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A CROSS-SECTIONAL STUDY ON THE INTENT AND PEDAGOGY OF DIETARY PRACTISES DURING THE SECOND AND THIRD TRIMESTERS OF PREGNANCY

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Introduction

The dietary practices during the second and third trimesters of pregnancy play a crucial role in ensuring the health and well-being of both the mother and the baby. In the Indian scenario, maternal undernutrition during pregnancy remains a critical public health issue[1]. Diets among pregnant women in India are often characterized by low energy, macronutrient imbalance, and inadequate micronutrient intake[4]. This highlights the need for a cross-sectional study to explore the intent and pedagogy of dietary practices during this crucial period.

Understanding the intent behind dietary practices during the second and third trimesters of pregnancy is essential to develop effective interventions and improve maternal and child health outcomes. Previous studies have shown that despite widespread awareness about the importance of nutrient-rich foods during pregnancy, diet in some populations, such as rural areas of Ethiopia and the Democratic Republic of Congo, may not meet the necessary nutritional requirements[2,3]. This emphasizes the need to investigate the dietary practices in the Indian context to identify gaps, barriers, and opportunities for improvement.

The intent of dietary practices refers to the motivations, beliefs, and knowledge that influence pregnant women's food choices and eating behaviors. Exploring the intent can provide insights into the factors that drive dietary decisions during pregnancy. Pedagogy, on the other hand, refers to the methods, approaches, and sources of information that pregnant women rely on to learn about and adopt dietary practices. Understanding the pedagogy can help identify effective strategies for disseminating accurate and evidence-based nutrition information to pregnant women.

A nutritious and healthy diet during pregnancy is crucial for the health of both the mother and the baby. Inadequate dietary intake during pregnancy can lead to maternal malnutrition and have long-term effects on the child's health[5]. It is important for pregnant women to understand the potential adverse health impacts that may result from a poor diet, including stillbirths, premature birth, and low birth weight.[8]

Physiological changes occur during pregnancy, and maternal diet plays a significant role in supporting these changes and ensuring optimal health outcomes for both the mother and the fetus[6]. The increased energy and nutrient requirements during pregnancy necessitate a focus on healthy eating habits[9]. A

good diet during pregnancy supports optimal maternal weight gain, protects against maternal anaemia, reduces the risk of preterm delivery, and improves birth weight[5].

However, studies have shown that maternal malnutrition is common in low-income countries, such as the Democratic Republic of Congo (DRC) and rural areas of Ethiopia[5,7]. These studies highlight the need to explore the dietary knowledge, beliefs, and practices of pregnant women in these regions to develop effective interventions and improve maternal and child health outcomes[6,8].

Research on dietary practices during pregnancy has evaluated the effects of diet on pregnancy and investigated the awareness of proper nutrition[7]. For example, one study found that consumption of fruits and vegetables increased during pregnancy, while intake of tea and red meat decreased[8]. Additionally, some pregnant women reported excluding fish, red meat, and white meat from their diet[8]. These findings provide insights into the dietary habits of pregnant women and can inform interventions to promote healthier eating practices during pregnancy.

Importance of dietary practices during pregnancy

Maintaining proper nutrition during pregnancy is of utmost importance for the health and well-being of both the mother and the baby. Comprehensive improvements in the nutritional and health status of women before and during pregnancy contribute to optimal fetal growth, better outcomes in childbirth, improved perinatal survival, and the potential for better long-term health for both the mother and child[9,13].

Healthy dietary patterns before and during pregnancy are associated with a reduced risk of various disorders, including gestational diabetes, preterm birth, obesity-related complications, preeclampsia, and high blood pressure[13]. Adequate nutrition therapy is particularly important for pregnant women with obesity, those who have undergone bariatric surgery, or those with preexisting diabetes[9].

Maternal nutrition plays a critical role in preventing pregnancy complications such as anemia and low birth weight[11]. An unacceptably high rate of pregnancy complications can be prevented through improved maternal nutrition[11]. Nutritional deficiencies, such as iron deficiency anemia, can have adverse effects on both the mother and the baby[12].

Furthermore, maternal nutrition during pregnancy can have lifelong consequences for the child. Adequate nutrition supports optimal fetal growth and development, reducing the risk of chronic diseases later in life, such as obesity, diabetes, and cardiovascular diseases[10,14]. Maternal nutrition also affects the long-term health and development of the child, highlighting the importance of a well-nourished mother[10].

