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Breast Feeding and Maternal Nutrition: Knowledge, Attitudes, and Practices among Lactating Mothers

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Abstract

Human breast milk plays a vital role in infant growth after delivery up to 6 months. At the same time personal diet of mothers will shows some impact on both of them (Infant and mother). This study developed a comprehensive questionnaire to investigate various maternal health behaviors, dietary habits and infant care practices among pregnant women and to understand the relationship between these factors and the biochemical composition of breast milk. The questionnaire was designed to capture demographic data, pregnancy complications, dietary preferences, supplement usage, breastfeeding awareness and sleep patterns. The survey revealed key trends such as 1) A high prevalence of pregnancies among women of optimal reproductive age (21–30 years), 2) Widespread non-vegetarian food consumption and 3) Substantial use of supplements. Additionally, the questionnaire highlighted a significant gap in awareness regarding the benefits of breastfeeding and colostrum. Importantly, this data was then correlated with biochemical analysis of breast milk, focusing on variations in the nutrient content, including fat, lactose and mineral composition. By linking the survey responses to the biochemical analysis, this study demonstrates how maternal diet, supplementation and health behaviors impact the quality of breast milk, which in turn may affect infant health outcomes. The findings from both the survey and the biochemical analysis suggest that targeted health interventions, including improving maternal education on breastfeeding and nutritional habits, are essential for enhancing maternal and infant health.
Keywords- Infant, Human Breast Milk, Maternal Diet, Food Habits.

1. Introduction

Human breast milk and its composition is vital for newborn health and development and also provides essential nutrients and vitamins those are help to growth and immunity and cognitive functions on early growth. It is also recognized that maternal health from women those are dietary habits, nutritional status and personal lifestyle those are influences the composition and quality of (Perrella et al., 2021). Consumption of several micro and macro nutrients (fat, proteins, vitamins and minerals) those are directly impacts the content of breast milk (Martin et al., 2022). Additionally, maternal health conditions (Diabetes, obesity and preeclampsia) those are alter the biochemical profile of breast milk those can have lasting effects in infant growth and healthy conditions (Suwaydi et al., 2022).

Similarly, maternal behaviours such as breastfeeding practices, several supplement intake and general awareness about the importance of breastfeeding also play vital roles in the form of newborn nutrition during the early stages of life. Breastfeeding also gives a natural defence mechanism against several infections and skin problems through the transfer of immune factors, especially colostrum that contains antibodies, and growth factors along with several enzymes play a vital role in immunity (Ip *et al.*, 2007). However, despite the known benefits, many women remain unaware of the complete scope the breastfeeding protective effects, leading to suboptimal breastfeeding practices in some of the populations (Ferguson *et al*., 2020). The complex relationship between several maternal factors, breastfeeding practices and breast milk compositions, it is also important to explore these variables systematically in all the newly delivered women. This will be

quantified with a well-designed questionnaire that can serve as an effective tool to assess maternal behavioural patterns and health status and dietary habits which can then be correlated with biochemical analyses of human breast milk. These approaching levels to every woman will allow for a comprehensive understanding of how different factors such as personal dietary preferences (Non-Veg and Veg) diets will always supplementation habits and pregnancy-related conditions all influence the nutritional and biochemical compositions of women's breast milk (Bravi et al., 2016).
In 2012 Kramer & Kakuma demonstrated survey data with biochemical analysis studies and this investigation aims to provide insights into the dietary and personal health conditions of pregnant women and their awareness of breastfeeding benefits and how these factors collectively influence the composition of breast milk. These findings can inform public health conditions and their interventions aimed at improving maternal and new-born health conditions, especially though good maternal education and targeted nutritional guidance (Dewey 2001).

2. Research Methodology

2.1. Selection of Area

This study was conducted in Harsha Hospital and Dr. Karra Ramesh Reddy paediatric clinic which are in Hyderabad, Telangana, India. This area encompasses urban, semi-urban and rural populations offering a broad representation of different socioeconomic backgrounds and easy access to healthcare. The selection of these regions enabled the inclusion of pregnant women from varied educational levels and nutritional statuses and enriched the data on maternal health practices and dietary habits. One of the Maternity hospital and paediatric clinic allowed for data collection from the women who are attending regular health check-ups for them and for their child. The area's diverse cultural practices, especially in terms of dietary habits such as non-veg and veg diet preferences, provided insight into how nutrition influences pregnancy outcomes. The high population density and variety of healthcare accessibility made this region ideal for examining maternal health conditions and nutritional awareness in breastfeeding practices.
Telangana, maternal health indicators such as gestational diabetes, hypertension and breastfeeding problems vary significantly across socioeconomic groups in this region, which will provide a strong foundation for our study. Furthermore, Da Mota et al., (2021) emphasize how dietary habits including the frequent consumption of non-veg intake can influence maternal nutrition and consequently, maternal and infant health conditions supporting the selection of this area for understanding maternal health patterns while breastfeeding.

2.2. Questionnaire Development

Developing a questionnaire for 100 pregnant and recently delivered women to capture essential information related to maternal health, nutrition, lifestyle factors and breastfeeding practices. It can be structured into various sections, starting with demographic details such as age, education, occupation, household income and residential area. The next section will address maternal health, including pre-pregnancy weight, medical conditions and any complications during pregnancy, as well as pregnancy outcomes. The dietary habits section would inquire about daily food consumption, including non-vegetarian food, green leafy vegetables, fruits, fast food and supplements like iron or multivitamins. It would also assess the respondent's knowledge of maternal nutrition. The breastfeeding section would ask about the initiation of breastfeeding, awareness of colostrum's benefits, duration of breastfeeding and any challenges faced. Additionally, sleep patterns, physical activity and access to healthcare services would be addressed. Post-delivery questions would focus on delivery type, postpartum complications and infant health. The questionnaire would incorporate both closed-ended and open-ended questions to capture a wide range of responses, providing valuable insights into maternal and child health in urban and rural settings and highlighting areas where targeted interventions could improve health outcomes.

