RELATIONSHIP BETWEEN MOTHER'S DIETARY DIVERSITY AND SOCIO-DEMOGRAPHIC FACTORS

A PROJECT REPORT

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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

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APPROVAL

This project, **"Relationship Between Mother's Dietary Diversity and Socio-Demographic Factors",** has been turned in by **Annette Jennifer** to the Department of Nutrition and Food Engineering at Daffodil International University. It has been accepted as a partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved for its style and content.

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DECLARATION

I hereby declare that this project has been done by me under the supervision of **Tasmia Tasnim, Assistant Professor**, Department of Nutrition and Food Engineering, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Background: Micronutrient deficiencies are prevalent among women of reproductive age in developing countries, posing several adverse effects on the health, function, and survival of women. This community-based cross-sectional study conducted in Bandarban, Bangladesh, aimed to assess women's dietary diversity and its association with socio-demographic factors.

Methods: A total of 200 women of reproductive age (15-49 years) participated, selected through random household sampling based on inclusion criteria and consent for participation. Data was collected using structured questionnaires. The MDD-W indicator evaluated the consumption of ten food groups, with a diversified diet defined as consuming five or more groups. Descriptive statistics and Pearson's Chi-square tests, were employed to explore associations ($p<0.05$) between socio-economic factors and dietary diversity.

Results: Among the studied sample, 8.5% women were illiterate, while primary education is most prevalent at 29.5%. Marriage is prevalent, with 96.0% of women were married, primarily in household duties, and 68.5% classified as housewives. A significant portion, 50.5%, experiences financial constraints, with a monthly income of less than 20,000 Bangladeshi Taka. Pearson's Chi-square test showed significant associations ($p<0.05$) between several socio-demographic factors such as marital status, number of child and minimum dietary diversity for women (MDD-W). However, age group, education, employment, and household income level do not significantly influence MDD-W attainment($p>0.05$).

Conclusion: The majority of the studied women have a diversified diet, indicating a positive dietary diversity status within the sample population. However, a notable percentage still lacks dietary diversity, suggesting a potential area for targeted interventions to promote healthier eating habits and nutritional diversity among this group.

Keywords: Cross-sectional study, Dietary diversity, factors, MDD-W.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Women of reproductive age in underdeveloped countries commonly experience micronutrient deficiencies, which have significant negative impacts on their health, functioning, and overall survival (Black et al., 2013). These deficiencies worsen throughout pregnancy as the body's need for nutrients increases to support the changes in the mother's body and the growth of the fetus. If not handled properly, this can result in negative pregnancy outcomes and an increased risk of death for both the mother and the baby. Adolescent females are more prone to have prenatal micronutrient deficits because they have higher dietary needs during their growth and maturation as young mothers (Nove et al., 2014). Insufficient intake and poor absorption of micronutrients are the primary factors contributing to micronutrient deficiencies (Ruel et al., 2013).

The nutritional status during gestation is significantly influenced by the dietary consumption of mothers, which is considered a risk factor for child malnutrition (Smith et al., 2003). The impaired nutritional condition of mothers, which includes both chronic energy and micronutrient deficiencies, significantly contributes to the occurrence of illness and death in both children and mothers. This phenomenon is particularly noticeable in nations with low and intermediate incomes, as indicated by Rahman et al. (1993). Studies have shown that the nutritional health of women has a crucial role in the survival of their children. When a woman is malnourished, it is likely that she will give birth to a baby with low birth weight, which decreases the odds of the child's survival (Karim et al., 2016). Dietary diversity refers to the range or quantity of distinct meals that individuals consume over a specific period of time, typically the preceding day or week. These foods are categorized into different food groups. The reference period for measuring dietary diversity may vary, as determined by Kennedy et al. (2010). If an individual's diet includes foods from all the various food groups, it can be classified as "diverse". Dietary diversity is a significant measure of the quality of one's diet and has a direct correlation with health and nutritional results (Ali et al., 2014). Minimum dietary diversity for women (MDD-W) is a proxy measure that can be used to assess household food security and/or the adequacy of micronutrient intake in women of reproductive age. This measure has been suggested by empirical data (Becquey et al., 2010). There is a wealth of evidence in the scientific literature regarding the minimum dietary diversity for women and the factors related with it. The study conducted by Saaka et al. (2017) found that women with low household wealth, land ownership, or assets, as well as those with poor health, tend to have a lower dietary diversity. On the other hand, women from smaller households and with higher monthly income tend to have a higher dietary diversity. The increased diversity in women's diet was attributed to higher educational attainment of women, as well as their husbands, and their participation in social safety net programs (Aliwo et al., 2019). According to Sh et al. (2014), women who engage in home gardening, possess good nutritional awareness, and have food-secured households tend to have a greater variety of foods in their diet. The growing availability of media platforms such as radio, television, and the internet has

played a crucial role in empowering women and granting them access to various opportunities, including the freedom to participate in the market. This empowerment has, in turn, led to a notable improvement in women's dietary diversity, as seen by the findings of Harris et al. (2015).

