

DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG WOMEN OF REPRODUCTIVE AGE IN PHILIPPINES

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Abstract

Dietary diversity is the main key to preventing various nutritional problems in women of reproductive age. The study aimed to assess dietary diversity and associated factors among women of reproductive age in the Philippines. This study is a cross-sectional study based on data from the 2022 Philippines National Demographic Health Survey (NDHS) with a total weighted sample of 25,315 women aged 15-49 years and who are not pregnant. The statistical analysis used was the chi-square test and logistic regression with a 95% CI. Overall, 70,8% of women aged 15-49 years achieved dietary diversity. Women with age 35-49 years [aPR = 2,20; 95%CI: 1,96-2,46], relatively rich for economic status [aPR = 1,23; 95%CI: 1,07-1,40], who access of mass media [aPR = 1,51; 95%CI: 1,38-1,65], didn't consumed unhealthy foods [aPR = 0,43; 95%CI: 0,39-0,48] and didn't consumed any sweet beverages [aPR = 0,77; 95%CI: 0,65-0,92] had a statistically significant with the acceptable dietary diversity among women of reproductive age in Philippines. To increase the adequate level of dietary diversity in women of productive age, interventions related to strengthening nutritional health promotion and its dissemination through mass media and socio-economic support from the relevant government are indeed too.

Keywords: Dietary Diversity, Philippines, Women of Reproductive Age

Introduction

Women of reproductive age are a vulnerable group of women (15-49 years) in nutritional problems because at a biologically level these groups need more higher nutrients per unit of body mass than men and other age groups, especially during the preconception period, pregnancy and breastfeeding [1]. Poor nutritional status in women has an impact on women's weak ability to survive at this time, making them vulnerable to illness and weakening their ability to care for children [2]. Inadequate nutritional intake before pregnancy, during pregnancy and breast-feeding is an important factor that has a negative effect on women and their infants. Inadequate nutritional intake is positively correlated with anemia, preeclampsia, bleeding and maternal death and also has negative impacts on babies such as stillbirth, low birth weight, wasting and developmental delays in children [3,4].

Deficiencies in key micronutrients such as iron, iodine, vitamin A, folate, vitamin D and zinc are still a major health problem that can affect of health impacts seriously [5]. Anaemia is a one of the disease that occurs due to a lack of micronutrients in the body, where the prevalence of anemia globally has reached 30% in women aged of 15-49 years [6]. A recent study, in 12 countries estimated that more than two-thirds of non-pregnant adolescent girls and women (69%) or 1,2 billion are

deficient in iron, zinc and/or folate. The thing to worry about is daughters of undernourished mothers are more likely to become undernourished mothers themselves, rotating the cycle of malnutrition to the next generation of children [7].

Adequate macronutrients and micro-nutrients in the diet are very important for women's health during the reproductive years. Therefore, it is necessary to prioritize the consumption of varied and balanced foods during this critical period. However, the current phenomenon is a lack of variety in animal protein diets, a lack of fruit and vegetable consumption and a higher daily calorie intake [8]. This triggers poor diet quality in women, especially a lack of diversity. A study state that there is a strong relationship between dietary diversity and nutritional adequacy [9].

No one food has all the nutrients, it is required to daily consume more various food types so that the body's nutritional needs can be achieved optimally. Dietary diversity scores based on the number of food groups consumed over a specified period of time have been developed as a proxy for diet quality and also have been validated as predictor of micro-nutrient adequacy. The proportion of women aged 15 to 49 who consume at least 5 out of 10 food groups is known as minimum dietary diversity for women (MDD-W). The MDD-W was developed by the United Nations Organization for Food and Agriculture (FAO) in 2016 [10].

Data analysis regarding dietary diversity patterns in women of reproductive age is still lacking, even though it is important to monitoring of dietary diversity patterns especially in non-pregnant. Eating habits is related to determining women nutritional status and it will also have a direct impact on her child's health status later in the long term. The study aimed to assess dietary diversity and associated factors among women of reproductive age. It is hoped that the information in this research will be useful for designing nutritional interventions that help to ensure nutritional security and sustainable food production so that to prevent various nutritional problems in mothers and children.

Methods

Study design and setting

The data source used in this research is secondary data from the 2022 Philippine National Demographic and Health Survey (NDHS) with the design applied is a cross sectional study. The dataset used in this research is the Individual Record (IR) file. The demographic health survey (DHS) used a two-stage stratified sampling technique to select the research participants.

Population and sampling procedures

All women 15-49 years are the source population, while all women 15-49 years were selected and not pregnant are the population in this study. The Demographic Health Survey (DHS) used a two-stage stratified sampling technique to select research participants. Missing values in the variables studied will be removed from the sample. A total weighted sample of 25,315 women was included in the final analysis.