3. Analysis of the Study

3.1 Analysis of Age and BMI Frequency of Pregnancy Women

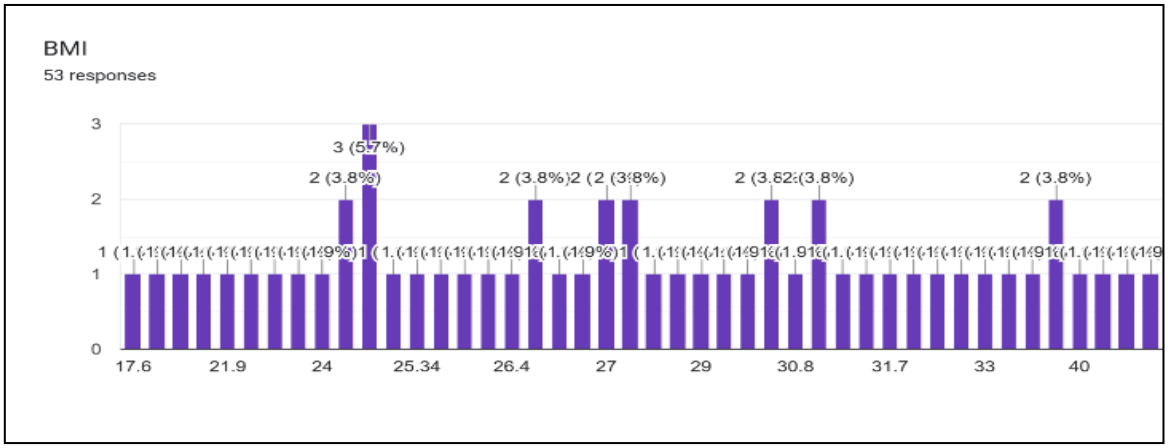

Figure-1 Distribution of Body Mass Index (BMI) Respondents.

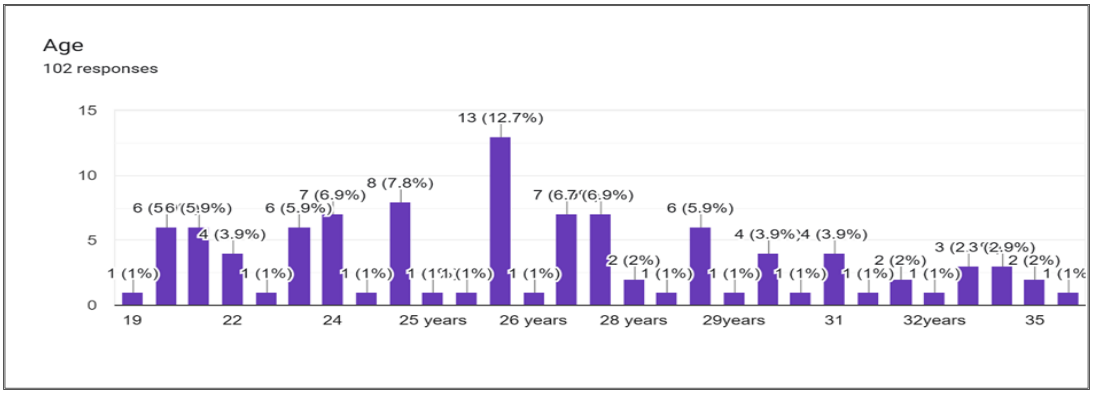

Figure-2 Age Distribution of Among Pregnant Women across Different Age Groups.

3.1.1 BMI and Age Classification (WHO Standards)

The dataset classifies BMI into four categories: **Underweight (<18.5),** associated with poor foetal growth and preterm delivery; **Normal Weight (18.5–24.9),** considered optimal with minimal risks and **Overweight (25–29.9)**, linked to gestational diabetes and hypertension. **Obesity (≥30)**, divided into three classes, poses higher risks of preeclampsia, caesarean delivery and neonatal complications. The dataset categorizes pregnancies into three distinct age groups. Adolescent pregnancies (≤20 years) account for 1% and are associated with higher risks of preterm birth, low birth weight, and socioeconomic challenges (Figure 1). The optimal Reproductive age (21–30 years) comprises the majority (67.6%), with the peak at 26 years (12.7%), reflecting the biologically favourable period for pregnancy due to lower risks of complications and higher fertility (Figure 2). Lastly, advanced maternal age (≥31 years) represents 21.6% of pregnancies, often linked to increased risks of maternal health issues, gestational diabetes and chromosomal abnormalities such as Down syndrome.

3.2 Analysis of Body Weight (BW) Distribution among Pregnant Women

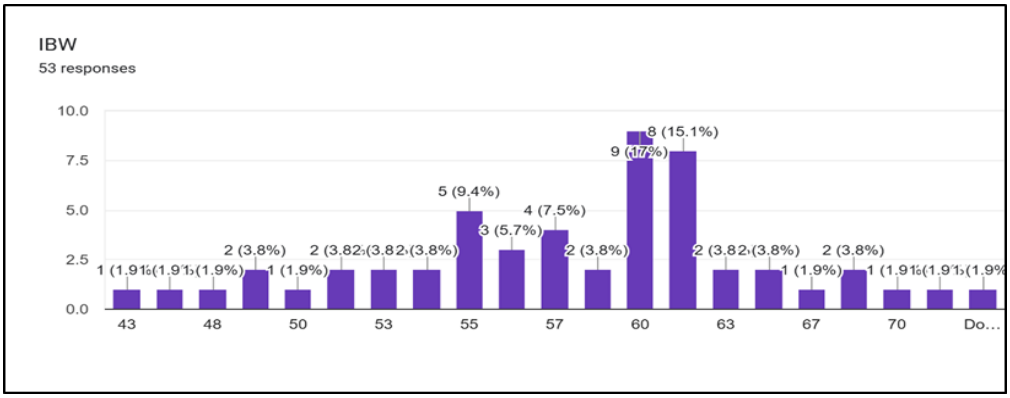

Figure-3 Body Weight Distribution of Pregnant Women.

The bar graph shows a right-skewed distribution of body weight (BW) among 53 pregnant women, with 17% in the 60–69 range. About 30% have BW below 55, 60% between 55 and 69 and 10% above 69 showed in (Figure 3). Lower BW is associated with maternal and foetal risks, emphasizing the need for proper monitoring and lifestyle interventions.