The MDD-W indicator was derived from the Women's Dietary Diversity Score, which consists of 10 food groups (Martin et al., 2015). The guideline suggests that consuming at least 5 out of the 10 food groups is a reliable way to ensure that women's diets are likely to have sufficient amounts of 11 different micronutrients. According to Martin et al. (2015), women who eat food items from at least five out of the ten food categories are more likely to consume foods from animal sources, pulses, nuts or seeds, and fruits or vegetables. They also have a higher chance of meeting their micronutrient needs compared to those who eat food items from four or fewer food groups. The efficacy of MDD-W in categorizing women into high and low levels of micronutrient sufficiency was assessed using consumption data from nonpregnant and nonlactating women of reproductive age (Arimond et al., 2010).

1.2 Objectives

1.2.1 Primary Objective

The primary objective of this study was to investigate the association between mother's dietary diversity and socio-demographic conditions.

1.2.2 Specific Objectives

1. To assess the socio-demographic characteristics of the studied sample.
2. To conduct Anthropometric assessments of studied sample.
3. To assess the minimum dietary diversity status of the studied women.
4. To conduct association test of socio-demographic variables with studied minimum dietary diversity for women (MDD-W).

CHAPTER 2

LITERATURE REVIEW

Minimum Dietary Diversity for Women (MDD-W) is a key indicator used to assess the quality of women's diets and their nutritional status. It focuses on the consumption of a variety of foods from different food groups to ensure adequate intake of essential nutrients, which is crucial for women's health, especially during pregnancy and lactation. This literature review aims to explore the concept of MDD-W, its significance, measurement methods, influencing factors, and implications for maternal and child health.

A diverse diet is essential for meeting women's nutritional requirements and supporting optimal health outcomes. Inadequate dietary diversity can lead to micronutrient deficiencies, compromised immune function, increased risk of maternal and child morbidity and mortality, and hindered physical and cognitive development in children (Ruel, 2003). Therefore, promoting MDD-W is fundamental for addressing malnutrition and achieving sustainable development goals related to health and nutrition.

The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) developed standardized guidelines for assessing dietary diversity, including the Minimum Dietary Diversity for Women (MDD-W) indicator. MDD-W is defined as the consumption of at least five out of ten predefined food groups within a specified reference period, typically the previous 24 hours (FAO & FHI 360, 2016). The ten food groups include starchy staples, pulses (beans, peas, and lentils), nuts and seeds, dairy, meat, poultry and fish, eggs, dark green leafy vegetables, other vitamin A-rich fruits and vegetables, other vegetables, and other fruits.

Various individual, household, and environmental factors influence women's dietary diversity. Socioeconomic status, education level, access to food, food security, cultural beliefs and practices, and household food distribution patterns are among the key determinants of dietary diversity (Martin-Prével et al., 2015). Additionally, maternal autonomy, decision-making power, and time allocation for food preparation and caregiving activities significantly impact women's ability to achieve MDD-W.

Sinharoy et al., (2018) investigated the connection between women's empowerment and dietary diversity among women in rural Bangladesh. By conducting a cross-sectional survey of 2,599 married women, the research identifies three domains of women's agency: social solidarity, decision-making, and voice with husband. The findings reveal that post-primary schooling positively correlates with women's voice with their husbands, which in turn positively impacts dietary diversity. Furthermore, education also directly influences dietary diversity. This suggests that educated women are better equipped to negotiate improved diets for themselves. The study underscores the importance of education and agency in promoting women's nutritional well-being (Sinharoy et al., 2018).

Nguyen et al., (2013) examined the agreement and association between maternal and child dietary diversity (DD) in Bangladesh, Vietnam, and Ethiopia, and identifies determinants of maternal and child DD. Results show agreement on staple foods but disagreement on nutrient-rich foods. A strong positive association exists between maternal and child DD,

with maternal education and household factors influencing both. Children of mothers with higher DD are more likely to achieve minimum DD. Findings suggest the importance of measuring both maternal and child DD in surveys and promoting comprehensive dietary diversity for improved child nutrition(Nguyen et al., 2013).

Blackstone et al. (2018) investigated predictors of minimum dietary diversity among infants and young children in Bangladesh in 2011 and 2014, utilizing data from the Bangladesh Demographic and Health Surveys. While overall minimum dietary diversity increased from 23.8% in 2011 to 28.8% in 2014, a significant increase was observed among the 18–23-month age group. Factors associated with dietary diversity included wealth, education, media exposure, and antenatal care. In 2011, wealth and decision-making were significant predictors for the 18–23-month group, while in 2014, education and media exposure were significant. The rise in education and media exposure between the two years suggests their potential as targets for future interventions, particularly for women with lower education levels and limited media exposure (Blackstone et al., 2018).

Attainment of MDD-W is associated with improved maternal and child health outcomes. Adequate dietary diversity during pregnancy reduces the risk of maternal anemia, low birth weight, and preterm birth, while enhancing fetal growth and development (FAO & FHI 360, 2016). Moreover, maternal consumption of diverse and nutrient-rich foods during lactation supports optimal breastfeeding practices and contributes to the nutritional well-being of infants and young children. Long-term benefits of promoting MDD-W include prevention of chronic diseases and promotion of overall health and well-being across the life course.

Minimum Dietary Diversity for Women (MDD-W) is a vital component of maternal and child nutrition programming, aiming to ensure women's access to a variety of nutrient-rich foods for optimal health outcomes. While MDD-W serves as a valuable indicator for assessing dietary quality, its promotion requires multisectoral approaches addressing social, economic, and cultural determinants of dietary diversity. Enhancing women's empowerment, improving access to nutritious foods, and strengthening health systems are critical strategies for advancing MDD-W and achieving sustainable development goals related to nutrition and health.

