

The Prevalence of Double-Burden Malnutrition among Registered Nurses in Iligan City

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Abstract:-

➤ *Background and Aim:*

The Philippines suffers from double-burden malnutrition, and nurses are no exception. This study aimed to investigate the association between the BMI, eating habits, and physical activity among registered nurses in Iligan City, Philippines.

➤ *Design:*

The researchers utilized a correlational research design to explore the connections between double burden malnutrition, BMI, physical activity, and eating habits among 81 registered nurses in selected hospitals in Iligan City.

➤ *Results:*

Most participants experienced high blood pressure (93.8%), and a minority had diabetes (9.9%). Dietary habits showed median intakes of 2.70 for go-foods (1-3 per month), 3.65 for grow foods (1 per week), and 2.47 for glow foods (1-3 per month). The majority engaged in physical activity for less than thirty minutes daily (96.3%). There was a significant BMI difference between low and moderate activity levels ($p = 0.003$), indicating an important association with physical activity patterns. However, BMI scores did not significantly correlate with eating habits.

➤ *Conclusion:*

No associations were found between the nurses' BMI and eating habits, but a strong association were found between BMI and physical activity, underscoring the double burden of malnutrition. Future research with larger samples is needed to clarify these relationships. The study also highlights the growing public health concern of overweight/obesity among registered nurses, indicating that their BMI and physical activity patterns may contribute to the double-burden malnutrition.

Keywords:- Double Burden Malnutrition, Registered Nurses, Eating Habits, Physical Activity, BMI,

I. INTRODUCTION

The Philippines suffers from this double burden nutrition, with an annual increase of overweight/obesity among adults at 0.73% over 20 years (1993–2013). The prevalence of cardiometabolic disease risks (overweight/obesity or abdominal obesity, elevated fasting blood glucose, and abnormalities in blood lipid levels) continuously rise. Worse still, chronic energy deficiency, anemia, and vitamin A deficiency are significant public health problems in Filipino adults (DOST 2015).

According to the World Health Organization, there are two types of double burden of malnutrition, the household level and the individual level (WHO 2023). A study shows that in the Philippines investigating DBM have primarily focused on the overlap between underweight and overweight/obesity in the population or within households (Angeles et al. 2020). For example, Blankenship et al. (2020) states that a large family increases economic barriers and regarded as a risk factor for malnutrition in developing countries, particularly for infants and young. Also, in low-income families, the more people live in the household, the less food each household member consumes. In the double burden of malnutrition at the individual level, the overall prevalence of individual level DBM was 29.4% (Hu et al. 2021). Research documenting the distribution of adults who are underweight or micronutrient deficient and at the same time experiencing cardiometabolic risk factors are also scarce and limited in urban settings (Yu et al. 2020).

Factors that contribute to the double burden of malnutrition are socioeconomic and demographic factors, including gender, age, height, weight, educational level, occupation, food intake, income, and urbanization (Guevara et al. 2021). Also, lifestyle factors like smoking, alcohol drinking, and physical activity were factors of DBM (Kolovou et al. 2016). These shifts have led to a rise in obesity and non-communicable diseases (NCDs), including hypertension, diabetes mellitus, and cardiovascular diseases (WHO 2023). Evidence suggests that nutrition transition contributes to the double burden of malnutrition (DBM) or the coexistence of undernutrition or micronutrient deficiency along with overweight, obesity, or diet related NCDs (WHO 2017).

There are interventions done in the Philippines like nutrition and education counseling, specifically the ‘Pinggang Pinoy’ program (DOH 2020). For instance, the “10 Kumainments” emphasize the consumption of diverse, nutrient-rich foods, appropriate portion sizes, and regular physical activity (Mendoza et al. 2020). Also, the Philippine Council for Health and Development that supports research projects focused on improving nutrition and addressing malnutrition (PCHRD 2023).

Despite the knowledge of the case, considering the factors of DBM, the problem continues to rise on approximately 28.8% of Filipino adults were classified as overweight or obese, while 5.6% were underweight (FNRI 2022). This nutritional imbalance is closely linked to the prevalence of NCDs such as hypertension, diabetes, and cardiovascular diseases, which collectively affect roughly 35% of the adult population annually (WHO 2023). What is alarming is that this phenomenon is occurring among healthcare professionals (Sharma et al. 2014). Currently, there are no studies on the individual level of the double burden of malnutrition among allied health workers here in the Philippines, specifically for registered nurses.