In summary, maintaining proper nutrition during pregnancy is essential for optimal maternal and fetal health outcomes. It contributes to optimal fetal growth, reduces the risk of pregnancy complications, and has long-term consequences for the health of both the mother and the child.

Adequate nutrition before and during pregnancy is crucial for promoting a healthy pregnancy and ensuring the well-being of both the mother and the baby.

Importance of dietary practices during second and third trimester:

Maintaining a healthy and balanced diet during the second and third trimesters of pregnancy is essential for the health and well-being of both the mother and the baby. During this time, the body requires slightly more calories, and it is essential to consume enough vitamins, minerals, proteins, fats, and carbohydrates to encourage healthy growth[14,15]. A balanced, nutritious diet during pregnancy is vital for a healthy mother and baby, and it ensures the fetus gets the nutrients it needs to develop correctly[19]. Consuming a healthy dietary pattern before and during pregnancy is associated with a reduced risk of various disorders, including gestational diabetes, preterm birth, obesity-related complications, preeclampsia, and high blood pressure[14,17,18]. Pregnant women should ensure they are getting enough iron, which helps to carry oxygen around the body and supplies oxygen to the

developing baby[17]. Omega-3 fats in the diet support the heart, brain, eyes, immune system, and central nervous system of both mother and baby[17]. Inappropriate dietary intake during pregnancy is a key factor in low birth weight, and a traditional diet characterized by a high intake of lean fish, fish products, boiled potatoes, and cooked vegetables was associated with lower birth weight[16]. Despite widespread awareness about the importance of nutrient-rich foods during pregnancy, diet in some populations, such as rural areas of Ethiopia, may not meet the necessary nutritional requirements[19]. Therefore, it is crucial to prioritize dietary practices during the second and third trimesters to ensure optimal maternal and fetal health outcomes.

Standard diet plan for Indian second and third trimester pregnant women:

1. Cereals: Include a variety of cereals like wheat, jowar, bajra, ragi, and rice in your diet. Avoid refined flour (maida) as it is devoid of many nutrients[23].
2. Pulses: Include a variety of pulses like moong dal, chana dal, and others in your diet. They are rich in protein, fiber, iron, and other nutrients[23].
3. Dairy products: Include milk, curd, paneer, and other dairy products in your diet. They are rich in calcium, which is essential for the development of the baby's bones and teeth[20,22].
4. Vegetables: Include a variety of vegetables in your diet, especially green leafy vegetables like spinach, fenugreek leaves, and others. They are rich in vitamins, minerals, and fiber[21].
5. Fruits: Include a variety of fruits in your diet, especially those that are rich in vitamin C like oranges, guava, and others. They help in the absorption of iron from other foods[20].
6. Meat and fish: Include meat and fish in your diet, especially those that are rich in omega-3 fatty acids like salmon, sardines, and others. They are essential for the development of the baby's brain and eyes[20].
7. Nuts: Include nuts like almonds, walnuts, and others in your diet. They are rich in protein, fiber, and healthy fats[20].

Methodology:

A modified pretested questionnaire was developed, and it was tried on some second and third trimester pregnant women to check feasibility and reliability. Necessary revisions were made based on the feedbacks to make the questions clearer and more understandable. The questionnaire was examined for a second time and the changes were made accordingly. The purpose of the questionnaire was to collect the findings such as knowledge and awareness about the diet and its plan for the healthier pregnancy.

The nature and purpose of the study was explained. Pregnant women were interviewed with a well-developed questionnaire. Patients were provided with the information about the study, its objectives, and the assurance of confidentiality. Those who had met the inclusion criteria were interviewed and it were collected data.

Totally 419 participants were assessed in a tertiary care hospital in Erode, Tamilnadu for a period of six months from September 2022 to March 2023. Among them from 380 patients was included in this study with the inclusion criteria of pregnant women who are all falling under second and third trimester in all age groups and from those who are visiting hospitals for the regular checkups. In our study participants who are all having maternal complications in second and third trimester such as hemorrhage, infections, hypertensive and newly confirmed as pregnant or participants falling under first trimester was excluded.

Collection of data:

Data were obtained directly from the study participants from the prepared questionnaire with or without assistance as due to some literate proficiency. In which the questionnaire consists of two parts. Part 1: consist of socio - demographics and in Part 2: knowledge and awareness about diet

during pregnancy.