3.3 Analysis of Medical Complications among Pregnant Women

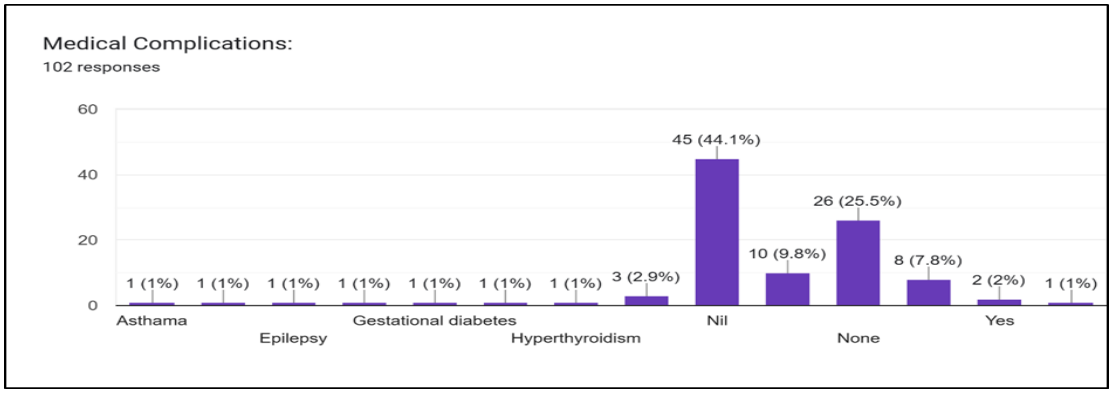

Figure-4 Distribution of Medical Conditions in Pregnant Participants.

The bar graph shows that 44.1% of pregnant women reported no complications, while 25.5% had gestational diabetes (Figure 4). Other conditions, including asthma, epilepsy and hyperthyroidism, were less common. Effective screening, management and personalized care are crucial to minimize pregnancy-related risks.

3.4 Analysis of Medical Complications during Pregnancy

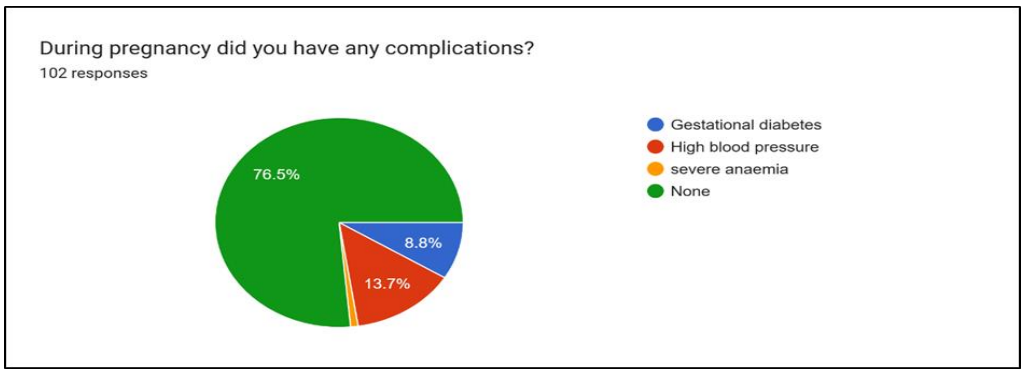

Figure-5 Prevalence of Medical Complications during Pregnancy.

The pie chart shows 76.5% of pregnant women had no complications, while 13.7% reported high blood pressure and 8.8% each had gestational diabetes and severe anaemia in women (Figure 5). These findings highlight the need for regular screening and personalized care. Effective management can help reduce maternal and foetal risks.

3.5 Analysis of Awareness about Colostrum Milk among Pregnant Women

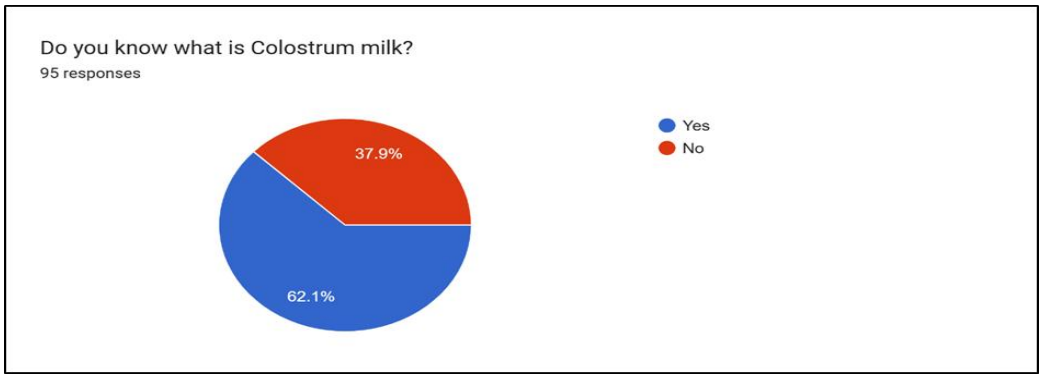

Figure-6 Knowledge of Colostrum Milk in Pregnant Participants.

Here we observed 62.1% of pregnant women are aware of colostrum, but 37.9% lack knowledge, indicating a need for education on its benefits (Figure 6). Increasing awareness can promote early breastfeeding, improving infant health and immunity**.**

3.6 Analysis of Colostrum Feeding Practices among Infants

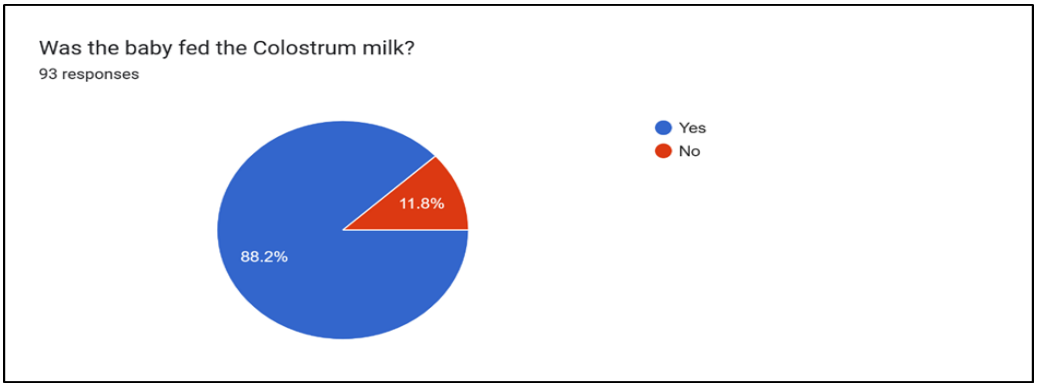

Figure-7 Colostrum Feeding Practices among Infants.

