

Minimum Dietary Diversity and its determinants among married women in a rural area of Chengalpattu district, Tamil Nadu- A Community-Based, Cross-Sectional Study

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ABSTRACT

Background: Dietary diversity is an important indicator of micronutrient adequacy and overall diet quality, particularly among women who are nutritionally vulnerable due to increased physiological demands. Limited dietary diversity remains a public health concern in many rural settings.

Objectives: To assess the minimum dietary diversity and its determinants among married women in a rural area of Chengalpattu district, Tamil Nadu.

Methods: A community-based cross-sectional study was conducted among married women aged 18–60 years residing in rural field practice area of a tertiary care institute, Tamil Nadu. A total of 211 women were selected using simple random sampling. Dietary intake was assessed using a 24-hour recall method, and minimum dietary diversity for women (MDD-W) was determined based on the consumption of at least five out of ten predefined food groups in the previous 24 hours. Data were analysed using IBM SPSS Version.26.

Results: Among the 211 participants, 36.2% achieved minimum dietary diversity. Cereals were consumed by almost all participants (99%), followed by other vegetables (96%) and legumes (74%). Lower consumption was observed for eggs (39%), dark green leafy vegetables (37%), and meat, poultry, and fish (34%), whereas fruits, nuts and seeds, were consumed by a smaller proportion of women.

Conclusion: A considerable proportion of married women in the rural area studied did not achieve minimum dietary diversity. Improving women's education, economic status, and access to diverse foods through community-based nutrition interventions may help enhance dietary diversity and improve nutritional outcomes.

Keywords: Dietary diversity, Minimum dietary diversity for women, Rural women, Nutrition, and Micronutrient adequacy

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INTRODUCTION

Dietary diversity is a qualitative measure of food consumption that reflects access to a variety of foods and is widely used as a proxy indicator of nutrient adequacy of the diet.¹ Women of reproductive age are particularly vulnerable to nutritional deficiencies due to the increased physiological demands of pregnancy and lactation. Inadequate intake of essential micronutrients before and during pregnancy can adversely affect maternal health as well as fetal growth and development, especially during

the critical first 1,000 days of life. In many low socioeconomic settings, women's diets are predominantly based on starchy staples and lack adequate diversity, resulting in insufficient intake of essential micronutrients.²

To enable population-level assessment of dietary diversity among women of reproductive age, the Food and Agriculture Organization (FAO) developed the Minimum Dietary Diversity for Women (MDD-W) indicator. MDD-W is a dichotomous indicator that reflects whether women

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aged 15–49 years have consumed at least five out of ten predefined food groups during the previous 24 hours. It serves as a proxy measure of micronutrient adequacy at the population level.³

Several studies from different parts of India have reported inadequate dietary diversity among women of reproductive age, particularly in rural and economically weaker communities. Low dietary diversity has been associated with lower educational status and limited household income. Evidence also indicates that women's diets remain predominantly cereal-based, with inadequate consumption of fruits, vegetables, and animal-source foods.⁴

The burden of micronutrient deficiencies, including anaemia among women, remains high in India and other low- and middle-income countries.⁵ Similar determinants of dietary diversity have been reported across Low middle income countries, where socioeconomic status, food security significantly influence dietary intake patterns.⁶

Although India has shown improvements in maternal and child health indicators, disparities persist across rural and socioeconomically disadvantaged populations, as highlighted by findings from the National Family Health Survey (NFHS-5).⁷ Factors such as household income, sociocultural practices, food availability, and intra-household food distribution may influence dietary diversity among married women. However, published data on minimum dietary diversity among women in specific local settings remain limited. Generating local evidence is essential for identifying nutritional vulnerabilities and designing targeted community-based interventions.

Therefore, the present study aimed to assess the minimum dietary diversity and its determinants among married women aged 18–60 years residing in a rural area of Chengalpattu district, Tamil Nadu. By identifying locally relevant socioeconomic and demographic factors associated with dietary diversity, this study seeks to provide evidence to guide interventions aimed at improving the nutritional status and overall health of women in this community.