CHAPTER 3

MATERIAL AND METHODS

3.1 Study design

A community-based cross-sectional study design was employed to assess women's dietary diversity. This study design allowed for the collection of data at a single point in time, providing a snapshot of dietary diversity among the target population.

3.2 Study location

The study was conducted in Bandarban, a southeastern district of Bangladesh, ensuring accessibility to the target population and representing a diverse socioeconomic and cultural background.

3.3 Study population

The study population will consist of women of reproductive age (15-49 years old) residing in the selected study location. Women from diverse socioeconomic backgrounds and marital statuses were included to capture a broad representation of dietary diversity.

3.3.1 Inclusion criteria

Households selection were random with the inclusion criteria in mind. Inclusion criteria was as following:

- Household must have at least one under 5 years old children
- It must have at least one adolescent girl (11-19 years old)
- It must have married women, and
- Must be consented to participate in the study.

3.4 Sample size determination

The sample size was measured using the ***Raosoft online calculator (Raosoft)*****,** which is designed specifically for population surveys to calculate the sample size and determine how many responses are needed. However, a total of only 200 participants agreed to take part and were requested to fill in the questionnaire form after meeting the inclusion criteria. With a confidence level of 95% and a 5.00% margin of error which may not fully affect the power of the study. (ε) margin of error:5%; ($\hat{p}$) population proportion: 50.00%; (z) z-score:1.96 (Singh et al., 2014).

$$\text{Sample size} = \frac{z^2 \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$= \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{0.05^2}$$

$$= \frac{3.8416 \times 0.25}{0.0025}$$

$$= 385$$

3.5 Data collection procedure

Data was collected through face-to-face interviews using structured questionnaires. The questionnaire underwent translation from English to Bengali. The questionnaire includes sections on socio-economic information including respondent's level of age, education, marital status, employment status, monthly household income and child number. Dietary diversity was assessed using standardized tools such as the Minimum Dietary Diversity for Women (MDD-W) indicator, which measures the consumption of at least five out of ten defined food groups (Becquey et al., 2010; Kennedy et al., 2011). Anthropometric measurements, including height and weight, also collected to assess nutritional status and its association with dietary diversity.

