diet	83	25.8
Eat at least five servings of fruit and/or vegetables each day	137	42.5
Maintain a healthy body weight or lose weight	78	24.2
Start or do more physical activity	151	46.9
Reduce salt in your diet	76	23.6

Table 10 states that Lifestyle advice from doctors and other health workers in which nearly half (46.9%) of the respondents received the advice to start or do more physical activity, 42.5% were advised to eat at least five servings of fruit and/or vegetables each day. Similarly, 25.8% of the respondents received

advice to reduce fat in their diet, less than one third (24.2%) of the respondents were advised to maintain a healthy body weight or lose weight as well, 23.6% were advised to reduce salt in their diet while 13% were advised to quit using tobacco or not to start.

Table 11: Nutritional status of respondents by BMI classification

n=322

Nutritional status (BMI)	Frequency (f)	Percentage (%)
Underweight (BMI <18.5)	12	3.7
Normal (BMI 18.5-24.9)	216	67.1
Overweight (BMI 25-29.9)	71	22.0
Obese (BMI ≥30)	23	7.1

Table 11 states that Nutritional status of respondents by BMI classification in which nearly one third (67.1%) of the respondents had normal BMI (18.5-24.9). Less than one forth (22%) of the respondents were overweight (BMI 25-29.9), 7.1% of the respondents were obese (BMI ≥30 and 3.7% were underweight (BMI <18.5).

DISCUSSION

This study showed that currently smoked tobacco users were 20.5% which is consistent with the study findings done in Nepal by STEPS survey, 2019 that showed currently smoked tobacco users was 17.1%. Regarding type of smoking tobacco products, this study showed users used great number of manufactured cigarette (21.1%), hand rolled cigarette (2.1%), bidi (0.6%) which is inconsistent with the study which showed cigarette (86.7%) followed by bidis (23.8%). These differences might be due to variation in sample size. Similarly, this study showed current smokeless tobacco users were 17.7% that supports the study findings of Nepal which showed 18.3% used current smokeless tobacco. This study finding showed the prevalence of tobacco use was 25.5% which supports with the study done in Nepal which revealed the prevalence of 28.9%.²¹ A cross-sectional study done in South-Asia among severe mental illness population showed 61% of the them used tobacco in both smoked and smokeless form.²⁸ Intake of tobacco in mentally ill patients might be influenced by cognitive impairment at some extent, low quality of life and low economic status which deteriorates physical health of mentally ill patients.

Regarding tobacco cessation measures, respondents who quitted tobacco smoking products was 40.9% which contradicts with the study done in Nepal that showed only 19.4% quitted tobacco smoking products. Similarly, regarding reason to quit smoking in past 12 months, current study showed more than half (71.4%) of the respondents quitted smoking because of health concern, about one fourth (21.7%) of the respondents noticed information about the dangers of smoking and tobacco products which

contradicts with the study that showed the reason was health warnings (44.8%) and 75.5% noticed health related information. This variation might be because of sample difference.²¹

Regarding Alcohol consumption, current study showed that nearly one-fourth (19.3%) of the respondents consumed alcohol in the past 12 months, 10.9% consumed in last 1 month and 8.7% consumed in last 7 days. These findings support the study done by STEPS survey, Nepal which showed 23.9%, 20.8% and 14.3% of the respondents consumed alcohol in the past 12 months, 1 month and 7 days respectively. Current study also revealed that 5.6% of the respondents needed alcohol early in the morning which is consistent with the study which also showed 6.3% needed alcohol early in the morning.²¹ Another study done in Nepal among adult population showed the prevalence of alcohol consumption was 31%.²² Prevalence of increased alcohol intake in mentally ill patients are due to cultural norms and restricted behavior of patients and easily availability of alcohol regardless of mental illness.

Regarding dietary habits of respondents, this study showed the average serving of fruit and vegetable intake per day were 1.98 and 1.33 respectively which supports to the study that showed the average serving of fruit and vegetable intake per day were 0.5 and 1.5 respectively.²¹ Limited servings of fruit and vegetables because of unavailability of seasonal fruits with costly price, having lack of adequate information on need to consume sufficient fruits and vegetables, less health consciousness of family members may be consequences of insufficient intake.