METHODOLOGY

Study design and study setting: The present study was a community-based cross-sectional study conducted among married women aged 18–60 years residing in Pulipakkam, a rural field practice area of tertiary care institute, Tamil Nadu. The study was carried out over a period of six months from November 2025 to March 2026.

Inclusion Criteria: Married women who had been residing in the study area for at least one year were included in the study.

Exclusion Criteria: Women with severe morbidities that impaired communication, such as stroke with aphasia,

significant hearing or visual impairment, and known psychiatric disorders were excluded from the study.

Sample Size Calculation: The sample size was calculated using the formula $n = Z^2pq/d^2$, the prevalence of adequate dietary diversity among the reproductive age group of women was reported 76.6% by Shashikantha SK et al., with a 95% confidence level and 5% absolute precision. The minimum sample size was estimated 192. Considering 10% for non-response rate, the final sample size was approximated to 215. A simple random sampling technique was applied. The sampling frame was prepared from the family register maintained at the Rural Health Training Centre (RHTC), Pulipakkam. A line listing of all eligible married women aged 18–60 years was prepared, and 211 women were selected based on random number generated method.

Study tool and Procedure: The selected participants were visited at their residences, and data were collected using a pre-designed structured questionnaire administered through face-to-face interviews after obtaining informed consent. In cases where the house was locked, two additional visits were made before labelling the participant as non-responsive. Dietary diversity was assessed using the 24-hour recall method based on the Minimum Dietary Diversity for Women (MDD-W) guidelines. Women who consumed at least five out of the ten predefined food groups during the previous 24 hours were classified as having adequate dietary diversity, while those consuming fewer than five food groups were classified as having inadequate dietary diversity.

Statistical Analysis: The collected data were entered into Microsoft Excel and were analysed using IBM SPSS version 26.0. Descriptive statistics such as frequencies and percentages were used to categorical variables. Asses the strength of association between dietary diversity and socio-demographic factors using the Chi-square test. A $P < 0.05$ considered statistically significant.

Ethical clearance: The ethical clearance was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

RESULTS

A total of 211 women participated. The distribution of dietary diversity scores among the participants ranged from 1 to 8 food groups (Table 1). Overall, the majority of women consumed between three and four food groups during the 24-hour recall period. Based on the Minimum Dietary Diversity for Women (MDD-W) criteria, 36.2% of women achieved adequate dietary diversity (consumption of ≥ 5 food groups), while 63.8% had inadequate dietary diversity.

Table 1: Distribution of dietary diversity scores among study participants

Dietary diversity score	Frequency (N=211)	(%)
1	1	0.5
2	13	6.2
3	58	27.5
4	63	29.9
5	26	12.3
6	33	15.6
7	9	4.3
8	8	3.8