A high colostrum feeding rate of 88.2% among infants reflects positive breastfeeding practices and maternal awareness (Figure 7). With only 11.8% of infants not receiving colostrum, the findings emphasize the importance of promoting early initiation of breastfeeding to enhance infant health outcomes.

3.7 Analysis of Breastfeeding Frequency among Mothers

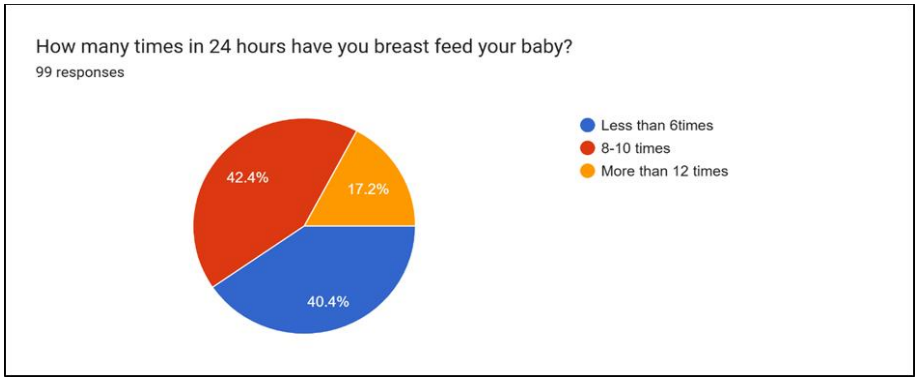

Figure-8 Distribution of 24-hour Breastfeeding Frequency among Mothers.

A high proportion of infants (88.2%) were fed colostrum, indicating positive maternal practices and awareness of its benefits, while only 11.8% did not receive it, highlighting a low rate of non-feeding and overall good breastfeeding initiation.

3.8 Analysis of Breastfeeding Duration Intentions among Pregnant Women

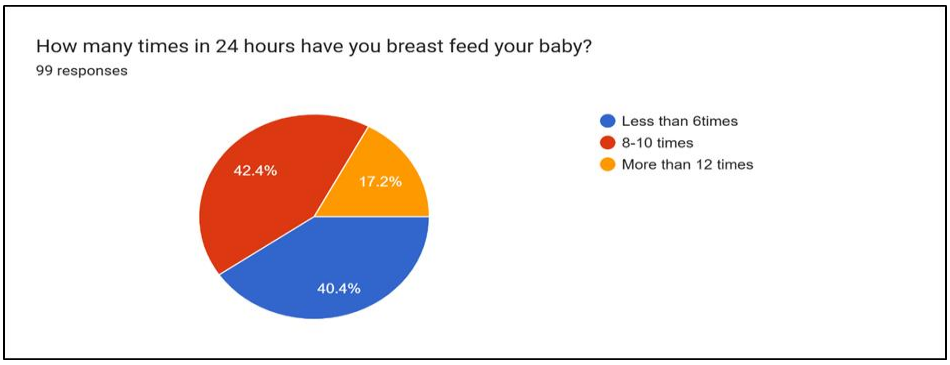

Figure-9 Distribution of Intended Breastfeeding durations among Pregnant Women.

A high colostrum feeding rate of 88.2% indicates positive breastfeeding practices, while only 11.8% of infants did not receive colostrum, reflecting strong maternal awareness of its health benefits showed in (Figure 9). This trend highlights the importance of promoting early initiation of breastfeeding to enhance infant health outcomes.

3.9 Analysis of Non-Vegetarian Consumption Habits

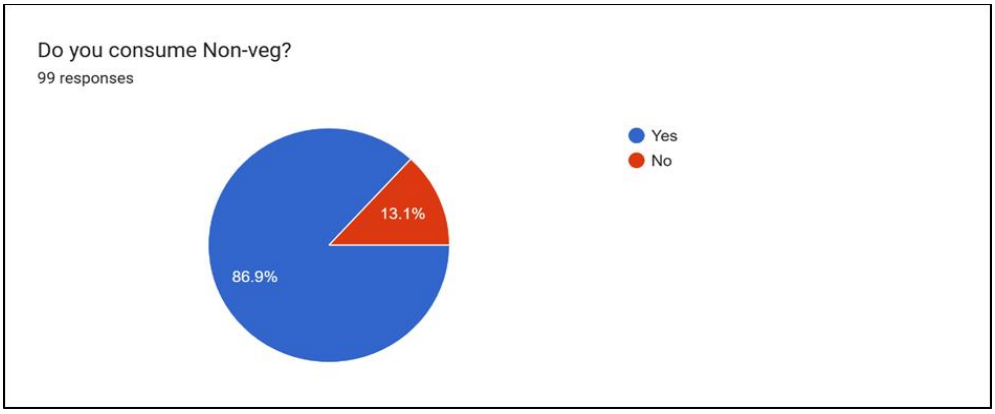

Figure-10 Distribution of Dietary Preferences, Vegetarian and Non-Vegetarian.

Most respondents (86.9%) reported consuming non-vegetarian food, indicating a strong preference for meat-based diets, while only 13.1% identified as vegetarians or vegans (Figure 10). This dietary trend highlights the need to consider public health interventions related to nutrition, food safety and disease prevention, particularly in regions with high non-vegetarian peoples. The majority of respondents (58.8%) consume non-vegetarian food three times per week, with smaller proportions consuming it once (21.2%) or twice (20%) per week, which may influence overall dietary patterns, health outcomes, and be shaped by cultural and social factors (Richter et al., 2016). The pie chart shows that 65.9% of respondents prefer chicken as

their main meat choice, while 20% opt for goat meat, and 14.1% consume other types of meat. This suggests a strong preference for chicken, followed by goat meat, among the surveyed population.

