Section: Maternal, New born and Child Health and Nutrition

Original Research Article

ASSESSING THE EFFECT OF POSITIVE ATTITUDES, SUBJECTIVE NORMS, PERCEIVED BEHAVIOUR CONTROL, AND INTENTIONS OF MOTHERS (15-49 YEARS) ON THEIR DIETARY INTAKE

Priyanshu Rastogi[1], Mansi Shukla[1], Sunil Mehra[1], Shantanu Sharma[1]

[1]Senior Program Manager, Department of Maternal, New born and Child Health and Nutrition, MAMTA Health Institute for Mother and Child, New Delhi, India.
[2]Program Manager, Department of Maternal, New born and Child Health and Nutrition, MAMTA Health Institute for Mother and Child, New Delhi, India.
[3]Executive Director, MAMTA Health Institute for Mother and Child, New Delhi, India.
[4]Deputy Director, Department of Maternal, New born and Child Health and Nutrition, MAMTA Health Institute for Mother and Child, New Delhi, India.

Received *: 04/05/2024*
Received in revised form *: 08/07/2024*
Accepted *: 23/07/2024*

Corresponding Author:
Ms. Priyanshu Rastogi,
Senior Program Manager, MAMTA Health Institute for Mother and Child, New Delhi, India.
Email: priyanshu@mamtahimc.in

DOI: 10.70034/ijmedph.2024.3.42

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2024; 14 (3); 238-243

ABSTRACT

Background: Women of reproductive age play a crucial role in determining maternal and child health, yet they face significant health challenges such as iron deficiency anemia (IDA) and the double burden of malnutrition. The present study aimed to assess the effect of positive attitudes, subjective norms, perceived behaviour control, and intentions of mothers (15-49 years) on their dietary intake in two districts of India.

Materials and Methods: A cross-sectional study was conducted in South-West Delhi and Gurugram, India, among mothers aged 15-49 years. A total of 337 women per district were surveyed using systematic random sampling. Data were collected on socio-economic profiles, healthy eating intentions, and dietary diversity through a semi-structured questionnaire. The dietary diversity score was calculated based on the consumption of at least five out of ten food groups in the past 24 hours. The study employed generalized linear regression models to assess the effects of positive attitude, subjective norms, intentions, and perceived behavioural control on dietary intake, adjusting for age, income, social class, and education.

Results: The median age of mothers was 26 years, with a median monthly income of INR 15,000. About 15% of mothers had a dietary diversity score of less than five. All the parameters (positive attitudes, subjective norms, intentions) had positive correlation with dietary intake. There was a 0.19-point increase in the dietary diversity score per one-unit increase in the intentions of the mothers.

Conclusion: The study highlights the importance of perceived behavioural control, positive attitudes, subjective norms, and intentions in influencing the dietary intake of mothers. These results highlight the importance of understanding the influence of social and behavioural factors on dietary practices to design effective nutritional interventions and policies.

Keywords: Dietary habits, Nutritional status, Behavior, Intentions.

INTRODUCTION

Women of reproductive age have a pivotal role in defining maternal and child health. However, they face increased vulnerability to health concerns such as iron deficiency anemia (IDA) and the double burden of malnutrition.[1] Globally, half a billion women (15–49 years of age) and 269 million children (6–59 months of age) are affected by anemia.[2] This puts an emphasis on the health of women of reproductive age group.

In India, mother and child health continues to be a priority despite improvements over the past few decades. In 2016, India was one of the countries with the highest rates of IDA.[3] Still, the prevalence of IDA amongst pregnant women consistently remained around 50% over the last four decades.[4] Promoting healthy dietary practices among women of reproductive age is imperative.

Dietary intake plays a critical role in defining the health of individuals from all age groups. However, it is essential for women as they are responsible for their own as well as their child's health. Poor maternal nutrition is linked to abnormal fetal development and an increased risk of developing childhood and adult chronic diseases.[5] Furthermore, maternal malnutrition can have an intergenerational impact, sustaining a cycle of poor health among families.[6,7] Thus, ensuring appropriate food intake for women is critical not just for their own health but also for future generations' well-being.