Figure 1: Normal distribution for the dietary diversity score

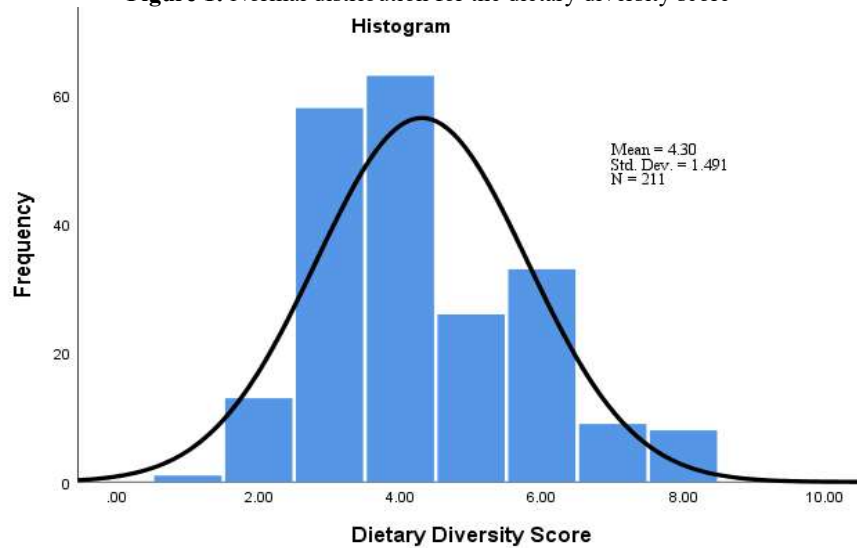
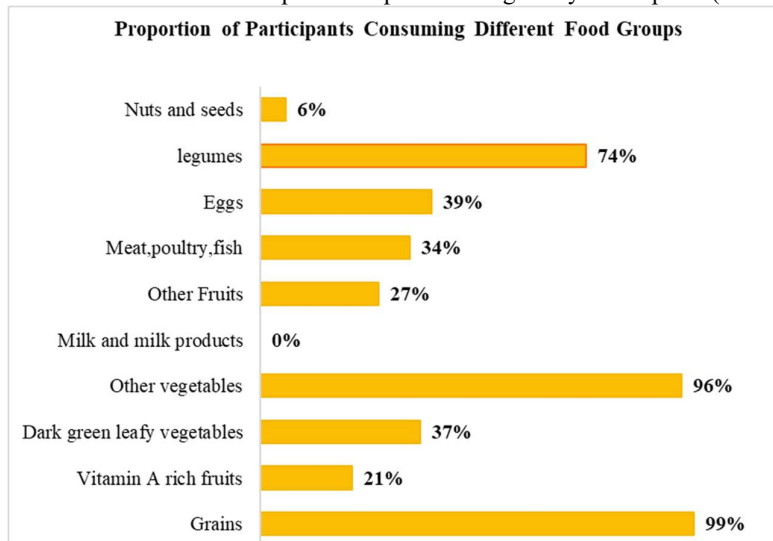


Figure-2 Distribution of Food Group Consumption Among Study Participants (24-hour Recall)



The percentage distribution of food groups consumed by the participants during the previous 24 hours is shown in Figure 2. Consumption of grains was reported by 99% of women, followed by other vegetables (96%) and legumes (74%).None of the participants reported consumption of milk and milk products during the 24-hour recall period.

Figure-3: Prevalence of minimum dietary diversity among study participants (n = 211)

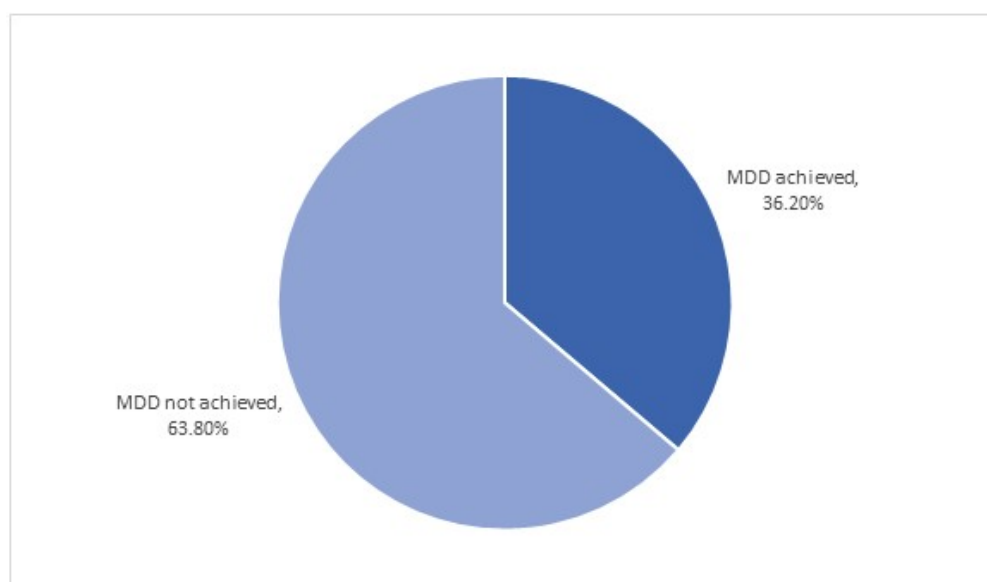


Figure-3 illustrates the prevalence of Minimum Dietary Diversity among the participants. Among the 211 women studied, 36% achieved minimum dietary diversity (consumption of ≥ 5 food groups), while 64% did not achieve the minimum dietary diversity threshold.