3.10 Supplementation Intake of Women's

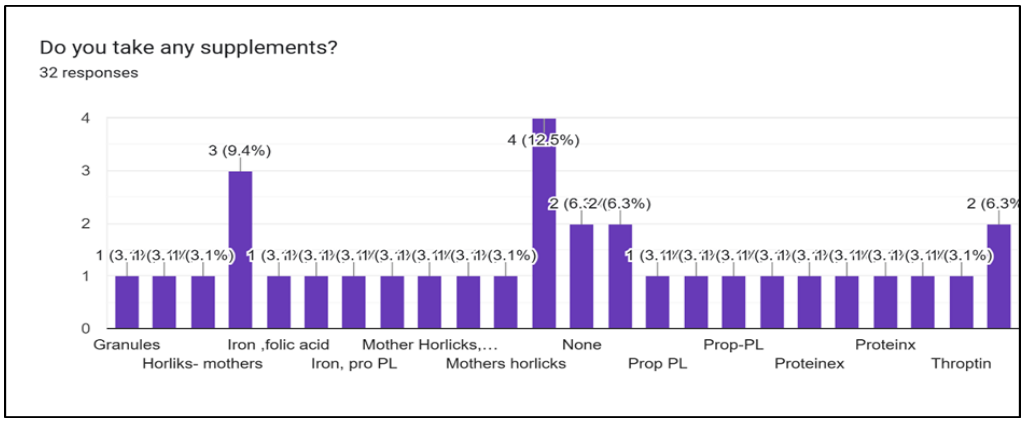

Figure-11 Distribution of Supplement Usage among Respondents.

A significant majority of respondents (87.5%) reported using at least one type of supplement, with "Mother Horlicks" being the most commonly used, followed by other supplements like iron, folic acid, protein powders, and multivitamins. This high prevalence suggests that many individuals perceive dietary deficiencies or specific health concerns, leading to a diverse range of supplement usage.

3.11 Analysis of Seed Consumption Preferences

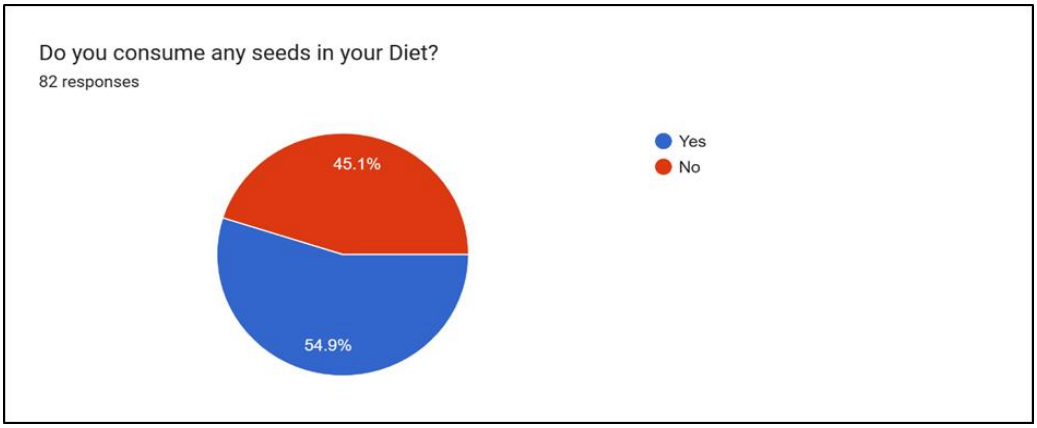

Figure-12 Distribution of Preferred Seed Types among Seed Consumers.

In the preferred seeds intake, almonds emerged as the most popular seed choice, with 20 respondents (42.6%) indicating their consumption. This suggests a strong preference for almonds among the surveyed population. Respondents displayed diverse seed consumption habits, with almonds, dry fruits, walnuts, and sprouts being commonly consumed. While almonds were the most popular, other seeds were consumed less frequently, indicating a preference for almonds over other options.

3.12 Analysis of Green Leafy Vegetable Consumption

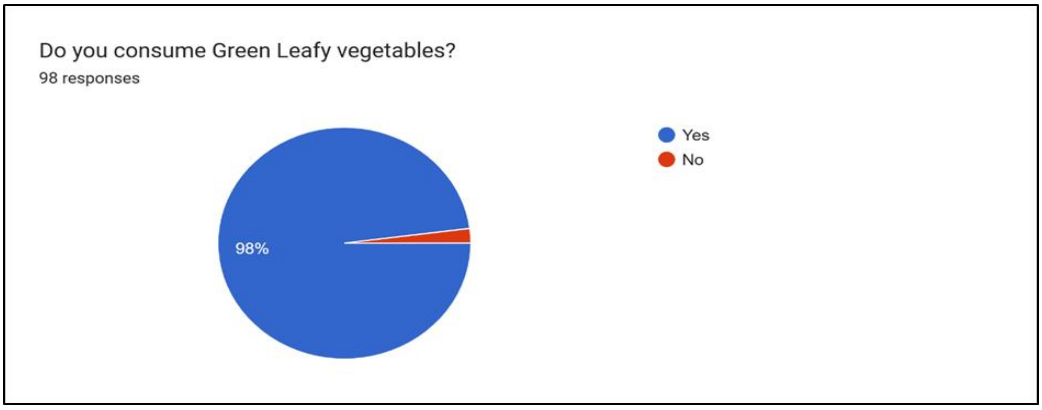

Figure-13 Prevalence of Green Leafy Vegetable Consumption among Respondents.

The overwhelming majority (98%) of respondents consume green leafy vegetables, indicating a strong preference and awareness of their nutritional benefits. Only 2% of respondents do not consume them, reflecting positive dietary habits and the incorporation of these nutrient-rich foods into daily diets.