Results:

Socio Demographic Factors				
SL. No	**Parameters**		**No. Of Participants**	
1	Age	15 - 24	162	42.63
		25 - 34	195	51.32
		35 - 44	23	6.05
		> 45	0	0.00
2	Marital Status	Married	361	95.00
		Divorced	12	3.16
		Widowed	7	1.84
3	Educational Status	Illiterate	38	10.00
		Primary	68	17.89
		Secondary	111	29.21
		Diploma	163	42.89
4	Occupational Status	Employed	99	26.05
		Housewife	199	52.37
		Daily Labour	54	14.21
		Business	28	7.37
5	Husband's Income	Employed	144	37.89
		Business	146	38.42
		Farmer	68	17.89
		Other	22	5.79
6	Estimated Monthly Income	< 10.000	57	15.00
		10,000 -	154	40.53
		> 20,000	169	44.47
7	Residence	Urban	202	53.16
		Rural	178	46.84
8	Pregnancy Count	1	194	51.05
		2	163	42.89
		3	23	6.05

Table 1: Socio demographic factors

A total of 162 (42.63%) study participants fell within the age of 15 to 24 years. Additionally, 195 (51.32%) individuals were categorized in the 25 to 34 age group, while 23 (6.05%) participants were in the 35to 44 age range. Most of the respondent's marital status as married 361 (95%), with a lesser number were divorced 12 (3.16%) and widowed 7 (1.84%). In terms of educational status, a higher proportion is diploma level of education 163 (42.89%), followed sequentially by secondary 111 (29.21%), primary 68 (17.89%), and illiterate education statuses 38(10%). Regarding occupational distribution, the prevailing occupation among the study participants was h o m e m a k i n g .
199 (52.37%), succeeded by employment 99 (26.05%), daily labor 54 (14.21%), and business activities 28 (7.37%). A similar pattern emerged for income distribution from these occupations, with business-related income were higher 146 (3842%) that of employed individuals 144 (37.89%) and farmers 68 (17.89%). Furthermore, the study population displayed a higher representation from urban areas 202 (53.16%) when compared to rural 178 (46.84%). In the point of reproductive history, first pregnancies were higher 194 (51.05%) than second 163 (42.89%) and third pregnancies 23 (6.05%). Table 1

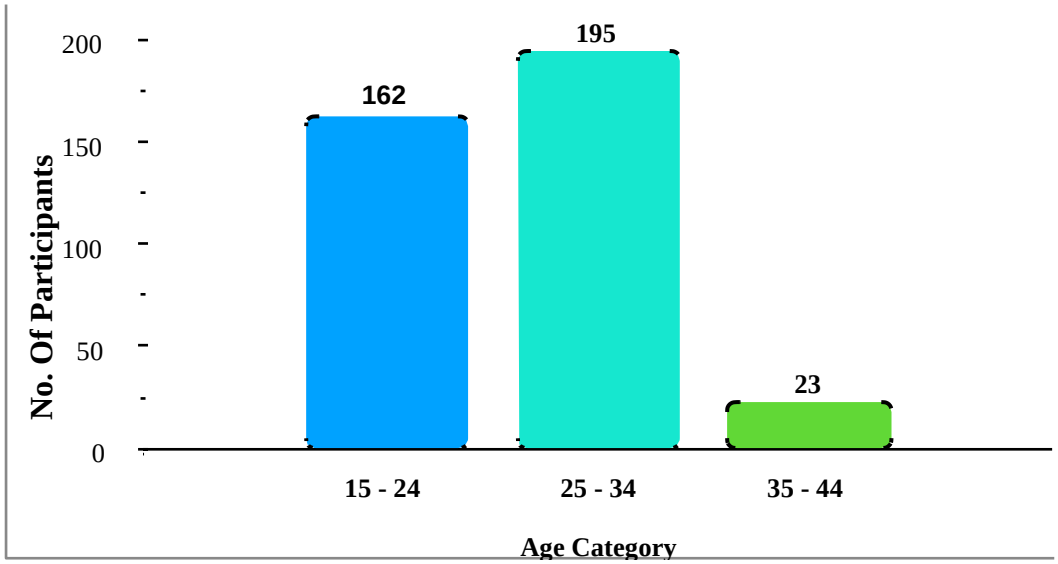

Fig 1: Age Category wise distribution

Practice characteristics of study participants of pregnant women on maternal nutrition