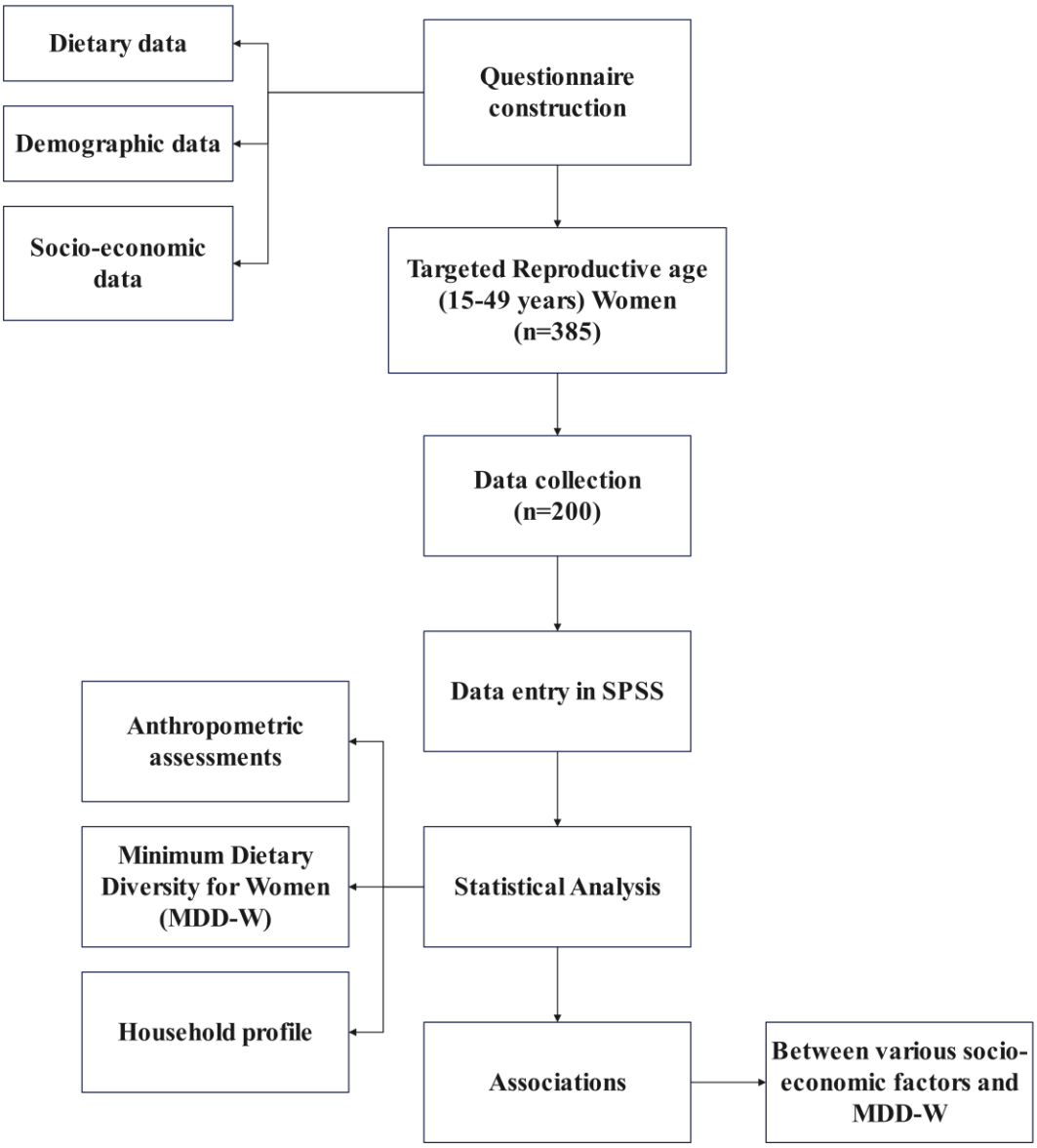

Figure 1: Flow Diagram of the Study.

3.6 Minimum dietary diversity for women

The MDD-W indicator was based on a 10-food group women's dietary diversity score (WDDS-10). These food groups were (i) Starch staples (grains, white roots and tubers, and plantains); (ii) Vitamin A-rich vegetables and fruits; (iii) Dark green leafy vegetables; (iv) Other vegetables; (v) Other fruits; (vi) Flesh foods (meat, fish, poultry, and liver/organ meats); (vii) Eggs; (viii) Pulses/legumes; (ix) Nuts and seeds; and (x) Dairy products (FAO, 2016).

The women were asked to recall all foods consumed from the above food groups on the previous day (24-hour dietary recall). Responses were recorded as 'yes' or 'no'. A 'yes' response was recorded as '1', and a 'no' response was recorded as '0'. The scores were summed up to create the women's Dietary Diversity score. Available evidence suggested that WDDS was an acceptable measure of household micronutrient adequacy and household nutrition insecurity. The dietary scores were split into categories such as "diversified diet" and "not diversified diet" based on the MDD-W. Women having a diversity score of less than 5 were classified as having a "not diversified diet" and scores between 5 and 10 were classified as having a "diversified diet". Dietary diversity was categorized into "diversified diet" and "not diversified diet" based on the MDD-W.

Table 1: Minimum dietary diversity for women Scoring

Responses	Dietary Diversity score	Minimum Dietary Diversity
Yes =1 No = 0	scores between 5 and 10	diversified diet
	score of less than 5	not diversified diet

3.7 Statistical Analysis

Descriptive statistics was used to summarize demographic characteristics, dietary diversity scores, and other relevant variables. Bivariate analysis, including Pearson's Chi-square tests was conducted to explore associations between socio-economic factors and dietary diversity at a statistical significance of $p < 0.05$, and 95% confidence intervals. All analyses were executed using IBM SPSS Statistics software (version 26, Chicago, IL, USA).

3.8 Ethical Consideration

Informed consent was obtained from all participants before their inclusion in the study, ensuring voluntary participation and confidentiality of their personal information. Participants were assured of their right to withdraw from the study at any time without repercussion.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results

The data shows that 8.5% of the sample population are illiterate, while the majority have attained some level of education. Among the educated women, the highest proportion holds primary education (29.5%), followed by secondary education (24.0%) and higher secondary education (25.0%). A smaller but notable percentage of women are graduates (13.0%).The overwhelming majority of women in the study are married, comprising 96.0% of the sample. Divorced women represent only 1.0% of the sample, while widowed women make up 3.0%. The data reveals that the largest proportion of women are housewives, constituting 68.5% of the sample. A smaller percentage are self-employed (20.5%), while full-time and part-time employment represent 7.5% and 3.5% of the sample, respectively. The majority of households (50.5%) have a monthly income of less than 20,000, indicating a significant portion of the sample may experience financial constraints. There is a gradual decrease in the percentage of households as income levels rise, with 27.5% falling into the 20,000-30,000 income range, and smaller percentages in higher income brackets. Only a small fraction of households (8.0%) has a monthly income exceeding 50,000. The majority of women have either one (41.0%) or two (44.5%) children. A smaller percentage have three children (13.0%), while very few have four children (1.5%).

Table 2: Socio-demographic and nutritional status of the study subjects.

Variables	Frequency	Percentages
Total women	200	100.0%
Distribution by age:		
15-20 year	7	3.5%
21-30 year	129	64.5%
31-40 year	64	32.0%
Employment status of women:		
Full time	15	7.5%
Part time	7	3.5%
Self-employed	41	20.5%
Housewife	137	68.5%
Educational status:		
Illiterate	17	8.5%
Primary	59	29.5%
Secondary	48	24.0%
Higher secondary	50	25.0%
Graduate	26	13.0%
Household monthly Income:		
Less than 20000	101	50.5%
21000-30000	55	27.5%
31000-40000	24	12.0%