Table. 2 The association between sociodemographic factors and Minimum Dietary Diversity (MDD) among the study participants

Study Parameter	Minimum Dietary Diversity			P* Value
	N (%)	Not Achieved (n= 135) %	Achieved (n= 76) %	
Age in years				
20 -30	19(9.0%)	6(31.6%)	13(68.4%)	0.002*
31 - 40	76(36.0%)	44(57.9%)	32(42.1%)	
41 - 50	65(30.8%)	49(75.4%)	16(24.6%)	
51 - 60	51(24.2%)	36(70.6%)	15(29.4%)	
Education				
No formal schooling	25(11.8%)	20(80.0%)	5(20%)	0.000*
Not completed schooling	75(35.5%)	63(84.0%)	12(16.0%)	
Completed schooling	64(30.3%)	42(65.6%)	22(34.4%)	
Graduate	47(22.3%)	10(21.3%)	37(78.7%)	
Occupational Status				
Homemaker	145(68.7%)	109(75.2%)	36(24.8%)	0.000*
Working	66(31.3%)	26(39.4%)	40(60.6%)	
Financial Status				
Dependant	168(79.6%)	126(75.0%)	42(25.6%)	0.000*
Independant	43(20.4%)	9(20.9%)	34(79.1%)	
Per Capita Income (in Indian rupee)				
<5000	91(43.1%)	71(78.0%)	20(22.0%)	0.000*
5000-10000	75(35.5%)	55(73.3%)	20(26.7%)	
>10000	45(21.3%)	9(20.0%)	36(80.0%)	
*Chi square test. P < 0.05 considered significant				

Table. 3 The Association between Women's Social Empowerment and MDD

Study Parameter	Minimum Dietary Diversity			
	N	Not Achieved (n= 135) %	Achieved (n= 76) %	P* Value
Engagement in domestic tasks				
Domestic tasks without family support	133	85 (63.9%)	48 (36.1%)	0.122
Domestic tasks with family support	71	48 (67.6%)	23 (32.4%)	
Not involved in domestic tasks	7	2 (28.6%)	5 (71.4%)	
Decision-making authority for household food purchase				
Other family members	62	56(90.3%)	6(9.7%)	0.000*
Husband	49	36(73.5%)	13(26.5%)	
Both jointly	28	13(46.4%)	15(53.6%)	
Self	72	30(41.7%)	42(58.3%)	
Decision-making authority for daily meal preparation				
Other family members	64	58(90.6%)	6(9.4%)	0.000*
Husband	56	48(85.7%)	8(14.3%)	
Both jointly	24	13(54.2%)	11(45.8%)	
Self	67	16(23.9%)	51(76.1%)	
When will you usually eat during meals				
Alone	13	12(92.3%)	1(7.7%)	0.000*
After serving others	117	93(79.5%)	24(20.5%)	
With family	74	26(35.1%)	48 (64.9%)	
First	7	4(57.1%)	3(42.9%)	
How often eat left over foods?				
Daily	31	28(90.3%)	3(9.7%)	0.000*
More than twice in a week	58	46(79.3%)	12(20.7%)	
Weekly twice	71	51(71.8%)	20(28.2%)	
During festivals	51	10(19.6%)	41(80.4%)	
How often do you fast				
Daily	1	1(100%)	0(0.0%)	0.000*
More than twice in a week	39	33(84.6%)	6(15.4%)	
Weekly twice	37	28(75.7%)	9(24.3%)	
During festivals	49	18(36.7%)	31(63.3%)	
Don't fast	85	55(64.7%)	30(35.3%)	
*Chi square test, P < 0.05 considered significant				
* MDD - Minimum Dietary Diversity				

DISCUSSION

The present study assessed minimum dietary diversity and its determinants among married women residing in a rural area of Chengalpattu district, Tamil Nadu. The findings revealed that 36.2% of women achieved minimum dietary diversity, indicating that a considerable proportion of women did not meet the recommended dietary diversity threshold. This finding indicates suboptimal dietary patterns and a potential risk of micronutrient inadequacy among women in this population, consistent with findings reported by Ruel et al. and Arimond et al.⁸⁻⁹