Hence, this study aimed to address the existing gap in research by focusing on registered nurses at the individual level targeting participants with obesity and noncommunicable disease in relation to their dietary patterns, regular exercises, and different shifts. The research studies on the dietary habits of this specific population has created a noticeable gap in our understanding of their nutritional practices. Furthermore, the study sought to bridge the practical-knowledge gap that currently exists among registered nurses, who, despite being allied health professionals, often neglect the application of nutritional knowledge to their own well-being. By addressing both the population and practical-knowledge gaps, this research contributes valuable insights into the dietary patterns and the prevalence of DBM among registered nurses. Creating an underexplored aspect of their professional and personal lives. The research questions were:

- What is the prevalence of double burden malnutrition among registered nurses in Iligan City?
- What are the eating habits of registered nurses, and how do they contribute to their nutritional status?
- What is the frequency of regular activity patterns among nurses, and how does this impact their BMI?
- Does BMI significantly differ based on physical activity levels among registered nurses?
- Is there a significant relationship between BMI and eating habits among registered nurses?

II. METHODS

➤ Research Design

This study attempted to investigate the associations between double burden malnutrition and registered nurses in Iligan City without changing or modifying them through the use of a correlational research approach. Our research study employed a correlational design to explore the relationship between double burden malnutrition, BMI, physical activity, and eating habits, examining how these variables are interconnected (Nelson et al. 2019). This approach was appropriate because it allowed us to examine the natural associations between variables without manipulating them (Nelson et al. 2019). By using correlational research, we identified potential links and patterns between malnutrition and the health outcomes of nurses (Creswell & Creswell 2020). This design helped in understanding the prevalence and impact of malnutrition among nurses in a real-world setting (Bryman 2021). Furthermore, correlational studies are useful in public health research to identify risk factors and inform intervention strategies (Schmidt & Brown 2023).

➤ Population and Sample

The respondents for this research were registered nurses, both male and female, currently working in hospitals in Iligan City, Lanao del Norte. Purposive sampling was utilized to select participants, ensuring they met specific criteria relevant to the study's objectives (Creswell & Creswell 2017). Participants must be currently employed as registered nurses within the city and must be positive in experiencing the double burden of malnutrition, which includes both undernutrition and overweight/obesity. They must be between the ages of 25 and 60, and willing to provide informed consent and complete all components of the study, including surveys on eating habits, physical activity levels, and anthropometric measurements for BMI calculation.

➤ Instrumentation/Tools

The study utilized the WHO STEP wise Approach to Surveillance (STEPS) questionnaire, a tool developed by the World Health Organization, for assessing risk factors for non-communicable diseases. This instrument has demonstrated reliability and validity across diverse populations (Rampal et al. 2010; Li et al. 2013). Additionally, the Exam 3 Food Frequency Questionnaire (FFQ) by the National Health Institute was used to measure the eating habits of registered nurses, with reliability and validity confirmed in various studies (Smith et al. 2016; Johnson et al. 2015; Brown et al. 2017). The International Physical Activity Questionnaire (IPAQ) short form was employed to measure daily exercise patterns, recognized for its reliability and validity in assessing physical activity levels (Craig et al. 2003; Lee et al. 2011; Fogelholm et al. 2006).

➤ Ethical Considerations

Ethical standards were upheld by obtaining permissions from the Dean of the Adventist Medical Center College School of Nursing and the Research Director. Informed consent was sought from all participants, ensuring

their confidentiality and anonymity. Data collected were used exclusively for research purposes. Participants received an informed consent form detailing the study's purpose, procedures, and voluntary participation. They were assured their responses would be confidential and used only for the research, with the option to withdraw at any time without penalty.

➤ Data Gathering Procedure

Data collection began with obtaining permission from relevant authorities and creating a consent form for participants. After receiving informed consent, the research team recruited participants who met the inclusion criteria. Questionnaires, including the WHO STEPwise Questionnaire, International Physical Activity Questionnaire, and Exam 3 Food Frequency Questionnaire, were distributed to participants. Participants were given ample time to complete the questionnaires, and assistance was provided as needed. Upon completion, the questionnaires were collected and checked for completeness before being prepared for analysis.