41000-50000	4	2.0%
More than 50000	16	8.0%
Marital Status:		
Divorced	2	1.0%
Married	192	96.0%
Widowed	6	3.0%
Number of Children:		
Single child	82	41.0%
Two children	89	44.5%
Three	26	13.0%
More than three children	3	1.5%
Nutritional Status:		
Underweight	18	9.0%
Normal	99	49.5%
Overweight	66	33.0%
Obese	17	8.5%
Dietary diversity:		
Acceptable MDDS (5–10)	165	82.5%
Low MDDS (0–4)	35	17.5%
Overall MDDS (mean ± SD)	7.95±2.11	

The majority of women fall within the age range of 21-30 years, constituting 64.5% of the sample. A substantial portion are also in the age range of 31-40 years, accounting for 32.0% of the sample. A smaller percentage (3.5%) are in the youngest age group of 15-20 years. The data reveals that nearly half of the women in the sample have a normal nutritional status, accounting for 49.5%. A significant portion of women are classified as overweight, comprising 33.0% of the sample. Smaller percentages are classified as underweight (9.0%) or obese (8.5%). The average height of the studied women is 152.98 ± 6.17cm, indicating the central tendency of height within the sample. The average weight is 57.52 ± 12.16kg, providing insights into the central tendency of weight within the sample. The dietary diversity status of the studied women revealed that 82.5% of the sample population have a diversified diet and 17.5% of the sample population do not have a diversified diet.

The figure 1 shows the relationship between dietary diversity and the consumption of various food groups, presenting notable percentage differences. Starchy staples constitute 11.1% of the total sample, with 10.5% in low dietary diversity and a significant 78.0% in high dietary diversity diets. Green leafy vegetables make up 9.4% of the total sample, with only 6.0% in low diversity diets but 68.5% in high diversity diets. Foods rich in vitamin A, such as specific fruits and vegetables, are 10.9% of the total, with 11.5% in low diversity and 75.5% in high diversity diets. Other fruits and vegetables are consumed by 9.2% of the total sample, but only 4.5% in low diversity diets compared to 69.0% in high diversity diets. Organ meat is consumed by 10.3% of the total sample, with a slightly higher 11.0% in low diversity and 70.5% in high diversity diets. Fish meat shows a stark contrast with 9.4% of the total sample, only 3.0% in low diversity, and 71.5% in high diversity diets. Egg

consumption is at 9.5% for the total sample, 5.0% in low diversity, and 70.5% in high diversity diets. Legumes, nuts, and seeds account for 9.7% of the total sample, with 5.0% in low diversity and 72.0% in high diversity diets. Milk and dairy products are 9.9% of the total, with 10.0% in low diversity and 68.5% in high diversity diets. Spices, while making up 10.6% of the total sample, are only 4.0% in low diversity diets but increase significantly to 80.5% in high diversity diets. Overall, the data underscores that high dietary diversity is associated with greater consumption of a wide variety of food groups, contributing to a more balanced and nutritious diet.

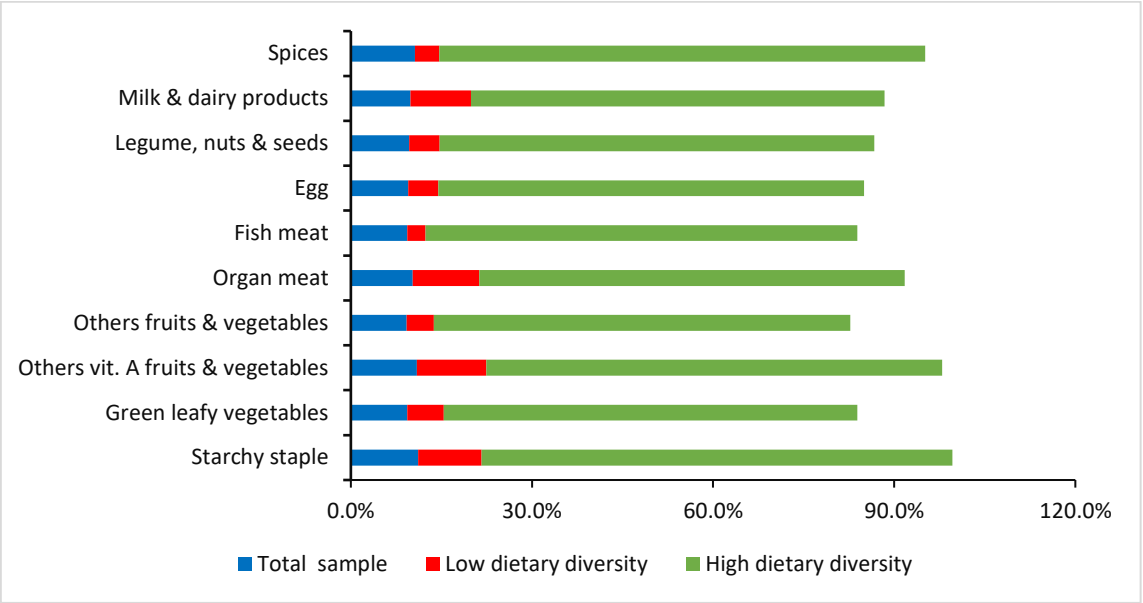

Figure 1: Proportion (%) of participants consuming each food group.