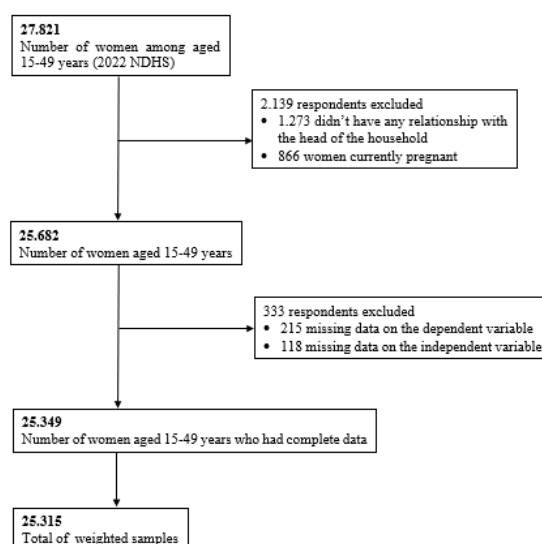


Figure 1. Flow diagram of participant selection in this study

Variable

Outcome variable

The outcome variable in this study is the dietary diversity status among women of reproductive age. Based on guidelines from DHS, women were classified as having adequate dietary diversity if she consumed at least five of the 10 possible food groups in the 24 hours before the survey. The indicator is based on 10 food groups which is grains, white/pale starchy roots, tubers, and plantains; pulses (beans, peas, and lentils); nuts and seeds; dairy (milk and milk products); flesh foods (meat, fish, poultry, and organ meat); eggs; dark green leafy vegetables; vitamin-A rich fruits and vegetables; other vegetables; and other fruits. On the other hand, women were classified inadequate dietary diversity if she consumed less than five of the 10 possible food groups in the 24 hours before the survey [11].

Independent variable

The independent variable in this study were the women's age (15-19 years, 20-34 years and 35-49 years), educational level (low, middle and high), wealth index (poor, middle and rich), type of residence (rural or urban), access to information on mass media (expo-sure to mass media consists of three variables, namely: reading newspapers, listening to the radio and watching television), consumption of unhealthy foods in the 24 hours before the survey (yes or no), consumption of sweet beverages (yes or no) in the 24 hours before the survey, family size (less than five or more than five and above), occupational status (not working or non-agricultural field, agricultural field) and breastfeeding status (yes or no) [11–13].

Data analysis

Firstly, the data were weighted to verify the representativeness of the DHS sample with the aim of obtaining reliable estimates and standard errors. The chi-square test and logistic regression test were used to determine the associated factors that affecting dietary diversity among women of reproductive age.

Ethics consideration

This research has obtained written approval to download and used the 2022 Philippines National Demographic and Healths Survey dataset from the data archiver of the International Review Board of Demographic and Health Surveys (DHS) program. All research ethical standards can be

accessed via the website <https://dhsprogram.com/methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm>.

Results

Dietary diversity characteristics

A total weighted sample of 25,315 women of reproductive age in Philippines was involved in this study. Based on table 1, it shows as many as 70,8% of women had acceptable dietary diversity (consumed at least five of the 10 possible food groups).

Table 1. Proportion of Acceptable Dietary Diversity Among Women of Reproductive Age in Philippines

Food groups consumption in previous 24 hours	Number (percent)
Grains, white/pale starchy roots, tubers, and plantains	25.148 (99.3)
Pulses	3.235 (12.8)
Nuts and seeds	4.363 (17.2)
Dairy (milk, cheese, yogurt, other milk products)	9.332 (37)
Flesh foods (meat, fish, poultry and liver/organ meats)	24.219 (95.7)
Eggs	15.646 (62)
Dark green leafy vegetables	14.525 (57.4)
Vitamin A rich fruits and vegetables	14.350 (56.7)
Other vegetables	16.715 (66)
Other fruits	14.566 (57.5)
Women had acceptable dietary diversity	No 7.381 (29.2)
	Yes 17.934 (70.8)

Characteristics of respondent

Table 2 shows characteristics of respondent. The majority of women are in the 20-34 years age group (43%). Most women reported that their education was in the medium category (52%) meaning up to high school/equivalent education. For the occupational status, the majority of women didn't working or working but non agricultural field (96,5%). Most of women in these study didn't have breastfeeding status (91%). A total of 14,125 respondents live in urban area (56%), many respondent had access to information from mass media (59%) and were categorized as rich for wealth status (44%). Respondents who had consumed of unhealthy foods (68,5%) and sweet beverages (84,6%). The largest number of household members in one house was consist of ≥ 5 members (60%).

Table 2. Characteristics of Respondent Regarding Dietary Diversity and Associated Factors Among Women of Reproductive Age in Philippines

Variable	Category	Number (percent)
Age	15-19 years	5.006 (19.7)
	20-34 years	10.848 (43)
	35-49 years	9.461 (37.3)
Educational level	Low	2.494 (10)
	Middle	13.209 (52)
	High	9.612 (38)
Occupational Status	Not working or non-agricultural field	24.407 (96.5)
	Agricultural field	908 (3.5)
Breastfeeding status	No	23.106 (91)
	Yes	2.209 (9)
Wealth index	Poor	9.027 (35.6)
	Middle	5.178 (20.4)
	Rich	11.110 (44)
Type of residence	Rural	11.190 (44)
	Urban	14.125 (56)
Media exposure	No	10.340 (41)
	Yes	14.975 (59)
Consumption of unhealthy foods	Yes	17.344 (68.5)
	No	7.971 (31.5)
Consumption of sweet beverages	Yes	21.422 (84.6)
	No	3.893 (15.4)
Family size	≥5 member	15.252 (60)
	<5 member	10.063 (40)

Factors associated with dietary diversity

Table 3 shows bivariate analysis of factors associated with dietary diversity among women of reproductive age. In the bivariate analysis, respondent's age, educational level, wealth index, media exposure, consumption of unhealthy foods and consumption of sweet beverages are became a candidate variable to be continued with multivariable analysis ($p < 0.05$).

Table 3. Bivariate Associations of Factors with Dietary Diversity Among Women of Reproductive Age in Philippines

Variable	Category	(%) MDD-W Low <5	(%) MDD-W Acceptable ≥5	p-value
Age	15-19 years	39	61	<0,001
	20-34 years	29.2	70.8	
	35-49 years	23.9	76.1	
Educational level	Low	30.7	69.3	<0,001
	Middle	31.8	68.2	
	High	25.1	74.9	
Occupational Status	Not working or nonagricultural field	29	71	0,513
	Agri-cultural field	28	72	
Breast-feeding status	No	29.1	70.9	0,989
	Yes	29.1	70.9	
Wealth index	Poor	32.3	67.7	<0,001
	Middle	30	70	
	Rich	26.2	73.8	
Type of residence	Rural	30	70	0,499
	Urban	29	71	
Media exposure	No	34.8	65.2	<0,001
	Yes	25.3	74.7	
Consumption of unhealthy foods	Yes	23.6	76.4	<0,001
	No	41.2	58.8	
Con-sumption of sweet beverages	Yes	27.8	72.2	<0,001
	No	37	63	
Family size	≥5 member	29.3	70.7	0,759
	<5 member	29	71	

The results of the multivariable analysis obtained in table 4 show that women who aged 35-49 years [aPR = 2,20; 95%CI: 1,96-2,46] were 2,20 times more likely to achieved dietary diversity compare to women who aged 15-19 years. Based on economic status, respondents who are classified as rich [aPR = 1,23; 95%CI: 1,07-1,40] were 1,23 times more likely to achieved dietary diversity compare to respondent classified as poor. The result of the analysis show that women who access to information on mass media [aPR = 1,51; 95%CI: 1,38-1,65] were 1,51 times more likely to achieved dietary diversity compare to women who didn't access to information on mass media. The results of this study also indicate that did not consuming unhealthy foods and not consuming any sweet beverages are protective factors for dietary diversity in women of reproductive age.

Table 4. Multivariate Associations of Factors with Dietary Diversity Among Women of Reproductive Age in Philippines

Variable	aPR	95% CI	
		Lower	Upper
Age			
15-19 years	<i>Ref</i>		
20-34 years	1,53***	1,34	1,74
35-49 years	2,20***	1,96	2,46
Educational level			
Low	<i>Ref</i>		
Middle	1,04	0,91	1,18
High	1,11	0,95	1,29
Wealth index			
Poor	<i>Ref</i>		
Middle	1,10	0,96	1,27
Rich	1,23**	1,07	1,40
Media exposure			
No	<i>Ref</i>		
Yes	1,51***	1,38	1,65
Consumption of unhealthy foods			
Yes	<i>Ref</i>		
No	0,43***	0,39	0,48
Consumption of sweet beverages			
Yes	<i>Ref</i>		
No	0,77**	0,65	0,92

* p <0,05

** p <0,01

*** p <0,001

Discussion

The study has assessed the dietary diversity among women of reproductive age who are not pregnant in Philippines. Our study finding indicated that both the mean dietary diversity (5,61) of women and the proportion of women who reached the MDD-W (70,8%) were acceptable. The women's diet was largely dominated by starchy staples (grains, white/pale starchy roots, tubers, and plantains) followed by flesh foods while dairy products, nuts and seeds also pulses were reported by few women. This pattern of consumption in our study population is consistent with descriptions found in previous study in Bangladesh, that starchy staples and flesh foods are the most food group consumed by women of reproductive age [14].

The age of respondent's was associated with dietary diversity. Our study found that women who aged 20-34 years and women who aged 35-49 years were more likely to had acceptable dietary diversity than women who aged 15-19 years. This findings was similar with study in Lesotho and Kenya [15,16]. The positive correlation between age and dietary diversity score could be due to the relatively better nutrition knowledge among older women and their ability to make better food choices [17]. However, this study gives special attention to women under 20 years of age to increase their consumption of a variety of foods considering that good eating habits must have to implemented from an early age cause it can influence nutritional status in the future.

This study revealed that women from wealthier households were more likely to consume diverse diet than women from poorer household which is supported by studies done in Kenya and

Nepal [18,19]. The possible reason is that higher income is positively with increased purchasing power which can help in promoting dietary diversity [18].

Based on research findings, women who are exposed to media (radio, newspaper or magazine, telephone and television) have a 1.51 times likely to had acceptable dietary diversity. Basically, mass media is the main platform and carrier of health communication with a wide reach, so it is hoped that it can influence the public's health behavior especially for eating behavior [20]. Media is one of the keys to forming the concept of healthy food and a healthy body, which through the media can help explain dominant misunderstandings about food, diet and nutrition. So, it is important that mass media can be a source of promoting nutritional literacy [21].

Dietary characteristics like consumption of unhealthy foods (cookies, sweet breads, ensaymada, kakanin or biko, candy, ice cream or sorbetes, and halo-halo and fried and salty foods such as potato chips, corn chips, cornick, chichacorn, french fries, fishball, kropek, and instant noodles) and consumption sweet beverages (fruit juice and fruit-flavored drinks, sodas, malt drinks, sports drinks, energy drinks, sweetened tea, coffee, herbal drinks, bubble tea, 3-in-1, chocolate-flavored drinks, sago at gulaman, and other sweetened liquids) were also found to be associated with acceptable dietary diversity. Our study found that not consuming unhealthy foods and not consuming sweet beverages are protective factors for dietary diversity. This finding was similar with study in Addis Ababa. Consuming sweet foods or sweet beverages might to increasing blood sugar levels and will end up in loss of appetite that results in decreasing the variation of food intake [22]. Apart from that, a study also states that there is a association between those who have been engaging in consumption of savory and fried snacks for a while, may have a strong desire to engage in other unhealthy dietary behavior such as consuming sweet foods or sweet beverages so that indirectly influencing the lack of diet diverse [12].

Several policies implemented in the Philippines have provided a lot of support for the nutrition and health of women of productive age, where based on the results of this study, more women had acceptable dietary diversity. In 2016, the Philippine government launched the “Nutrition Action Plan” which focuses on the importance of food diversification in the diet to ensure adequate nutritional intake for women of reproductive age. The Pantawid Pamilyang Pilipino Program (Pantawid Pamilya), which was founded in 2007 in the Philippines, is also one of the programs that has introduced various initiatives to increase dietary diversity, including for women. Some of the ways in which Pantawid Pamilya can influence women's dietary diversity include financial assistance for poor families so that they can be used to buy various types of food, nutritional education for women, food education programs and promotion of local agriculture [23,24].

The strength of this study is describes dietary diversity among reproductive age group using large sample size, representative of women of reproductive age group in Philippines. But for the limitation of this study did not consider the quantity of food consumed by women of reproductive age and a single twenty-four-hour recall did not indicate the normal dietary routine of women. There might be social desirability bias and recall bias during data collection which do not show cause and effects.

Conclusion

The prevalence of MDD-W in Philippines was 70.8%, which means that more than half of the studied women who are not pregnant had a diverse diet. The diet was mainly based on the consumption of starchy foods and flesh foods. In our study, the MDD-W was significantly related to age of respondent's, wealth index, media exposure, not consumed unhealthy foods and not consumed sweet beverages. On the other hand, educational level, respondent's occupational status, breast-feeding status, type of residence and family size were not significant determinants of MDD-W. The

finding of the study will help in designing tailored intervention program of nutrition. It is important to increase consumption of diverse foods, especially focusing on those under 20 years of age because instilling better nutritional health starts from an early age. There is need to support existing and come up with new policies targeting these variables especially among the poor and vulnerable populations. Intensive public health awareness campaigns through mass media are one of the keys to instilling nutritional literacy with the hope that women's awareness will increase regarding the importance of nutrition-related problems.

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