➤ Data Analysis

Data were analyzed using SPSS version 25 to investigate the relationships and potential associations between double burden malnutrition, dietary patterns, physical activities, and BMI. Data cleaning was performed in Excel to address inconsistencies and missing values. Normality of continuous variables was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Descriptive statistics, including frequencies and percentages, were used to determine the prevalence of double burden malnutrition among nurses. Means, medians, and modes summarized the eating habits of nurses and analyzed their contribution to

nutritional status. The frequency and impact of regular activity patterns on BMI were determined using descriptive statistics. To assess the significant association between BMI and physical activity levels, descriptive statistics and the chi-square test were employed. Finally, bivariate correlations using Kendall's tau measured the relationship between BMI and eating habits, identifying any significant correlations.

➤ Prevalence of Double Burden Malnutrition among Registered Nurses

As shown in Table 1, the majority of the participants reported that their blood pressure has been measured by a doctor or other health care worker, has been told that a raised blood pressure or hypertension is present, have been told about the raised blood pressure in the last 12 months, drugs and medications have been taken in the past two weeks, and were advised to reduce salt intake. Few of the participants have reported that their blood pressure has not been measured by a doctor or other health care worker, being told by a doctor or other healthcare worker that hypertension is present, have been told in the past two weeks, taking drugs or medications for hypertension in the past two weeks, and advised to reduce salt intake. Majority of the participants also reported that they were not advised to lose weight, advised to stop smoking, advised to exercise more, was seeing a traditional healer for hypertension, and are currently taking any herbal or traditional remedy for hypertension. Few of the participants reported that they have been advised to lose weight, stop smoking, and to do more exercise, seeing a traditional healer for hypertension, and was currently taking herbal or traditional remedy for hypertension.

Table 1 Frequencies and Percentages of the Respondents Cases of DBM

History of Raised Blood Pressure	Yes f(%)	No f(%)
1. Blood pressure has been measured by a doctor or other health care worker.	76 (93.8)	5(6.2)
2. Being told by a doctor or other health worker that raised blood pressure or hypertension is present.	76 (93.8)	5(6.2)
3. Have been told in the past 12 months.	76 (93.8)	5(6.2)
4. Drugs (medication) have been taken in the past two weeks.	76 (93.8)	5(6.2)
5. Advice to reduce salt intake	78 (96.3)	3(3.7)
6. Advice or treatment to lose weight	29(35.8)	52(64.2)
7. Advice or treatment to stop smoking	33(40.7)	48(59.3)
8. Advice to start or do more exercise	23(28.4)	58(71.6)
9. Seeing a traditional healer for raised blood pressure or hypertension has occurred.	24(29.6)	57(70.4)
10. Currently taking any herbal or traditional remedy for raised blood pressure.	11(13.6)	70(86.4)

Table 2 exhibited results about the participants history of diabetes. Few of the total participants of DBM reported raised blood sugar and that has been taking medications for blood sugar. This suggests that the majority of the participants have not measured their blood sugar by a doctor, being told by a doctor that a raised blood sugar or diabetes is present, being told has occurred in the past 12 months, Insulin, drugs or medications being taken in the past 2 weeks, had special prescribed diet, advised to lose weight, stop smoking, start to do more exercise, were seeing a traditional healer for diabetes, or currently taking any herbal or traditional remedy for diabetes.

Few of the participants reported that they have been measured their blood sugar by a doctor, being told by a doctor that a raised blood sugar or diabetes is present, being told has occurred in the past 12 months, Insulin, drugs or medications being taken in the past 2 weeks, had special prescribed diet, advised to lose weight, stop smoking, start to do more exercise, were seeing a traditional healer for diabetes, or currently taking any herbal or traditional remedy for diabetes.

Table 2 Frequencies and Percentages of the Respondents' Cases of DBM

History of Diabetes	Yes f(%)	No f(%)
1. Blood sugar has been measured by a doctor or other health worker.	8(9.9)	73(90.1)
2. Being told by a doctor or other health worker that raised blood sugar or diabetes is present.	8(9.9)	73(90.1)
3. Being told has occurred in the past 12 months.	8(9.9)	73(90.1)
4. Insulin	9(11.1)	72(88.9)
5. Drugs (medication) have been taken in the past two weeks.	6(7.4)	75(92.6)
6. Special prescribed diet	8(9.9)	73(90.1)
7. Advice or treatment to lose weight	5(6.2)	76(93.8)
8. Advice or treatment to stop smoking	4(4.9)	77(95.1)
9. Advice to start or do more exercise	7(8.6)	74(91.4)
10. Seeing a traditional healer for diabetes or raised blood sugar	2(2.5)	79(97.5)
11. Currently taking any herbal or traditional remedy for diabetes.	2(2.5)	79(97.5)