Dietary intake is majorly regulated by hunger and satiety. However, it is strongly intertwined with social norms, behaviours, and intentions within the cultural context.[8,9] Social norms tend to work in an implicit manner, affecting behavioural patterns and intentions and significantly shaping diet intake and dietary-related behaviour.[10] Social norm-based interventions have been found to promote healthy eating behaviours such as positive intention to consume vegetables using descriptive social norm message (vs. control) and increase in diet diversity to prevent anemia among non-pregnant women of reproductive age with 47% higher odds in the treatment group. Furthermore, an increased selection and intake of fruits and vegetables with exposure to a novel 'liking norm' message, increased purchase of meals containing vegetables from 63% to 68% of meals in student canteen settings, and higher odds for decreased alcohol.[11–14]

Thus, it is imperative to understand the impact of social norms, behaviours, and intentions on dietary intake to design effective interventions and policies that improve maternal and child health. There were limited studies assessing in-field relationship of the dietary intake with positive attitudes, social norms, behaviours, and intentions of mothers. The present study aimed to assess the effect of positive attitudes, societal norms, behaviours, and intentions on the dietary intake of mothers aged 15 to 49 years.

MATERIAL AND METHODS

Study design, study population, and study settings: We conducted a cross-sectional study in three areas of South-West Delhi and two areas of the Gurugram districts of India. These two districts were selected as the intervention sites for the project. The study was conducted among mothers (15-49 years) residing in the areas for at least the past 1 year. All the individuals who did not provide written consent or assent (individuals below 18 years) to participate in the study or suffered a major illness in the past 1 year or migrated were excluded. The confidentiality and privacy of the participants were ensured at all stages of the study, and they were free to leave the study at any time. The minimum sample size came out to be 337 for each district. The sample size was calculated considering a 20% prevalence of children less than 3 years who received breastfeeding within 1 hour of birth, 5% absolute error, 10% non-response rate, and after adjusting the design effect of 1.5. The sample size was equally distributed across the selected areas.

Each of the selected areas was divided into four zones (North, South, East, and West) from the center of the area. In each of these zones in Delhi, nearly 40-45 households, and in Gurugram, 50-60 households were selected using systematic random sampling. The first household was randomly selected, and subsequent households were selected using the 'kth' interval. One woman from each household was interviewed.

Study tools

A predesigned, pretested, semi-structured questionnaire containing items on the socioeconomic profiles such as age, educational status, occupational status, area of residence, type of family, religion, caste, type of toilet used, and socio- economic status was used. Furthermore, the questionnaire had questions on the healthy eating intentions scale, including attitudes, subjective norms, intentions, and perceived behavioural control. The data were also collected on the consumption of food groups in the last 24 hours to calculate their dietary diversity. The questionnaire was developed in English and then translated into the local language (Hindi).

The healthy eating attitude was assessed by using a five-point Likert scale. There were seven items on the scale. A coding system was employed where Good/Beneficial response received a code of 5, Useful/Wise response was coded as 4, Foolish was assigned a code of 3, Useless received a code of 2, and Harmful was coded as 1. The total of healthy eating intentions was calculated by summing up the individual scores of the seven items. The subjective norms were assessed using a five-point Likert scale. There were four items on the scale. The strongly agree response was coded as 5, agree was coded as 4, neutral was coded as 3, disagree was coded as 2 and strongly disagree was coded as 1. A coding scheme was implemented, assigning a code of 5 to strongly agree, 4 to agree, 3 to neutral, 2 to disagree, and 1 to strongly disagree. The subjective norms score was calculated by summing up the individual scores of the four items. Similarly, there were three items to assess the perceived behavioural control of subjects. It was calculated by summing up the total score of three items. Likewise, the intention scale comprised four items aimed at gauging the subject's intentions regarding nutrition. The code for 'definitely yes' was assigned as 5, 'somewhat yes' was coded as 4, neutral received a code of 3, 'somewhat no' was coded as 2, and 'definitely no' was assigned a code of 1. The total

intentions regarding nutrition score were calculated by summing up the scores of four items.