The table 3 presents the results of the Chi-Square test for association between various variables and minimum dietary diversity for women (MDD-W). There is no significant association between age group and MDD-W ($\chi2=4.757$, $p=0.093$). There is no significant association between nutritional status and MDD-W ($\chi2=0.877$, $p=0.831$). Nutritional status does not seem to influence the likelihood of achieving MDD-W in this sample. There is no significant association between education and MDD-W ($\chi2=4.876$, $p=0.300$). Education level does not appear to be a determining factor for achieving MDD-W in this population. There is a significant association between marital status and MDD-W ($\chi2=10.714$, $p=0.005$). Married women are more likely to have MDD-W compared to divorced or widowed women. There is no significant association between employment status and MDD-W ($\chi2=3.610$, $p=0.307$). Employment status does not seem to influence the likelihood of achieving MDD-W in this sample. There is no significant association between household monthly income level and MDD-W ($\chi2=9.380$, $p=0.052$). Household income level does not appear to be significantly associated with achieving MDD-W in this population. There is a significant association between the number of children and MDD-W ($\chi2=13.183$, $p=0.004$). Women with fewer children (1 or 2) are more likely to achieve MDD-W compared to those with more children. These findings highlight several factors that are associated with achieving minimum dietary diversity for women. Being married, and having fewer children are associated with a higher likelihood of achieving MDD-W in

this population. However, age group, education, employment, and household income level do not seem to have a significant influence on MDD-W attainment.

Table 3: Factor associated for meeting Minimum Dietary Diversity

Factors	Non-Diverse Group (DDS < 5)	Diverse Group (DDS ≥ 5)	$\chi 2$ test, p value
Age group			
15-20 year	2(1.0%)	5(2.5%)	
21-30 year	17(8.5%)	112(56.0%)	0.093
31-40 year	16(8.0%)	48(24.0%)	
Nutritional Status			
Underweight	4(2.0%)	14(7.0%)	
Normal	15(7.5%)	84(42.0%)	0.831
Overweight	13(6.5%)	53(26.5%)	
Obese	3(1.5%)	14(7.0%)	
Education			
Illiterate	1(0.5%)	16(8.0%)	
Primary	8(4.0%)	51(25.5%)	
Secondary	11(5.5%)	37(18.5%)	0.300
Higher secondary	8(4.0%)	42(21.0%)	
Graduate	7(3.5%)	19(9.5%)	
Marital Status			
Divorced	2(1.0%)	--	
Married	33(16.5%)	159(79.5%)	0.005*
Widowed	--	6(3.0%)	
Employment			
Full time	2(1.0%)	13(6.5%)	
Part time	3(1.5%)	4(2.0%)	0.307
Self-employed	8(4.0%)	33(16.5%)	
Housewife	22(11.0%)	115(57.5%)	
Household monthly Income Level (BDT)			
Less than 20000	14(7.0%)	87(43.5%)	
21000-30000	8 (4.0%)	47(23.5%)	
31000-40000	9(4.5%)	15(7.5%)	0.052
41000-50000	--	4(2.0%)	
More than 50000	4(2.0%)	12(6.0%)	
Child Number			
Single child	11(5.5%)	71(35.5%)	
Two children	13(6.5%)	76(38.0%)	0.004*
Three	11(5.5%)	15(7.5%)	
More than three children	--	3(1.5%)	

*Significant at $p<0.05$, BDT: Bangladeshi Taka.

4.2 Discussion

The Bangladesh Demographic and Health Survey (BDHS) found that 15.8% of households in Bangladesh were headed by women (De et al., 2009; Harris et al., 2015; Islam et al., 2022). Approximately 8.5% of the female population were identified as lacking education, a lower percentage compared to the findings of the BDHS report (17%) (De et al., 2009; Harris et al., 2015). The study revealed that approximately 29.5% of women successfully finished basic school, while 24.0% completed secondary education. The BDHS survey states that 15.5% of women had completed primary school, whereas 26.5% had completed secondary education (De et al., 2009; Harris et al., 2015).

This study demonstrated a considerable enhancement in the proportion of women who had successfully attained primary level education. The study revealed that just 3.5% of women were married between the ages of 15-20, a significantly lower percentage compared to the reported figure of 30% in the BDHS (De et al., 2009; Harris et al., 2015). It signifies a reduction in the occurrence of early marriage. According to this survey, 17.5% of the women were identified as having a limited variety of foods in their diet. The distribution indicates that the dietary diversity status was favorable, since a significant proportion of women (82.5%) had a diverse diet. Multiple studies have also discovered elevated proportions of women with MDD-W (eating five or more food groups), which is consistent with the findings of this study (Sultana et al., 2019; Seiermann et al., 2021; Nguyen et al., 2018).

The study revealed that the mean MDD-W score was 7.95±2.11. A study conducted in Ghana (Saaka et al., 2021) reported an average MDD-W score of 6.3±2.2, while another study conducted in Kenya (Kiboi et al., 2017) showed a score of 6.84±1.46. A research conducted in the northern part of Bangladesh revealed that the average MDD-W score was 3.9±1.2, as reported by Shaun et al. in 2023. Multiple studies corroborate the conclusions of this investigation. Multiple research have found that an increase in household income is positively correlated with higher levels of material deprivation and well-being (MDD-W). A study conducted in Belgium found that the educational background and nutritional awareness of young and middle-aged women are both independently linked (De et al., 2009). Furthermore, prior research have emphasized the need of possessing nutritional knowledge in order to fulfill the requirements for minimal dietary diversity (MDD) (Saaka et al., 2017; Aliwo et al., 2019).