➤ Eating Habits of Registered Nurses

Table 3 reported results on the median and interquartile range of the different food groups based on the Pinggang Pinoy. Go food group shows the median value of 2.70 suggests that the central tendency of the dataset is around this value. Additionally, the small interquartile range of .30 indicates that the middle 50% of the data is tightly clustered around the median, with relatively little variability. This suggests that the values in the dataset are fairly consistent and close to the median value.

Grow food group shows the median value of 3.65 suggests that the central tendency of the dataset is around this value. The relatively large interquartile range of .98 indicates that there is significant variability within the middle 50% of the data. This means that there is a wide spread of values between the 25th and 75th percentiles,

suggesting that the data points are dispersed across a range of values.

Glow food group shows the median value of 2.47 suggests that the central tendency of the dataset is around this value. The relatively small interquartile range of .20 indicates that there is minimal variability within the middle 50% of the data. This means that the values in the dataset are clustered closely around the median, with little dispersion. The data points are relatively consistent and close to the median value.

A report shows that 2.67 of the participants had an intake of Go foods about 1- 3 per month, 3.47 of the participants also reported an intake of Grow foods for about 1 per week, and a mean of 2.47 among the participants reported an intake of 1-3 per month of glow foods.

Table 3 Eating habits of the Respondents

Food Groups	Mean ± SD	Median and IQR
Go	2.67±.21 1-3 per month	2.70 - (.30) 1 per week
Grow	3.47±.56 1 per week	3.65 - (.98) 2-4 per week
Glow	2.47±.14 1-3 per month	2.47 - (.20) 1-3 per month

Note: 1.0 - 1.84 (Never) 3.55 - 4.39 (2-4 per week) 6.10 - 7.0 (4+ per day)
1.85 - 2.69 (1-3 per month) 4.40 - 5.24 (1 per day)
2.70 - 3.54 (1 per week) 5.25 - 6.09 (2-3 per day)

➤ Frequency and Percentage of the Physical Activity Pattern

Table 4 reported that the majority of the participants falls on the low category on the activity patterns among the registered nurses. It indicates that the majority of them engage in less than 30 minutes per day on different physical activity pattern which is a combination of walking, moderate activity or vigorous activity involved.

Table 4 Frequencies and Percentages of the Physical Activity Patterns among Registered Nurses

Category	Frequency	Percent
Low (1) < 30 minutes in a day	78	96.3
Moderate(2) 30 minutes in a day	3	3.7

➤ Relationship between the BMI and Physical Activity Pattern

Table 5 reported the mean value of 27.26 represents the typical or average value in the dataset. So, on average, the observations in the dataset are around 27.26. It shows that there is a difference in the BMI and the mean of the physical activity pattern which are the low and moderate. The table provides insights into the physical activity patterns of registered nurses with the low category group showing higher mean with less variability compared to the moderate category group, which has a lower mean and higher variability.

Table 5 Category of the Physical Activity Pattern among Registered Nurses

N	Mean ± SD
(Low) 1= 78	27.26 ± 2.2
(Moderate) 2= 3	21.64 ± 3.8

➤ *BMI and Physical Activity Pattern Significance on Kruskal Wallis Test*

Table 6 shows that BMI significantly differ on physical activity between low to moderate activity. As shown in the Kruskal Wallis Test, the p-value of .003 suggests that these differences are unlikely to have occurred by chance alone, thus supporting the alternative hypothesis that there are genuine differences between the BMI and the physical activity pattern among the participants. It indicates that the physical activity patterns affect the BMI among the registered nurses.

Table 6 Test Statistics

Kruskal Wallis H	8.563
Df	1
Asymp. Sig.	.003

➤ *BMI and Physical Activity on the Chi-Square Test*

Table 7 shows the *Chi-Square Test* is a test of independence and this table shows the association between the two variables, the BMI and physical activity pattern among the participants which are the registered nurses. The count indicates the actual which are 0, 56, and 22 a total of 78 in the low category and 1, 2, and 0 a total of 3 in the moderate category. The expected count in the low category are 1.0, 55.9, and 21.2 with a total of 78.0 in the low category and an expected count of .0, 2.1, and .8 a total of 3.0 in the moderate category with a *Chi-square* value of χ^2 ($df = 2$, $n=81 = 26.86$, $p < .0001$) The table reports a significant association between the two variables.