Regarding salt intake, 6.5% of the respondents always added salt to their food right before eating or as they are eating. This study finding is similar to the study that showed 5.6% added salt to their food right before eating. Similarly, this study showed 15.5% of the respondents often eat processed food high in salt which is consistent with the study finding that also showed 19.5% often eat processed food high in salt.²¹

Regarding perception of salt intake, current study revealed that about more than three quarter (72.4%) of the respondents stated they consumed exact amount of salt intake and only 1.9% stated they consumed too much or much amount of salt intake. This finding is coherent with the study that revealed 74.9% of the respondents stated they consumed exact amount of salt intake while 10.6% stated too much or much amount of salt intake. Regarding measures to control salt intake, current study showed statements by respondents like they avoid/minimize consumption of processed foods such as achar or papad (39.1%), look at the salt and sodium content in food label (29.2%), buying low salt/sodium alternatives (64.4%), avoid eating foods prepared outside of home (3.4%) which contradicts the study that showed only 2.6% of the respondents doing something to control salt intake.²¹

Regarding type of oil most often used for meals preparation, this study revealed that maximum (80.1%) of the respondents used mustard oil followed by refined vegetable oil (18%) which is incoherent with the study findings that showed less than half (43.8%) used mustard oil while about half (51.4%) used refined vegetable oil for cooking.²¹ Usage of mustard oil over refined vegetable oil might be because of health concern by family members and most family had derived from own farming also.

The present study showed that the median moderate intensity Physical Activity (minute per day) was 42.85 (12.85–120) followed by walking Physical Activity (minute per day) 21.42 (0–60). Likewise, median of time spent on sedentary activity was 60 (0–180). The median of Total physical activity in minutes of moderate intensity activity (min per day) was 118.92 (34.28–240) which is not supported by the study which showed average time spent on physical activity was 229.2 minutes per day and average time spent on sedentary activity is 201.2 minutes per day.²¹ These discrepancies might be due to variation in sample size. The reasons for not doing adequate physical activity may be because of their alteration in mood and psychomotor instability related to mental disorders, and also due to urbanization living style with better access to means of transportation facilities that supports in lack of physical activity or motor exercise in patients.

With regards to physical activity according to WHO recommendations among respondents this study showed more than half (58.8%) respondents do not meet Physical activity recommendations of WHO and less than one third (25.8%) meet Physical activity recommendations of WHO which contradicts findings of the study showed 7.4% of adults had insufficient level of physical activity defined as < 150 minutes of moderate intensity activity.²¹ Likewise another study done among psychiatric disorders in North-India revealed 72.7% of the respondents had insufficient physical activity.²⁶ Another study among severe mental illness in South Asia also showed 45.6% had lack of physical activity.²⁸ Lack of adequate physical activity in mentally ill patients may adversely affect in their body metabolism which results into different chronic physical illnesses that need to get controlled on time.

Regarding history of raised blood pressure, current study showed more than three quarter (87%) of the respondents had their blood pressure checked by doctor ever in which 19.9% had history of raised blood pressure in last 12 months additionally 6.5% were taking antihypertensive drugs. This finding supports the study done in Nepal in which 55.9% of the respondents had their blood pressure measured by doctor where 12.3% had history of raised blood pressure.²¹ A cross-sectional study done in Bangladesh and Pakistan among severe mental illness showed 24.7% had hypertension.²⁸

Regarding history of raised blood sugar, this study revealed more than half (64.3%) of the respondents checked blood sugar where 10.2% had history of raised blood sugar. Another study showed among severe mental illness population that the prevalence of raised blood sugar was 8%.

Regarding history of raised cholesterol, current study showed more than half (55.9%) of the respondents had checked their cholesterol in which 13% had history of raised cholesterol detected. The findings are consistent with the study which showed 13.4% checked their cholesterol and 11% had history of raised cholesterol.²¹

Regarding history of cardiovascular disease, current study revealed that 2.8% of the respondents had history of cardiovascular disease such as heart attack, chest pain which is coherent with the study that 1.1% had history of cardiovascular disease.²¹

These kind of risk factors of developing hypertension, diabetes, obesity, cardiac disease in mentally ill population is about 40% higher than in general population which can lead into chronic illness. Different factors may trigger to develop non-communicable diseases in mentally ill population like, stress, low socio-economic condition, stigma and discrimination towards mental illness in society, more sedentary lifestyle, lack of physical activity and neglected dietary pattern. Thus, awareness towards adequate screening, prevention and management of these modifiable risk factors should be initiated by the family members and mental health professionals through family as well as community level.

Regarding lifestyle advice from doctors and other health workers, respondents were advised from their doctors and other health workers on; eat at least 5 servings of fruit and/or vegetables each day (42.5%), reduce fat in your diet (25.8%), reduce salt in your diet (23.6%), quit using tobacco or don't start (13%), maintain a healthy body weight or lose weight (24.2%), start or do more physical activity (46.9%) which are coherent with the study that also showed; eat at least 5 servings of fruit and /or vegetables each day (52.3%), reduce fat in your diet (48.2%) and reduce salt in your diet (46.1%).²¹

This study showed that more than half (61.1%) of the respondents had normal (18.5–24.9) BMI. Similarly, about one fourth (22%) of the respondents were overweight (BMI 25-29.9), 7.1% of the respondents were obese (BMI $\geq$ 30) and only 3.7% of the respondents were underweight (BMI < 18.5). These findings support the study conducted in Nepal that showed prevalence of overweight, obese and underweight were 20%, 4.3%, 10.2% respectively.²¹ Similarly, another study done among severe mental illness in South-Asia showed the prevalence of overweight or obese was 43.4%²⁸ Tendency in increasing weight and obesity are proportionately related to less physical activity, less health concern related to dietary pattern, and also due to common adverse effects of taking long term psychotropic medications that cause adverse effect causing increase in glucose and lipid metabolism in mentally ill patients.

CONCLUSION

This study concludes that prevalence of increasing tobacco and alcohol, insufficient physical activity, increased blood pressure, blood sugar, cholesterol, overweight, obesity and cardiovascular diseases are the major risk factors for NCDs among mentally ill patients. Increasing prevalence are the result of several behavioral risk factors in this population. Thus, there is need to recognize those unmet need and prioritize for timely screening, prevention and treatment of NCDs in these vulnerable population.

Abbreviations

CVD

Cardio Vascular Diseases

COPD

Chronic Obstructive Pulmonary Diseases

DM

Diabetes Mellitus

LMICs
Low- and middle-income countries
MET
Metabolic Equivalents of task
NCDs
Non communicable diseases
PEN
Package of Essential Non-communicable Diseases
SDGs
Sustainable Development Goals
WHO
World Health Organization

Declarations

Ethical Approval and Consent to participate

Ethical Approval Process

[In accordance with the Declaration of Helsinki]

Ethical clearance was taken from Institutional Review Board of Institute of Medicine, Tribhuwan University, Kathmandu. Written permission for the approval of data collection was requested from Biratnagar Nursing Campus. Ethical approval was obtained from Ethical Review Board (ERB) of Tribhuvan University Institute of Medicine, Kathmandu. Next, Administrative approval for data collection at Psychiatric OPD was taken from Koshi hospital administration. Verbal as well as written informed consent was obtained from each participant after explaining component of Participant Information Sheet. The confidentiality of the information was maintained throughout the study.

Consent for publication

Not Applicable.

Availability of Data and materials

All data generated or analysed during this study are included in this published article [and its supplementary information files].

Competing Interest

The authors declare that they have no competing interests.

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Authors' Contribution

There are total 4 Co-authors who had had major contributions in conducting this study beside Principal author.

Co-authors are: Ms Sharada Kunwor, Ms Punam Kumari Mandal, Dr. Sachin Nepali and Ms. Tulasa Dahal.

-Ms. Sharada Kunwor, Assistant Professor of Department of Psychiatric Nursing, TU IOM Biratnagar Nursing campus. She had major contribution as Co-investigator of this study. She has been actively involved since development of proposal, tool development, data collection, data analysis, preparing research report and manuscript on time.

Ms. Punam Kumari Mandal, Assistant Professor of Dept of Community Health Nursing, TU IOM Biratnagar Nursing campus. She had major role in Data collection, Data analysis and report writing during the study.

Dr. Sachin Nepali, Consultant Neuropsychiatrist of Dept of Psychiatry, Koshi Hospital. He had major contribution in tool validation and Data collection during study period.

Ms. Tulasa Dahal, Lecturer of Dept of Maternity Health Nursing. Her major contribution is she helped in data collection during specific time period.

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Footnote

Not Applicable

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