The dietary practices explored the consumption of food items from ten food groups, encompassing grains, white roots and tubers, pulses, beans, and lentils, nuts or seeds, milk or milk products, meat, organ meat or fish, eggs, green leafy vegetables, other vegetables, and vitamin A-rich fruits and vegetables. Additionally, the intake of miscellaneous foods such as chips, fried items, chocolates, candies, biscuits, sweet pastries, and beverages (tea/coffee) was documented. The Minimum Dietary Diversity (MDD) score for women aged 15-49 was then calculated to ascertain whether they had consumed at least five out of the ten food groups in the past 24 hours.

Moreover, a team of five investigators underwent a comprehensive one-week training on the questionnaire and data collection techniques before commencing the actual data collection. The mock surveys were conducted during this training period. Special emphasis was placed on achieving maximum intra- and inter-individual agreement on all questions. Continuous supervision was ensured by both the field team and the head office team, with random monitoring conducted throughout the data collection process. To streamline the process, all questionnaires were converted into an Android-based mobile application using Open Data Kit (ODK). Approximately 5% of the completed forms underwent screening to ensure data completeness, consistency, and coherence. The data collection spanned over a period of 2-3 months.

Ethical clearance

The project obtained ethical clearance from the MAMTA Internal Ethical Review Board. All study subjects aged 18 years and above provided informed written consent.

Statistics

The quantitative data were described as mean (standard deviation, SD) or median (Interquartile Range; IQR), and the categorical data were described as frequency (percentages). We assessed the effect of the positive attitudes, subjective norms, intentions, and perceived behaviour control towards nutrition and dietary intake of the mothers using generalized linear regression models. We adjusted for the co-variates like age, monthly family income, social classes, and education status in the model. All the analyses were performed using StataCorp. 2023 (Stata Statistical Software: Release 18. College Station, TX: StataCorp LLC). The associations were expressed as a beta coefficient (β) and 95% confidence interval (CI). We performed Pearson's correlation amongst all the parameters (attitudes, perceived behavioral control, intentions, subjective norms, and MDD). The correlation was expressed as r (Pearson's correlation coefficient) and p value. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The median (IQR) age of the women was 26 (24-30) years. The median (IQR) years of cohabitation was 7 (4-10) years. The median (IQR) age of the husband was 30 (28-32.5) years. The median (IQR) monthly income was INR 15000 (12000-20000), as shown in Table 1. Around 15% of the mothers had dietary diversity score of <5. The median (IQR) dietary practices score of the mothers was 6 (5-8), as shown in Table 2.

We found that perceived behaviour control was significantly associated even after adjusting the co-variates like age, monthly family income, social classes, education status with MDD score of mothers (ß (95%CI); p-value:0.14 (0.09, 0.19); <0.001). Similarly, there was a 0.19-point increase in the MDD per one-unit increase in the intentions of the mothers (ß (95%CI); p-value: 0.19 (0.16, 0.21); <0.001), as shown in Table 3. The association remained statistically significant even after adjustment for co-variates like monthly family income, social classes, education status. There are positive correlations between attitudes and subjective norms (r=0.17; p<0.001), attitudes and intentions (r=0.19; p<0.001), intentions and perceived behaviour control (r=0.65; p<0.001), intentions and subjective norms (r=0.59; p<0.001), and perceived behavioural control and subjective norms (r=0.46; p<0.001) (Fig 1). A negative but statistically insignificant correlation was noted between attitudes and perceived behavior control (r= -0.03; p=0.42). Likewise, all the parameters were positively correlated with MDD. There was a positive correlation between intentions & MDD (r=0.48; p<0.001), subjective norms and MDD (r=0.35; p<0.001), perceived behavioral control and MDD (r=0.21; p<0.001), and attitude and MDD (r=0.18; p<0.001).