The prevalence of adequate dietary diversity observed in the present study is comparable with findings from other studies conducted in similar settings. Gupta et al. and Shashikantha et al. reported that approximately 30% of

rural women in India achieved minimum dietary diversity, indicating that a majority of women consumed diets dominated by staple foods with limited dietary variety.¹⁰⁻¹¹ Similarly, Adubra et al. reported that only 27% of women in rural Mali achieved minimum dietary diversity, highlighting the widespread problem of inadequate dietary diversity among women in low-resource settings.¹² These findings are comparable to the present study and suggest that inadequate dietary diversity remains a persistent public health concern among rural women in low- and middle-income countries.

In the present study, cereals were consumed by almost all participants (99%), reflecting the staple cereal-based dietary pattern commonly observed in rural Indian populations. Higher consumption was observed for other

vegetables (96%) and legumes (74%), whereas the intake of nutrient-dense food groups such as eggs (39%), dark green leafy vegetables (37%), and meat, poultry, and fish (34%) was comparatively lower. Consumption of fruits and nuts and seeds was also limited, and milk and milk products were not consumed by any participants during the 24-hour recall period. Similar dietary patterns have also been reported in Indian studies. Panda et al. reported that diets among women were largely dominated by cereals with low intake of nutrient-rich foods.¹³ Torheim et al. reported that diets among women in rural Mali were predominantly cereal-based with low consumption of animal-source foods and fruits, contributing to inadequate micronutrient intake.¹⁴

Socioeconomic factors showed significant associations with minimum dietary diversity in the present study. Women with higher educational status had significantly better dietary diversity compared to those with lower levels of education. Similarly, working women and those who were financially independent demonstrated significantly higher dietary diversity than homemakers and financially dependent women. Higher household income was also significantly associated with improved dietary diversity. These findings are consistent with those reported by Jones et al. and Shumayla et al., who observed that socioeconomic and demographic factors significantly influenced dietary diversity among women.¹⁵⁻¹⁶

Women's social empowerment factors were significantly associated with minimum dietary diversity in the present study. Women who had autonomy in household food purchase and meal preparation decisions demonstrated significantly better dietary diversity compared to those where decisions were made by husbands or other family

STRENGTHS AND LIMITATIONS

The present study provides local evidence on minimum dietary diversity among married women in a rural area of Chengalpattu district using the standardized MDD-W indicator and a community-based random sampling method. The study was conducted in a single rural field practice area, which may limit the generalizability of the findings.

CONCLUSION

The present study highlights that dietary diversity among married women in the rural area studied remains inadequate and is influenced by several socioeconomic factors. Improving women's education, economic status, and access to diverse and nutritious foods may help enhance dietary diversity. Strengthening community-based nutrition education and food security initiatives could contribute to improving the nutritional status of women in rural communities.

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members. Eating practices also showed a significant association, with women who ate with family members having better dietary diversity compared to those who ate after serving others or ate alone. These findings highlight the importance of women's decision-making power and household food practices in improving dietary diversity, consistent with findings reported by Ruel et al.⁸

Dietary practices and intra-household food behaviours may also influence dietary diversity. Practices such as meal timing, consumption of leftover food, and fasting behaviours can affect access to diverse and nutrient-rich foods. In many settings, women tend to eat after other family members or consume leftover food, which may limit both the quantity and quality of food intake. Cultural and religious fasting practices may further restrict the consumption of certain food groups. These sociocultural and household-level practices may contribute to inadequate dietary diversity, as reported by Alamirew et al.¹⁷

The findings of the present study highlight the need for targeted interventions to improve dietary diversity among rural women. Community-based nutrition education, promotion of balanced diets, and improved access to nutrient-rich foods are essential. Strengthening household food security and diversifying food production systems have been identified as key strategies to improve dietary quality and nutritional outcomes in low- and middle-income countries, as highlighted by Ruel et al.⁸ and FAO guidelines.¹ Doke et al. also reported that dietary diversity among women is influenced by nutritional and socioeconomic factors, emphasizing the need for context-specific interventions.¹⁸

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