It is anticipated that providing nutrition education and counselling will enhance women's food literacy, which refers to a high degree of knowledge and comprehension of nutrition (Girard et al., 2012). The results of our study indicate that the intervention had a positive impact on the women's food literacy. Specifically, over 50% of the participants achieved higher scores in terms of having a more varied diet. The findings indicate that a sufficient level of nutrition literacy is necessary to improve the receptiveness to health recommendations (Spronk et al., 2014). In this context, nutrition literacy was shown by the women's capacity to comprehend and analyze information about the dietary requirements, while the shift towards a more varied diet indicated their adequate ability to make optimal nutrition choices (Spronk et al., 2014). Therefore, we may conclude that the intervention

successfully improved food literacy, which is demonstrated by the acquisition of skills in nutrition literacy and the capacity to utilize that knowledge to make sound nutrition choices. The findings align with prior research and theories that have shown the effectiveness of nutrition interventions that emphasize a mix of nutrition awareness, motivation, and environmental support for taking action (Contento et al., 2007).

CHAPTER 5

CONCLUSION

The majority of women have attained primary level of education, but a notable portion remains illiterate. Marriage is prevalent, with a significant percentage being housewives. Financial constraints are evident, as more than half of households earn less than 20,000 monthly. Additionally, most families have one or two children, indicating a moderate family size. Additionally, the nutritional status of the sampled women varies, with almost half classified as having a normal status and a notable percentage classified as overweight. Several factors associated with achieving minimum dietary diversity for women (MDD-W). Being married, and having fewer children are significantly associated($p<0.05$) with MDD-W fulfilment. The majority of the studied women have a diversified diet, indicating a positive dietary diversity status within the sample population. However, a notable percentage still lacks dietary diversity, suggesting a potential area for targeted interventions to promote healthier eating habits and nutritional diversity among this group.

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APPENDICES

Appendix 1: Questionnaires

Relationship Between Mother's Dietary Diversity and Socio-Demographic Factors

Socio-demographic information

1. Respondent's Name:_____
2. Age(years):_____
3. Height(ft in):_____
4. Weight(kg):_____
5. Education: ☐Illiterate ☐Primary ☐Secondary ☐Higher Secondary ☐Graduate
6. Marital Status: ☐Divorced ☐Married ☐Widowed
7. Employment status: ☐Full time ☐Part time ☐Self-employed ☐Housewife
8. Household monthly Income(BDT):_____
9. Number of Children:_____

Dietary diversity

24hr recall

Food items		Yes=1 No=0
Starch staples	Rice, Wheat, Maize, Potato, Sweet Potato, Taro, Plantains	
Vitamin A-rich vegetables and fruits	pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + other locally available vitamin-A rich vegetables	
Dark green leafy vegetables	sweet pepper, dark green/leafy vegetables, including wild ones + locally available vitamin-A rich leaves such as cassava leaves etc.	
Other vegetables	other vegetables, including wild vegetables	
Other fruits	other fruits, including wild fruits	
Flesh foods (meat, fish, poultry, and liver/organ meats)	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
Eggs	Chicken Eggs, Duck Eggs	
Pulses/legumes	Lentils (Masoor, Moong, Musur), Chickpeas, Black Beans, Green Peas	
Nuts and seeds	Peanuts, Cashews, Almonds, Sesame Seeds, Sunflower Seeds	
Dairy products	milk, cheese, yogurt or other milk products	

Respondents Signature:_____

Appendix 2: Synopsis

Daffodil International University
Department of Nutrition and Food Engineering (NFE)
Faculty Of Health and Life Sciences
Daffodil International University
Daffodil Smart City, Birulia, Savar, Dhaka – 1216, Bangladesh

1. Student's Name: Annette Jennifer

2. Id: 192-34-971

1.Title: Relationship Between Mother's Dietary Diversity and Socio-Demographic Factors

2.Introduction:

Background: Nutrition, a pivotal aspect of public health, plays a crucial role in maternal and child well-being. This research focuses on understanding the dietary diversity of mothers, particularly within the context of socio-demographic factors.

Context: The study encompasses diverse geographical area, spanning rural settings. It acknowledges the disparities in access to nutritious food and healthcare services across different socio-economic strata and geographical regions.

Rationale: Ensuring adequate nutrition is essential for both mother health and child development. However, disparities in dietary diversity persist, influenced by socio-demographic factors such as income, education, cultural practices, and geographical location. Addressing these disparities is crucial for improving mother and child health outcomes.

Research Question or Hypothesis: The main research question driving this study is: How do socio-demographic factors influence mother's dietary diversity?

3.Objectives:

General Objective: To investigate the relationship between mother's dietary diversity and socio-demographic factors.

Specific Objectives:

1. To assess the dietary diversity of mothers across different socio-demographic profiles.
2. To identify the socio-demographic determinants influencing mother's dietary diversity.

4.Methodology:

Study Design: This study will employ a cross-sectional research design.

Selection Criteria: Participants include expectant and mothers aged 15-45 years from diverse socio-economic backgrounds and geographical locations.

Data Collection Methods: Data is collected through structured questionnaires, dietary assessments, anthropometric measurements.

Ethical Considerations: Informed consent will be obtained from all participants prior to data collection.