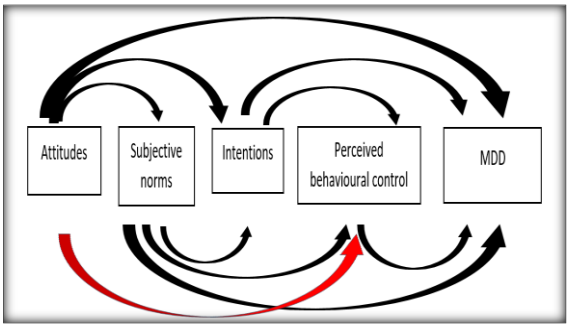

Figure 1: Correlations amongst attitudes, subjective norms, intentions, perceived behavioural control and minimum dietary diversity (MDD)

Note: Negative and statistically insignificant correlation is highlighted in red arrows and positive and statistically significant correlations are highlighted in bold black arrows.

Table 1: Socio-demographic characteristics of the mothers

Indicator	N=644 n(%)
Education status of women	
Illiterate	84 (13.4)
Primary	39 (6.2)
Middle	99 (15.7)
Secondary	148 (23.5)
Senior secondary	165 (26.2)
Graduation and above	93 (14.8)
Occupation	
Housewife	502 (77.9)
Private job	57(8.9)
Daily wage earners	67 (10.4)
Others	18 (3.2)
Religion	
Hindu	601 (93.3)
Muslims and others	43 (6.7)
Social caste	
General	360 (55.9)
Scheduled caste	89 (13.8)
Scheduled tribe	10 (1.5)
Other backward classes	183 (28.4)
Type of cards	
BPL	132 (20.5)
AAY	11 (1.7)
APL	21 (3.2)
None	480 (74.5)
Type of family	
Nuclear	579 (90)
Joint	65 (10)

Abbreviations: *AAY: Antayodya Anna Yojna card (Extremely below the poverty line); APL: Above the Poverty Line card; BPL: Below the Poverty Line card*

Table 2: Median scores of the scales of the mothers

Variables	Positive attitudes	Subjective norms	Intentions	Perceived behavioural control	MDD
Median (IQR)	29 (27-33)	18 (15-20)	15 (11-19)	14 (11-17)	6 (5-8)

Abbreviations: *IQR: Interquartile Range; MDD: Minimum Dietary Diversity*

Table 3: Effect of positive attitudes, subjective norms, intentions, and perceived behaviour control towards nutrition and dietary intake of the mothers

Independent variables	MDD ß (95% CI); p-value	MDD ß (95%CI); p-value	MDD ß (95% CI); p-value	MDD ß (95%CI); p-value
Age (years)	0.03 (-0.006, 0.063); 0.11	0.01 (-0.01, 0.05); 0.31	-0.002 (-0.03, 0.027); 0.87	0.007 (-0.02, 0.04); 0.65
Monthly family income (INR)	5.5 $*10^{-6}$ ($-2.5*10^{-6}$, $13.0*10^{-6}$); 0.17	$2.9*10^{-6}$ ($1.9*10^{-6}$, $10.3*10^{-6}$); 0.47	$4.0*10^{-6}$ ($2.9*10^{-6}$, $11.1*10^{-6}$); 0.25	$2.3*10^{-6}$ ($5.2*10^{-6}$, $10*10^{-6}$); 0.54
Social classes				
AAY	**-1.58 (-2.71, -0.45); 0.006**	**-1.49 (-2.59, -0.39); 0.008**	-0.89 (-1.88, 0.088); 0.07	**-1.32 (-2.39, -2.57); 0.01**
APL	0.08 (-0.77, 0.94); <0.001	0.26 (-0.57, 1.10); 0.53	**-0.76 (-1.08, -0.44); <0.001**	**-0.68 (-1.03, -0.33); <0.001**
None	-7.9 (-1.16, -0.42); 0.841	**-0.77 (-1.13, -0.41); <0.001**	0.60 (-0.14, 1.35); 0.11	0.20 (-0.60, 1.0); 0.61
BPL	*Reference*	*Reference*	*Reference*	*Reference*
Education status				
Middle	**0.77 (0.37, 1.17); <0.001**	**0.73 (0.34, 1.11); <0.001**	0.31 (-0.03, 0.66); 0.08	**0.52 (0.14, 0.0.90); 0.006**
Senior secondary	**0.57 (0.14, 1.0); 0.009**	**0.56 (0.14, 0.98); 0.009**	0.17 (-0.20, 0.55); 0.37	0.38 (-0.02, 0.0.79); 0.06
Graduation or above	**0.78 (0.28, 1.28); 0.002**	**0.71 (0.22, 1.19); 0.004**	0.30 (-0.13, 0.74); 0.17	**0.57 (0.09, 1.04); 0.01**
Illiterate or primary	*Reference*	*Reference*	*Reference*	*Reference*
Positive attitudes	**0.04 (0.01, 0.08); 0.006**	-	-	-
Perceived Behavioural control	-	**0.14 (0.09, 0.19); <0.001**	-	-
Intentions	-	-	**0.19 (0.16, 0.21); <0.001**	-
Subjective norms	-	-	-	**0.19 (0.15, 0.23); <0.001**

Abbreviations: *AAY: Antayodya Anna Yojna card (Extremely below the poverty line); APL: Above the Poverty Line card; BPL: Below the Poverty Line card; MDD: Minimal Dietary Diversity; β: Beta coefficient; CI: Confidence Interval*

All the associations with p value<0.05 were highlighted bold.

DISCUSSION

The present study highlights the effect of positive attitudes, social norms, perceived behaviour control, and intentions among mothers aged 15-49 years on their dietary intake. The results indicate a positive association between attitudes, perceived behavioural control, subjective norms, and intentions with MDD. According to the Theory of Planned Behaviour (TPB), intention is directly influenced by three major constructs: attitude, subjective norms, and perceived behavioural control. The stronger the intention, the more likely an individual is to perform the behaviour.[14] To the best of our knowledge, we did not find any previous study which assessed the effect of subjective norms, behaviour, and intentions among mothers (15-49 years) on their dietary intake. However, a study conducted on pregnant women found a significant relationship between nutrition behaviour and the beliefs, attitudes, subjective norms, and enabling factors model. The results indicated that as the scores for each construct of the model increased, the women's nutritional behaviour scores also improved.[11]

Evidence showed that descriptive social norms were significantly associated with young adults' dietary behaviour. Most young adults reported that their families regularly engaged in healthy dietary behaviours, while fewer reported regular consumption of sugar-sweetened beverages and unhealthy foods by their families. Those who perceived that their families regularly consumed sugar-sweetened beverages or fast food had significantly higher mean intakes of these foods and beverages compared to those who perceived less frequent consumption by their families ($p < .001$). Additionally, young adults' fruit and vegetable intake was 0.4 servings higher among those who perceived regular family consumption, though the result was not statistically significant.[12] Additionally, we found a study that predicted healthy eating behaviour among adolescents. The study's findings indicated that perceived behavioural control, followed by attitudes, were the most important factors in predicting behavioural intention among adolescents.[13] However, the present study focused solely on assessing the effects of positive attitudes, subjective norms, planning, and behaviour control on the nutrition and dietary intake of mothers. Our findings revealed that positive attitudes, perceived behavioural control, intentions, and subjective norms regarding nutrition and dietary intake were statistically significant ($p<0.001$) among the mothers.

The present study had some limitations. It was conducted with mothers in semi-urban areas, and responses related to attitudes, norms, and behavioural control may differ between urban and rural settings. Moreover, the study was conducted only in South-West Delhi and Gurugram, so the findings may not be generalized to the other settings. Furthermore, the calculation of MDD was limited to recording the consumption of food groups within the past 24 hours without considering the quantities consumed. However, due to constraints of resources, the study was limited to mothers only. Like other studies, we could have also recorded the intentions, attitudes, norms, behavioural control, and dietary intake of family members. Despite its limitations, one of the major strengths of the study were its assessment of the effects of positive attitudes, subjective norms, intentions, and behavioural control on the nutrition and dietary intake of mothers. The study utilized standardized tools for data collection, distinguishing itself as one of the few studies to examine these factors in relation to mothers.

CONCLUSION

Our study findings indicate a significant positive effect of positive attitudes, perceived behavioural control, intentions, and subjective norms on MDD. These results highlight the importance of understanding the influence of social and behavioural factors on dietary practices to design effective nutritional interventions and policies.

The study also revealed that maternal education, family income, and social class significantly impacted dietary diversity. Improving maternal nutrition through targeted interventions that consider social norms and behavioural factors is crucial for breaking the cycle of poor health and ensuring the well-being of future generations. The policymakers should incorporate these findings into strategies aimed at enhancing dietary practices among women of reproductive age, ultimately contributing to better maternal and child health outcomes.

REFERENCES

1. Hasan MM, Ahmed S, Soares Magalhaes RJ, Fatima Y, Biswas T, Mamun AA. Double burden of malnutrition among women of reproductive age in 55 low- and middle-income countries: progress achieved and opportunities for meeting the global target. Eur J Clin Nutr. 2022 Feb;76(2):277–87.
2. Anaemia [Internet]. [cited 2024 Feb 17]. Available from: https://www.who.int/news-room/fact-sheets/detail/anaemia
3. Natekar P, Deshmukh C, Limaye D, Ramanathan V, Pawar A. A micro review of a nutritional public health challenge: Iron deficiency anemia in India. Clin Epidemiol Glob Health. 2022 Mar 1; 14:100992.
4. Anemia Alert: Is the Government Aiming for Cost-Effective Interventions? | NITI Aayog [Internet]. [cited 2024 Feb 17]. Available from: https://www.niti.gov.in/anemia-alert-government-aiming-cost-effective-interventions
5. Marshall NE, Abrams B, Barbour LA, Catalano P, Christian P, Friedman JE, et al. The importance of nutrition in

pregnancy and lactation: lifelong consequences. Am J Obstet Gynecol. 2022 May 1;226(5):607–32.
6. orfonline.org [Internet]. [cited 2024 Feb 22]. Malnutrition: India needs to urgently break inter-generational cycle. Available from: https://www.orfonline.org/research/malnutrition-india-needs-to-urgently-break-inter-generational-cycle
7. Kumar S, Nahlen B. Intergenerational Persistence of Health: Evidence from India. 2023;
8. Suwalska J, Bogdański P. Social Modeling and Eating Behavior—A Narrative Review. Nutrients. 2021 Apr 7;13(4):1209.
9. Monterrosa EC, Frongillo EA, Drewnowski A, de Pee S, Vandevijvere S. Sociocultural Influences on Food Choices and Implications for Sustainable Healthy Diets. Food Nutr Bull. 2020 Dec 1;41(2_suppl):59S-73S.
10. Frontiers | Perceptions of social norms around healthy and environmentally-friendly food choices: Linking the role of referent groups to behavior [Internet]. [cited 2024 Feb 20]. Available from: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.974830/full
11. Mohammadi A, Effati-Daryani F, Ghelichkhani F, Zarei S, Mirghafourvand M. Effective factors on nutrition behaviors of pregnant women based on the beliefs, attitudes, subjective norms, and enabling factors model: A cross-sectional study. J Educ Health Promot. 2022 Jan 31; 11:12.
12. Higgs S. Social norms and their influence on eating behaviours. Appetite. 2015 Mar; 86:38–44.
13. Grønhøj A, Bech- Larsen T, Chan K, Tsang L. Using theory of planned behavior to predict healthy eating among Danish adolescents. Health Educ. 2013 Jan 1;113(1):4–17.
14. Lim SL, Teoh C, Zhao X, Umareddy I, Grillo V, Singh SS, et al. Attitudes & beliefs that influence healthy eating behaviours among mothers of young children in Singapore: A cross-sectional study. Appetite. 2020 May 1; 148:104555.