General Health SL.No	Question	Yes	%	No	%
1	Have you been taking prenatal vitamins as recommended by your healthcare provider?	330	86.8	50	13.2
2	Have you experienced any unusual symptoms during your pregnancy?	260	68.2	120	31.8
3	Have you been getting regular exercise as recommended by your healthcare provider?	197	51.8	183	48.2
4	Have you been avoiding alcohol and tobacco during your pregnancy?	380	100	0	0
5	Have you been getting enough sleep during your pregnancy?	228	60.0	152	40.0

Table 2: General Health about the Second and Third Trimester

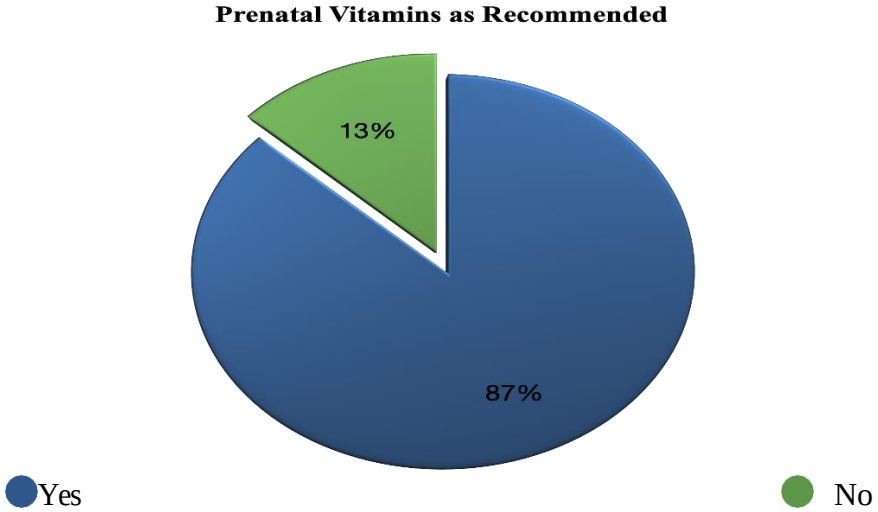

Fig 2: Prenatal Vitamins Taken as Recommended by the Healthcare Provider

From the Fig 2 most of the study participants 330 (86.8%) were taking prenatal vitamins and 260 (68.2%) participants experienced unusual symptoms during pregnancy. In Table 2 197 (51.8%) participants were done regular exercises, 380 (100%) participants avoided alcohol and tobacco as due to holistic tradition in the southern India culture and Furthermore 228 (60%) of participants

experienced good sleep in their second and third trimester of pregnancy.

Diet					
SL.No	Question	Yes	%	No	%
1	Have you been eating a variety of fruits and vegetables?	245	64.5	135	35.5
2	Have you been eating enough whole grains?	217	57.2	163	42.8
3	Have you been consuming enough dairy products?	250	65.8	130	34.2
4	Have you been avoiding processed foods?	70	18.4	310	81.7
5	Have you been avoiding foods that are high in sugar and fat?	127	33.4	253	66.6

Table 3: Knowledge about the dietary practices among the participants

Table 3 shows 250 (65.8%) of participants have added dairy products into their dietary intake. Additionally, a significant proportion of 64.5% have included fruits and vegetables in their nutritional regimen. Furthermore, 217 (57.2%) of participants have opted to include whole grains in their dietary choices. Surprisingly, a substantial percentage of 33.4% (127) have actively chosen to avoid foods high in sugar and fat. Moreover, 70 (18.4%) of participants have excluded processed food.

Food Preferences					
SL.No	Question	Yes	%	No	%
1	Are there any foods or beverages that you cannot or will not eat?	173	45.6	207	54.4
2	Have you been experiencing any food cravings during your pregnancy?	278	73.2	102	26.8
Food Preferences					
SL.No	Question	Yes	%	No	%
3	Have you been experiencing any food aversions during your pregnancy?	110	28.7	270	71.3
4	Have you been avoiding any foods due to religious or cultural reasons?	244	64.2	136	35.8
5	Have you been avoiding any foods due to allergies or intolerances?	139	36.7	241	63.3

Table 4: Knowledge about the food preferences among the participants

Table 4 reveals a significant percentage of 207 (54.4%) refrained from consuming beverages. Furthermore, a substantial 278 (73.2%) of participants reported experiencing food cravings, while an equally 270 (71.3%) noted instances of food aversion. Additionally, 244 (64.2%) of participants choose to abstain from certain foods due to cultural considerations. And 241 (63.3%) of participants did not report any instances of allergies or intolerances.