Table 7 Relationship between Categorical Variables

Category		Low (1)	Moderate (2)	Total
Underweight (1)	Count	0	1	1
	Expected Count	1.0	.0	1.0
Overweight (2)	Count	56	2	58
	Expected Count	55.9	2.1	58.0
Obese (3)	Count	22	0	22
	Expected Count	21.2	.8	22.0
Total	Count	78	3	81
	Expected Count	78.0	3.0	81.0

Table 8 presents the evaluation of the normality of three data sets using the Kolmogorov-Smirnov and Shapiro-Wilk tests. For Go Foods, the Kolmogorov-Smirnov test produced a statistic of 0.096 with a p-value of 0.064. Since the p-value exceeds 0.05, the null hypothesis is not rejected, suggesting no significant deviation from normality. Conversely, the Shapiro-Wilk test resulted in a statistic of 0.968 with a p-value of 0.040. Here, the p-value is less than 0.05, leading to the rejection of the null hypothesis and indicating a significant deviation from normality. Thus, there is conflicting evidence regarding the normality of Go Foods, with the Kolmogorov-Smirnov test implying normality and the Shapiro-Wilk test suggesting non-normality.

For Grow Foods, the Kolmogorov-Smirnov test yielded a statistic of 0.160 with a p-value of 0.000, and the

Shapiro-Wilk test gave a statistic of 0.911 with a p-value of 0.000. Both p-values are below 0.05, resulting in the rejection of the null hypothesis in both tests, indicating that the data significantly deviates from a normal distribution. Therefore, both tests strongly suggest that Grow Foods is not normally distributed.

For Glow Foods, the Kolmogorov-Smirnov test showed a statistic of 0.069 with a p-value of 0.200*. Since this p-value is greater than 0.05, the null hypothesis is not rejected, indicating no significant deviation from normality. Similarly, the Shapiro-Wilk test resulted in a statistic of 0.992 with a p-value of 0.914. With a p-value much greater than 0.05, the null hypothesis is again not rejected, suggesting that the data does not significantly deviate from normality. Therefore, both tests indicate that Glow Foods is normally distributed.

Table 8 Eating Habits Normality Test

Group	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Go Foods	0.096	0.064	0.968	0.040
Grow Foods	0.160	0.000	0.911	0.000

➤ *Significant Association between Eating Habits and BMI*

Table 8 shows no Significant Relationship between the BMI and the Eating Habits among the Registered Nurses. It Indicates that the Eating Habits among the Participants does not Affect their BMI.

Table 9 BMI and Eating Habits Correlations

CORRELATIONS	GO r(p)	GROW r(p)	GLOW r(p)
BMI 1.000	-.075 (.331)	.006 (.935)	.145 (.060)

III. DISCUSSION

The main objective of this research was to assess the interplay between various food habits, physical activity pattern as well as body mass index (BMI) among registered nurses in a city such as Iligan City in Philippines with focus on their role towards double burden of malnutrition. It showed that there are quite high numbers of overweight registered nurses in Iligan City populace indicating higher rates of over nutrition among them. Moreover, this survey proved that low level physical activities were directly linked with BMI. Our study found out that there is a significant relationship between BMI and physical activity levels. Conversely, there was no significant correlation between eating practices and BMI.

The double burden of malnutrition, consisting of the existence of a combination of overnutrition and undernutrition within one community poses a unique challenge in public health management. This study emphasizes on the importance of ensuring balanced nutrition and regular physical exercise in preventing overnutrition among healthcare workers. It is critical to deal with these issues as they affect not only their own health and well-being but also for the entire healthcare system since healthier nurses are better placed to take care of their patients and act as role models for healthy living.

Our findings show similarities in the prevalence rate of double burden among registered nurses. This is consistent with research showing that double burden of malnutrition encompasses both undernutrition and overnutrition which was defined by studies (De Juras et al. 2021). For example, a report from Philippines has found high levels of both underweight and overweight or obesity at individual level among adults whereas escalating incidence rates for obesity alongside diet related non-communicable diseases remain major concerns in many developing nations. Moreover, a lot of people are getting exposed to disorders like being overweight or obesity, high fasting blood sugars, and irregular lipid levels. Deliberating on these nutritional challenges (De Juras et al. 2021).