3.13 Analysis of Milk and Milk Product Consumption

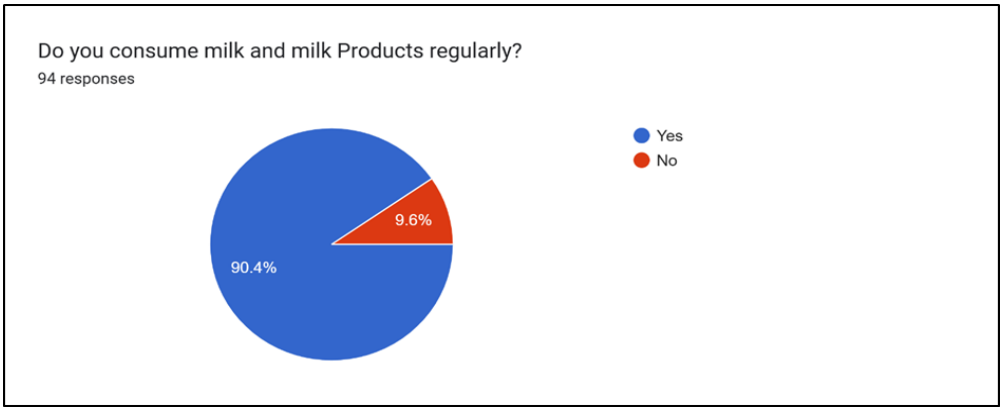

Figure-14 Prevalence of Dairy Product Intake of Pregnant Women.

A strong majority (90.4%) of respondents consume milk and milk products regularly, indicating a significant preference for these items in their diet. Only 9.6% do not consume milk and milk products, showing high awareness of their nutritional benefits, including calcium, protein and vitamin D, contributing to overall health and well-being.

3.14 Analysis of Sleep Patterns

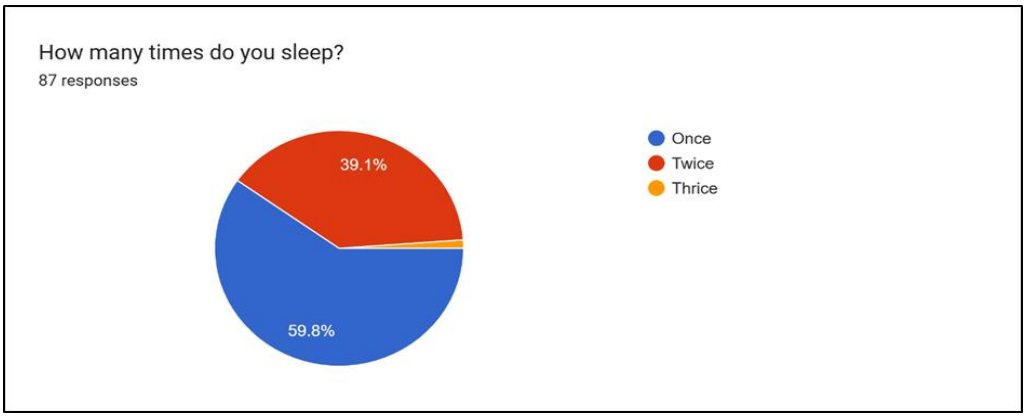

Figure-15 Sleep Patterns Among all Pregnant Women.

A significant majority of respondents (59.8%) prefer a single-phase sleep pattern, sleeping once per night. However, a notable portion (39.1%) follows a biphasic sleep pattern, sleeping twice nightly, while only a small percentage (1.1%) engage in multiple-phase sleep, sleeping thrice a night. This suggests that single-phase sleep is dominant, with biphasic patterns being relatively common but multiple-phase sleep being infrequent

3.15 Analysis of Fast-Food Consumption Habits

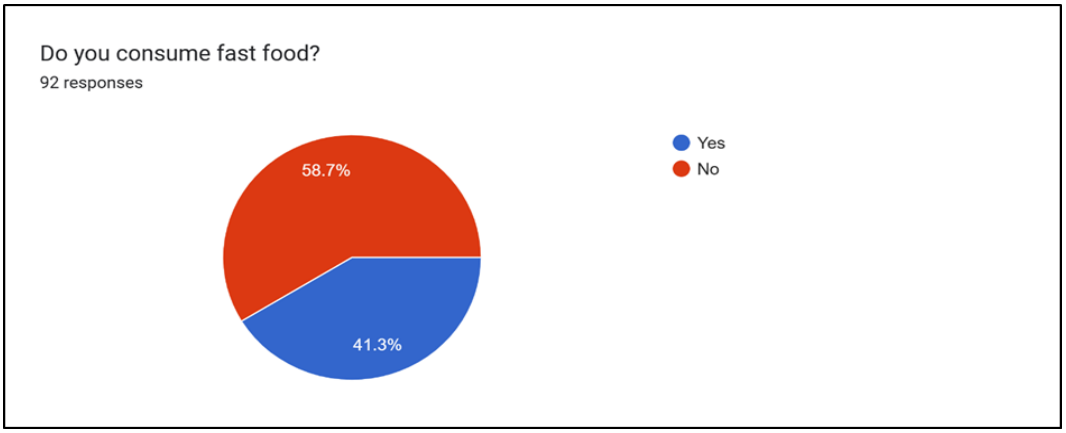

Figure-16 Fast Food Consumption Habits in Pregnant Women.

This survey indicates a high prevalence of fast-food consumption, with 58.7% of respondents reporting regular consumption, suggesting fast food's significant role in the dietary habits of the population. However, 41.3% of respondents avoid fast food, indicating a substantial portion that opts for healthier alternatives. Fast food consumption, often linked to high intakes of calories, saturated fats, and added sugars, has been associated with health issues like obesity, heart disease, and diabetes, highlighting the need for public health interventions to address these concerns.