Nutritional Knowledge					
SL.No	Question	Yes	%	No	%
1	Do you know which foods are good sourcesof protein?	203	53.4	177	46.4
2	Do you know which foods are good sources of iron?	282	74.2	98	25.8
3	Do you know which foods are good sources of calcium?	313	82.3	67	17.7
4	Do you know which foods are good sources of folic acid?	140	36.8	240	63.2
5	Do you know how many servings of fruits and vegetables you should be eating each day?	121	31.8	259	68.2
6	Do you know how many extra calories you need to consume during pregnancy?	33	8.6	347	91.4
Nutritional Knowledge					
SL. No	Question	Yes	%	No	%
7	Do you know which foods are good sources of omega-3 fatty acids?	132	34.7	248	65.3
8	Do you know which foods are good sources of vitamin D?	54	14.3	326	85.7
9	Do you know which foods are good sources of fiber?	213	56.1	167	43.9
10	Do you know which foods are good sources of vitamin C?	297	78.2	83	21.8

Table 5: Assessment of knowledge about the nutrition

Table 5 shows 203 (53.4%) participants actively incorporated protein-rich sources, while 282 (74.2%) prioritized iron-rich foods, and 313 (82.3%) included calcium-rich options. However, 240 (63.2%) omitted folic acid sources. A significant 259 (68.2%) lacked awareness of recommended fruit and vegetable consumption, while 347 (91.4%) were uninformed about extra pregnancy calories. Moreover, 248 (65.3%) disregarded omega-3 fatty acids, and 326 (85.7%) neglected vitamin D sources. On other side 297 (78.2%) took vitamin C-rich foods and 213(56.1%) added fiber-rich in their diet.

Discussion

The study found that 51.8% of the participants engaged in the recommended level of exercise which is contrary to a study conducted by Borodulin et al.[25], which found that majority of women did not reach the recommended level of activity.

The study revealed that all participants refrained from alcohol and tobacco consumption throughout their pregnancy that contradicts with the study conducted by Hamułka et al.[26], which found that 22% of the participants solely smoked cigarettes, 13% solely drank alcohol while 7% smoked cigarettes and drank alcohol.

The study found that significant proportion of respondents were able to obtain sufficient sleep during their pregnancy whereas a study by Bublitz et al.[27], found that the prevalence of poor sleep quality in American women was 48% and 40% in the second and third trimesters, respectively.

The study found that pregnant women have inadequate dietary practices, particularly in terms of fruit and vegetable intake and whole grain consumption[24] which aligns with a study conducted by Nana et al.[28], which revealed that only 39.3% of the study participants had good dietary practice indicating that the overall dietary practice of the pregnant women in Bahir Dar town is suboptimal.

The study also revealed that 38.42% of the participants were engaged in business activities, 37.9% were employed, and 17.9% were farmers, whereas in a study conducted by Khojasteh et al.[29], revealed that In terms of employment, majority of them were housewives whereas those who were employed were teachers, worked in hospitals, and were office workers.

Conclusion:

This study provides a comprehensive evaluation of the dietary practices of pregnant women during the second and third trimesters. The findings highlight the need for interventions to improve dietary practices among pregnant women, particularly in terms of fruit and vegetable intake and whole grain consumption. The study also emphasizes the role of cultural and religious beliefs in shaping dietary practices during pregnancy.

The study's results have important implications for public health policies and programs aimed at improving maternal and child health outcomes. The findings suggest that interventions should be developed to promote healthy dietary practices among pregnant women, with a focus on culturally appropriate strategies. Future research should also explore the nutritional quality of the participants' diets, which is an important factor in evaluating dietary practices during pregnancy.

Overall, this study underscores the importance of promoting healthy dietary practices during pregnancy to ensure optimal maternal and child health outcomes. The findings provide valuable insights into the dietary practices of pregnant women in this region and can be used to inform public health policies and programs aimed at improving maternal and child health outcomes.

Limitations:

1. The study relied on self-reported data, which may be subject to recall bias.
2. The study was conducted in a specific region of the country, and the findings may not be generalizable to other regions.
3. The study did not assess the impact of dietary practices on maternal and child health outcomes, which is an important area for future research.

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