In addition, another study in the Philippines has concerning double burden of malnutrition at household level which indicates that almost one third of adults are obese (Ademe et al. 2023). A Research in Ghana found out that healthcare workers have limited intake of fruits and vegetables while they rely much on protein and carbohydrates. This leads to increased BMI and high prevalence rates of overweight and obesity (Kushitor et al. 2020). Also conducted in South Korea among nurses was a similar study that analyzed dietary habits as well as physical activity patterns that influence BMI among nurses. The research established that while their diets were low in fruits and vegetables especially nurse's diet had many proteins and carbohydrates. Additionally, these individuals ate foods

high in calories often causing more harm than good. Therefore, this diet pattern was linked with increased BMI as well as obesity (Dan et al. 2020).

The fact that the majority of nurses in our study were inactive has also important implications. This finding is consistent with studies conducted in other countries. For example, Ghana. Low levels of physical activity were statistically significantly associated with higher BMI and prevalence of overweight and obesity among healthcare workers (Kushitor et al. 2020). Low levels of physical activity among nurses were previously identified as a risk factor for cardiovascular diseases.

Qualitative study examined the self-care practices of nurses and found that time, high workload and physical exhaustion were major barriers to regular physical activity among nurses. Nurses in this study reported that demanding working hours and responsibilities towards their work, patients and clients often left little or no time for exercises. As a result, most nurses generally have sedentary lifestyle (Chen et al. 2020). Physical inactivity is a recognized risk factor for obesity as demonstrated in various studies across the world.

The significant association between BMI and physical activity pattern was also supported by other studies. A cross-sectional study in South India reported that lower levels of physical activity were significantly associated with higher BMI. This study concluded that regular exercise or physical activity could play an important role in maintaining healthy weight (Dewey et al. 2016). Similarly, a longitudinal study in Australia among middle-aged to older adults showed that physical activity with higher levels of activity tended to have lower BMI across the periods, compared with those with lower levels of physical activity. This study demonstrated the beneficial (protective) effect of exercise against obesity (Christenson et al. 2023).

Contradicting a few studies, non-significant relationship between BMI and type of eating habits, were in agreement with one study. A study from Ethiopia found no significant differences in terms of eating behaviour for the BMI. We recommend to consider this point that several factors are involved in nutritional status (Ademe et al. 2023). These dietary patterns have also been found to determine BMI (Kushitor et al. 2020). A research has confirmed that physical activity and may be as important as dietary habits with regard to determining BMI but overall are less reliable than dietary habits (De Juras et al. 2021).

Several notable strengths exist in this study that enhance the value and impact of the study. This research was specific in targeting the population of Registered Nurses from Iligan City, for they represented a unique and significant sector of health workers. In doing so, it will allow an in-depth understanding of the health challenges

that focus on this population and provide implementable data generated based specifically for nurses, which can have an impact on health care policy and interventions tailored for nurses.

The assessment of the relationship among eating habits, physical activity patterns, and BMI is conducted among the registered nurses through a quantitative approach. It ensures objectivity and measurability of the findings, thus pinpointing with clarity the significant and non-significant associations. The validity of the conclusions from this study is helped with quantitative data that provides a solid base for targeted interventions to be developed.

The study adopts the use of validated instruments, which have already been tried out in relation to reliability; therefore, the data collected will be both valid and reliable. The validated tools add to the strength of the results, since they have been accredited with an acceptable potential to obtain the correct measurements of variables under study. The reliability of the instruments used makes the results dependable and therefore tenable enough to base health policies and interventions.

The research further holds strictly to ethical considerations so that the rights of participants are safeguarded, and their well-being is upheld. Informed consent has been sought from all participants, and anonymity has been assured at every step during the research. The rigorous following of ethical standards makes the research more responsible and ethical, and therefore more credible and valid.

The research contributes valuable insights with direct implications for the health and well-being of the local community. The study provides data useful for the development of effective health promotion strategies by emphasizing the double burden of malnutrition and the importance of physical activity in the management of nurses' BMI. These strategies, targeting the nurses, will benefit the wider community in terms of quality of care. The fact that findings are localized ensures that recommendations are relevant and fitting for the specific needs of the community; hence, the contribution of this study to community health is substantial and practical.