3.16 Analysis of Awareness about Breastfeeding and Disease Protection

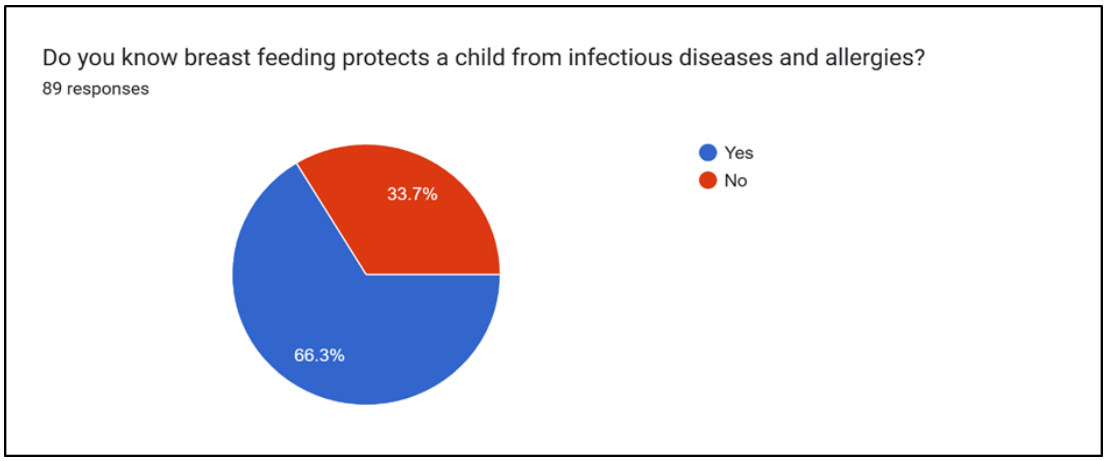

Figure-17 Knowledge of Breastfeeding's Role in Disease Prevention.

This data shows that 66.3% of respondents are aware of the protective benefits of breastfeeding against infections and allergies, while 33.7% are not aware. This gap indicates a need for further educational efforts to raise awareness. Given the numerous health benefits of breastfeeding, promoting this knowledge is essential for improving infant health outcomes.

4. Observations

4.1 Impact of maternal Age, BMI, and Health Complications on Newly Delivered Women While Breast Feed

Here we observed women in the 21–30 age group had better pregnancy outcomes compared to adolescents and older mothers, who were at higher risk of complications (preterm birth, Anaemia, Blood pressure and gestational diabetes). A normal BMI was associated with fewer complications, whereas overweight and obese women faced increased risks of hypertension and caesarean deliveries. Maintaining optimal maternal weight appeared crucial for reducing risks of low birth weight and preterm births. Gestational diabetes and hypertension emerged as the most significant complications, emphasizing the need for early detection and management before pregnancy in all women.
Similarly, breastfeeding practices indicated a high rate of colostrum feeding, yet the lack of awareness among some mothers underscores the need for targeted educational interventions. Prolonged breastfeeding intentions were promising for infant health, but promoting exclusive breastfeeding for the first six months remains essential for facing several disease and proper growth in the infants.

4.2 Correlation of Maternal Health Through Balanced Nutrition, Quality Sleep While Breastfeeding

The widespread use of supplements (Green leaves, meat, highly nutritional seeds, almonds and salads) suggested good awareness of the importance of micronutrients, yet continuous education on balanced nutrition is necessary. Sleep patterns were generally adequate, though ensuring quality sleep (more than 6 hours) during pregnancy could further improve maternal health outcomes. Lastly, while most women were aware of breastfeeding's protective role against infections, increasing this awareness among the remaining population could significantly enhance infant immunity and overall health outcomes. Contrastingly some habits like, intake of fast-food alcohol consumption and smoking will give negative impacts on mother and baby.

5. Results

The majority of pregnant women in the study were aged between 21–30 years (67.6%), considered the optimal reproductive age, while only 1% were adolescents, and 21.6% were of advanced maternal age (≥31 years). Whereas, most participants fell within the normal range of BMI (18.5–24.9), but a notable proportion were overweight or obese, increasing the risk of hypertension and gestational diabetes. Likewise, Body weight analysis revealed that 60% of the women weighed between 55–69 kg, with lower weights linked to a higher risk of delivering low birth weight babies. Medical complications were reported by 55.9% of the participants, with gestational diabetes (25.5%) and hypertension (13.7%) being the most prevalent conditions, while 8.8% experienced severe anaemia.
Breastfeeding practices were generally positive, with 88.2% of mothers initiating colostrum feeding. However, 37.9% lacked awareness of its benefits. Most mothers intended to breastfeed for a prolonged period, reflecting a general understanding of its importance for infant health. Dietary habits showed that 86.9% consumed non-vegetarian foods, with

chicken being the most popular, while green leafy vegetables were included in 98% of their diets after and before delivery. Supplement use was common, with 87.5% taking iron, multivitamins, or healthy juices. Importantly, sleep patterns were predominantly single-phase (59.8%), while 39.1% followed a biphasic pattern. Fast food consumption was reported by 58.7%, indicating a potential dietary risk. Awareness of breastfeeding's role in disease prevention was observed in 66.3% of participants, though a significant portion remained uninformed.

6. Discussion

The findings of this study on maternal health, nutrition and breastfeeding practices align with and contribute to existing literature on these subjects. A significant proportion of the pregnant women in the study were within the optimal reproductive age (21–30 years), which is associated with better pregnancy outcomes and lower rates of complications (Nguyen et al., 2021). In contrast, women of advanced maternal age (≥31 years) or adolescents, although less common, present increased risks for complications like preeclampsia, gestational diabetes and low birth weight (Laopaiboon et al., 2014). This investigation also found that the majority of the people had a normal BMI (Body mass index) but a considerable proportion was overweight or obese. Overweight and obesity during pregnancy time are well calculated and along with risk factors for hypertensive disorders, diabetes and other complications that can negatively affect both maternal and foetal health conditions (Heude et al., 2012). These findings highlight the need for targeted interventions to address maternal nutrition and weight management, especially for women had overweight and obese conditions.