5.Expected Outcomes:

This project is expected to generate insights into the complex relationship between mother's dietary diversity and socio-demographic factors. It will contribute to evidence-based policy development and academic discourse surrounding maternal and child nutrition.

6.Socio-economic Impact:

The findings of this study could inform targeted interventions aimed at improving mother's nutrition and, subsequently, maternal and child health outcomes. By addressing socio-demographic disparities in dietary diversity, the research aims to contribute to more effective treatments and policy development strategies.

7.References:

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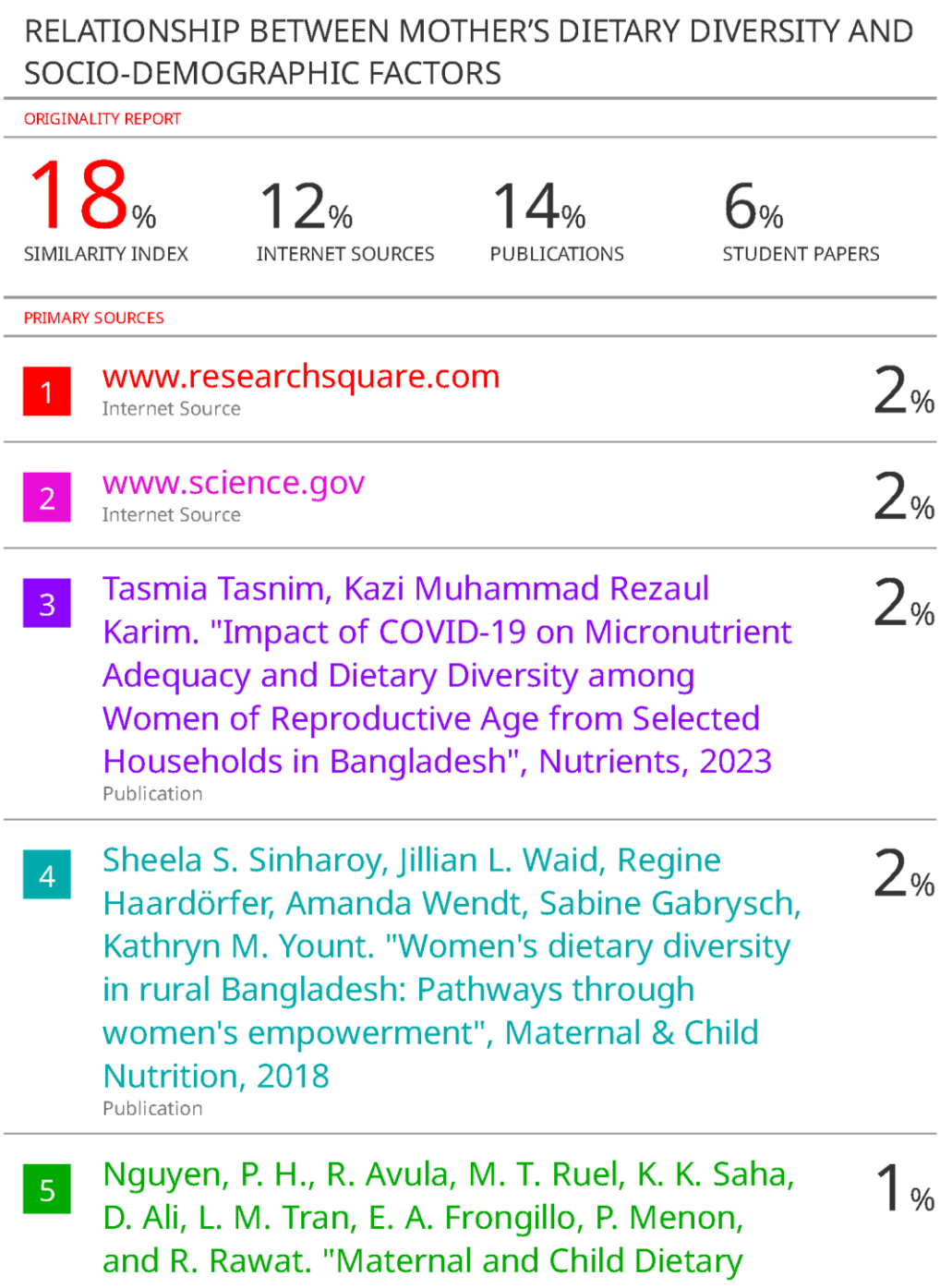
Signature of Supervisor **Signature of Fellow**

_____ _____

Appendix 3: Plagiarism report



RELATIONSHIP BETWEEN MOTHER'S DIETARY DIVERSITY AND SOCIO-DEMOGRAPHIC FACTORS

ORIGINALITY REPORT

18%	12%	14%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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4	Sheela S. Sinharoy, Jillian L. Waid, Regine Haardörfer, Amanda Wendt, Sabine Gabrysch, Kathryn M. Yount. "Women's dietary diversity in rural Bangladesh: Pathways through women's empowerment", Maternal & Child Nutrition, 2018 Publication	2%
5	Nguyen, P. H., R. Avula, M. T. Ruel, K. K. Saha, D. Ali, L. M. Tran, E. A. Frongillo, P. Menon, and R. Rawat. "Maternal and Child Dietary	1%