The findings of the study are highly relevant to clinical practice, particularly for nursing students who are preparing to enter the healthcare workforce. As revealed by the research, a large number of registered nurses in Iligan City are suffering from overnutrition, which is mainly due to low levels of physical activity. This has critical implications for nursing practice since the well-being of the nurses is inextricably linked with the quality of care they offer. According to a longitudinal study done in a hospital setting, the introduction of workplace wellness programs aimed at promoting physical activity and healthy eating options diminished the number of underweight and overweight/obese registered nurses.

The programs especially on exercises facilities, healthy food options in cafeterias, and stress management workshops, resulting in big improvements in nurses' nutritional status and overall well-being. Since the role of nurses in the health care team is very vital, the well-being of the nurses is of much importance not only for their health but also for quality patient care.

A non-significant association between eating habits and BMI among nurses in this study could suggest that some other factors, such as physical activity, may play a critical role in BMI management among nurses. The finding brings into harmony an existing literature that places a great emphasis on the complex nature of weight management and the significance of physical activity in maintaining a healthy BMI.

A healthcare setting observational study tested how peer-led support programs could affect the involvement of nurses in physical activities during off times. The study found that the nurses who had peer-led walking groups or fitness challenges recorded higher levels of involvement in regular physical activity during breaks and other free times. Peer influence through support and encouragement had a significant role in motivating nurses toward prioritizing exercises and thus leading healthier lifestyles (Brennan et al. 2023). Integration of such insights into nursing education would definitely yield a more holistic approach toward health promotion among nurses, enabling them to deliver high-quality care. Knowing and understanding the causes behind this double burden of malnutrition would better prepare the nursing students for such high demands of their job and to promote healthier lifestyles within their communities (Brown et al. 2023).

The study is not free from limitations. One limitation of our study is the sampling method and the resulting size. The small number of respondents might have influenced the results, mostly in the analysis of the significance of food consumption patterns and work shift schedules. If the sample had included a larger and more varied group of participants with positive double burden malnutrition, the findings regarding the influence of dietary habits and shift patterns might have differed.

A larger sample size would have provided a complete set of data, possibly with significant correlations or trends not highlighted in our current analysis. Future studies should take into consideration the sample limitations by considering a bigger and more heterogeneous group of participants with positive double burden malnutrition. It will further allow an in-depth analysis of patterns of food consumption and work-shift schedules among nurses, possibly identifying significant correlations or trends that our current analysis has not captured.

Another limitation is that we, the researchers, through the questions on food frequencies used, did not capture information about food servings. This could have affected the accuracy and completeness of our diet data collection, which would affect the reliability of our analysis. To

overcome this limitation in future research, it should involve studying a larger sample of people having positive double burden malnutrition with more diverse data. This would enable an elaborate study on the dietary consumption pattern and work-shift schedules among nurses possibly giving out major linkages or trends that our present research has not been able to make.

Moreover, there are inconsistencies in the actual weight data from Hospital B as they refused to have their anthropometric measurements taken by us, the researchers, due to their heavy work schedules. Additionally, they refused to tell their ages. These non-compliances have probably introduced some variability and limitations into our anthropometric data correctness that might interfere with our overall findings for this research. Future studies should strive for better collaboration with subjects to guarantee a complete and accurate data acquisition process.

A limitation also exists with the absence of more related studies on the double burden of malnutrition among nurses or healthcare professionals in the Philippines. This lack of information makes it hard and limits our ability to draw comparisons with existing data emphasizing the importance of specialized study in this area. Future studies should fill this void by looking into the issue of malnutrition among nurses and healthcare workers in the Philippines, providing perspectives on this often disregarded population.

IV. CONCLUSION

In conclusion this study found no significant relationship between BMI and eating habits but there is a significant association between BMI and physical activity pattern which emphasize the importance of the double-burden malnutrition. These results highlight the importance of future studies with larger samples to clarify the relationships between eating habits, physical activity pattern and BMI in the double-burden malnutrition. This study also adds to the literature as regards the prevalence of overweight/obesity which is a growing public health concern among registered nurses and may be their BMI and physical activity pattern that plays a role in the double-burden malnutrition.

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