The association between body weight and birth will outcomes is also stable with previous reports that reports higher rates of low birth weight in women with lower body weights (Khashan et al., 2009). Contrastingly, excessive weight gain during pregnancy can result in higher birth weight and obesity complications such as macrosomia and caesarean delivery (Aune et al., 2014). Gestational diabetes and hypertension both were common in the study populations with rates comparable to those reported in other studies conducted in urban regions in India (Swaminathan et al., 2020). These conditions, when poorly managed and that lead to long term health problems for both side of mother and new born infant. The need for effective ness screening, early diagnosis and management of these conditions is imperative for improving maternal and neonatal health outcomes in these populations. Regarding breastfeeding practices, the study found high initiation rates for colostrum feeding ratio (88.2%), but a lack of awareness of its benefits were in the 37.9% of mothers. This is in lie with other studies that already showed that gaps in maternal education regarding could be helpful for create awareness of breastfeeding, despite its well-established role in immune protection and infant development (Horta *et al.*, 2015). Similarly, increasing maternal awareness of colostrum feeding and its health benefits could further improve breastfeeding outcome. This will be proven by again by observing dietary patterns are predominantly non-veg intake persons with high consumption of meat (chicken or mutton) along with green leafy vegetables align with other studies that emphasize the role of maternal nutrition in forming infant health conditions (P. V. et al., 2019) Furthermore, the high proportion of women taking supplements (87.5%) is promising as micronutrient deficiencies, especially, iron and folic acid are both common such as anaemia and low birth weight (Zimmermann & Hurrell, 2007). Dietary risks such as fast-food consumption was also identified in this study (58.7%), which may contribute to excessive weight gain and also increase the risk of metabolic conditions, including gestational diabetes in newly delivered women (Cui et al., 2023).

This highlights the need for public health interventions focused on reducing the consumption of processed foods and encouraging a balanced diet, particularly in urban areas where access to unhealthy food conditions is prevalent. This study reinforces the importance of maternal age, BMI, weight and nutrition to ensure healthy pregnancies before and after delivery until breastfeeding practices. It also underscores the need for the development of awareness and education among mothers about the benefits of breastfeeding to proper nutrition and the risks of poor dietary habits.

7. Conclusion

This study highlights several aspects of maternal health (pre and post-delivery), personal nutrition and breastfeeding practices. The majority of participants of women were in the optimal reproductive age (22-30 age), with fewer complications compared to those of advanced maternal age or adolescent pregnancies (>30). However, a significant proportion were overweight or obese, presenting risks for conditions like diabetes and hypertension those were prevalent in the study population. The study also linked total body weight to birth outcomes, emphasizing the importance of weight organization for healthy pregnancies. Breastfeeding initiation was high, but awareness about the benefits of colostrum feeding was not properly unknown, indicating the need for enhanced education. Several dietary habits showed a strong reliance on non-veg and veg dietμ, with many women using supplements to address nutritional deficiencies. However, fast food consumption was a concern, suggesting the need for public health initiatives to promote healthier eating habits. Overall, the study emphasizes the need for targeted interventions focused on weight management, nutrition and maternal education to improve pregnancy outcomes and infant health.

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Conflict of Interest

The authors disclosed that no potential conflicts of interest that could be relevant to the research or its publication in International Journal of Innovative Research & Growth.

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APPENDIX

Survey Questionnaire: Mother's Dietary choices during 0-6 Months of Breast Feeding

Name: Age:
Height: BMI:
Weight: IBW:
Medical Diagnosis:

1. During pregnancy did you have any complications?

a. Gestational diabetes b. High blood pressure c. severe anemia

d._____

2. Do you know what is colostrum milk?

a. yes b. No

3. Was the baby fed the Colostrum milk?

a. Yes b. No

4. How many times in 24hour have you breast feed your baby?

A. Less than 6times b. 8-10times c. More than 12 times

5. How many months do you wish to breast feed your baby?

a. 2-3months b.6-9 months c.7-12 months

6. Do you consume non-veg?

a. Yes b. No

7. If yes how many times per week?

a. once b. Twice c. Thrice

8. What is the meat you consume more?

a. Chicken b. Goat c. Others

9. Do you take any supplements?

a._____

10. Do you consume any seeds in your Diet?

a. Yes b. No

11. If yes seeds Name?

a._____

12. Do you consume Green Leafy vegetables?

a. Yes b. No

13. How often you consume Vegetable salad?

a. Regular b. Twice in a week c. Once on a week d. Rarely

14. Do you have awareness about Balanced Diet?

a. Yes b. NO

15. Do you consume milk and milk Products regularly?

a. Yes b. No

16. If yes how many servings of milk and milk products In a day?

a. One serving b. Two serving's c. More than two

17. How many times do you sleep?

a. Once b. Twice c. Thrice

18. Do you consume fast food?

a. Yes b. No

19. If yes how many times in a week?

a. Once b. Twice c. Thrice d. More than three

20. Do you Consume Alcohol?

a. Yes B.NO

21. Do you Smoke?

a. Yes b. No

22. Do you take any lactogogus foods?

a. Yes b. NO

23. If yes mention the food_____

24. Are you restricting any foods in lactation?

_____

25. At what time you sleep?

a.10pm b.11pm c. After 12pm

26. Do you know breastfeeding accelerates children's brain development?

a. Yes b. No

27. Are you feeding baby during illness and medication time?

a. Yes b. No

28. Do you know breast feeding protects a child from infectious diseases and allergies?

a. Yes b. No

29. Do you know breastfeeding is enough to the baby till 6months of age?

a. Yes b. No

30. Are you monitoring baby height and weight regularly?

a. Yes b. No

32. Are you able to see how breast milk baby is drinking?

a. Less b. sufficient c. high volume

Baby (boy/girl) Height and weight chart

Age (Months)	Weight in Kg (Boy)	Height in Cms (Boy)	Weight in Kg (Girl)	Height in Cms (Girl)
0	2.5-4.3	46.3-53.4	2.4-4.2	45.7-52.7
1	3.4-5.7	51.1-58.4	3.2-5.4	50.0-57.4
2	4.4-7.0	54.7-62.2	4.0-6.5	53.2-60.9
3	5.1-7.9	57.6-65.3	4.6-7.4	55.8-63.8
4	5.6-8.6	60.0-67.8	5.1-8.1	58.0-66.2
5	6.1-9.2	61.9-69.9	5.5-8.7	59.9-68.2
6	6.4-9.7	63.6-71.6	5.8-9.2	61.5-70.0

Baby Gender:
Age:
Height:
Weight: