

Evaluation of Dietary Choices, Preferences, Knowledge and Related Practices Among Pregnant Women Living in An Indian Setting

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ABSTRACT

Introduction: Healthy and nutritious diet is very essential component of Antenatal care along with clinical advice. The objective of this study was to understand the dietary choices, preferences, knowledge and related practices among pregnant women living in an Indian setting.

Materials and Methods: Hundred pregnant women were enrolled in this cross-sectional study. Information about Socio-demographic profile, food item price and approach during inflation, nutrition related knowledge, attitude and practices and 24 hour dietary recall was acquired.

Results: Majority of the participants (87%) reported regular antenatal care visits and intake of iron and folic acid tablets. Eighty two percent of the participants were acquainted with standardized marks on food items and 64% of them reported checking of these marks before purchasing. Thirty two percent of the participants did not know about balanced diet. Fifty eight percent of the participants felled in fair category of dietary recall final scores.

Conclusion: There is still vast room for improvement of the nutritional status of pregnant women as none of the participants were able to achieve excellent status on 24 hour food record scoring sheet.

Keywords: Pregnancy, Food prices, Food record

INTRODUCTION

Pregnancy is a crucial period of every woman's life. At this stage nutritional status of woman is very essential as it affects the pregnancy outcome. Inadequate nutrition during pregnancy may have unfavorable effects on fetus [1]. It is also seen that the diet during pregnancy is related to the disease pattern of the resulting child in adult life [2]. Inadequate nutrition may lead to problems like premature delivery, low birth weight babies, anemia, cardiovascular diseases, hypertension, diabetes, obesity to mother and child [1,3].

During pregnancy, energy requirement of women increases by 330 Kcal per day and protein by 15 gram per day (NIN, ICMR 2011). Nutrient deficiency can be due to inadequate intake of protein, energy, Vitamin C, iron, etc but by other conditions like environmental factors, socio-economic factors, malaria, and worm infestation [4]. Social, economic and cultural factors are associated with maternal poor nutrition intake which can result into still birth, premature birth, and low birth weight babies [3,4]. Previous study has shown prominent ethnic differences during postpartum period [5]. Intake of adequate amount of vitamins and minerals in adolescent and preconception phase reduce risk of neural tube defects among neonates [6].

Government of India has initiated several programs to improve nutritional status of pregnant and lactating mothers which included ICDS (Integrated Child Development Scheme), RCH (Reproductive Child Health), NNAPP (National Nutritional Anemia Prophylaxis Program), CSSM (Child Survival and Safe Motherhood Program) [4]. Despite massive and multidimensional efforts only 21% women are able to receive the benefits of ICDS scheme during pregnancy [7].

Thirty three percent of reproductive age group women of India are underweight and 15% are obese or overweight. More than half of married women (56%) and pregnant women (58%) are anemic (National Family Health Survey, NFHS-3). Promotion of kitchen gardening of green leafy vegetables may contribute in reducing the burden of anemia in pregnancy [8].

Pregnant women must be well nourished to meet the demands of her offspring, her own body needs, and to prepare her body for lactation [9]. The harmful effects of nutrient deficiencies, especially from the conception period, are well established and documented. Therefore, early detection of nutritional deficiency among pregnant women is very essential in order to improve the pregnancy outcome and reduction of maternal mortality. Further it is essential to identify under privileged pregnant woman with poor nutritional status in order to give nutrition education for improving their dietary quality [1]. Therefore, the aim of this study was to understand the dietary choices, preferences, knowledge and related practices among pregnant women living in an Indian setting.

MATERIALS AND METHODS

This cross-sectional study was conducted at Saveetha Medical College and Hospital, Chennai, India, from August to November 2013 for a period of four months. Pregnant women visiting to gynaecology and obstetrics department was considered as sample frame. Hundred pregnant women were enrolled in this study on the basis of convenient sampling. The inclusion criteria comprised of pregnant women who were ready to participate in study by providing informed consent. All participants were informed about the study purpose before their enrollment in the study. Pregnant women having mental or physical challenges making difficulty in their participation in the study, or enrolled in other clinical studies were excluded from the study. Investigator had contacted pregnant woman fulfilling the inclusion criteria and interviewed each of the participants separately to maintain the confidentiality. The study conforms to the Declaration of Helsinki and the study protocol was approved by the Institutional Review Board (IRB) of Foundation of Healthcare Technologies Society, New Delhi, India (IRB#FHTS/005/2013). Each and every participant was assigned to distinctive identification codes for maintaining anonymity.

DATA COLLECTION TOOLS

Information about the variables was gathered through a contextually modified version of previously validated questionnaires. Sections of the data collection tool are summarized below:

Socio-Demographic Characteristics

Information was gathered about age (years), location, type of family, marital status, family size, educational status, annual household income (INR), occupation status and occupation of partner [10]. Further information was gathered about their parity and having children, weight of first child, modification of diet during pregnancy and lactation period, antenatal visits, intake of iron and folic acid and their source, personal and familial history of hypertension, diabetes or cardiovascular diseases and diet type (vegetarian/non vegetarian).

Price Information, Consumption and Approach Towards Food Items during Inflation

Several parameters were assessed, including how participants make decision of purchasing certain food items, awareness of standardized marks on food items, checking of them before purchasing, monthly expenditure on household groceries and outside eating, frequency of eating outside home, preferred food while eating out, place of purchasing household food items, quantity and prices of oil, salt, wheat flour and milk, stopping or not eating of certain food items with reasons, perception towards severity of higher food prices and approach towards higher food prices [11].

Knowledge Attitude and Practices

Assessment of diet and nutrition related knowledge, attitude and practices were done by administering 20 items questionnaire. Following items were included in the questionnaire: (i) Eating a lot of different kinds of foods is healthier than eating only a few kinds (false/true); (ii) Do you feel it's better to use whole wheat flour than refined flour (false/true); (iii) Physical activity should be a part of everyone's daily life (false/true); (iv) If you are eating a healthy diet there is no need for you to be physically active (false/true); (v) Drinking clean water protects you against diseases (false/true); (vi) How much water you drink in a day (glass); (vii) How many fruits and vegetables should be eaten in a day; (viii) Habit of adding any of the following before eating (salt/spices/ghee/sugar); (ix) Which method you prefer for cooking vegetables at home?; (x) What do you prefer to eat daily in your meals?; (xi) Most of the foods you eat should contain?; (xii) Food ate in office hours (for working woman only); (xiii) Sugar contains a lot of vitamins and minerals(false/true); (xiv) Which of the following food item is fortified with iodine (rice/salt/bread/milk); (xv) A woman needs more nutrients when she is pregnant (false/true); (xvi) Which oil you use at home for cooking; (xvii) Preferred form of fruit (whole fruit/fruit juice); (xviii) How do you identify your own or your household's cooking in terms of oil (more/less oily); (xix) Do you boil water before drinking (yes/no); and (xx) Is any disease condition is restricting your meal pattern at home (yes/no), if yes then specify.

Cleanliness of Food Items and Consumption of Nutritional Supplements

Information was gathered about the participants practicing washing of fruits, legumes, rice and meat before cooking/consumption and washing of green leafy vegetables, roots and tubers before chopping. Further information was gathered about participants' consumption of iodized salt, calcium, vitamins, zinc and iron supplements.

Guidance on Healthy Diet

Guidance on healthy diet is one of the important factors for optimum nutrition of a pregnant woman. Information was gathered about the source of guidance for healthy diet.

Balance Diet

One open ended question was asked about the participants' perception towards balance diet.

Dietary Recall

Nutritional status of the participants was assessed by the 24-hours diet recall. All participants were asked about the previous day's food intake at breakfast, lunch, evening and dinner. It is well accepted method to assess the dietary status of an individual (WHO Training course 2001) [12]. For maintaining uniformity and reduction of uncertainty we have used 250 ml cup for measuring the quantity of food items.

STATISTICAL ANALYSIS

Descriptive analysis was performed using univariate statistics to report means, median and standard deviations for the continuous variable and frequency distributions for the categorical variables. Unpaired t-statistics and one-way ANOVA was performed to see any possible difference in continuous variables. Further Pearson correlation was applied to see relation between final dietary recall scores and independent continuous variables. Content analysis of the open ended data was performed to identify the common themes that emerged from the analysis.

RESULTS

Observations of the study have shown that hundred percent of the participants were married, living in nuclear families (81%) with an average family size of 3 members (SD=1). There were no differences in urban or rural location of the study participants (urban=48; rural=52). More than half of the participants had highest education level of graduation or above (53%) and 68% of them were home makers. More than half of the participants, life partners were blue collar workers (57%) with median annual household income of 200000 INR (US\$ 3226 approx.). More than half of the participants had at least one child and among them majority of them recalled their first baby's birth weight with an average of 2.84 kg (SD=.3). Among those who had children, forty five percent changed their dietary pattern during pregnancy and lactation period. Eight percent of the participants had history of diabetes, hypertension or cardiovascular diseases. Participant's family history of diabetes, hypertension and cardiovascular disease was 39%, 15% and 12% respectively [Table/Fig-1].

No.	Variables	Frequency
i.	Age (Years)	Mean=26; SD=4; Median=25
	≤ 20	10
	21-25	45
	26-30	30
	> 30	15
ii.	Location	
	Urban	48
	Rural	52
iii.	Family Type	
	Joint	19
	Nuclear	81
iv.	Family Size	Mean=3; SD=1; Median=3
	2	36
	3	35
	≥4	29
v.	Education	
	≤ High School	25
	Intermediate or equivalent	22
	Graduation or above	53

No.	Variables	Frequency
vi.	Occupation Self	
	Working	32
	Home maker	68
vii.	Occupation Partner	
	White collar	43
	Blue collar	57
viii.	Annual Household Income (INR)	Mean=568590; SD=752547; Median=200000
	≤ 100000	36
	100001-200000	17
	200001-300000	12
	>300000	35
ix.	Do you have any children?	
	Yes	55
	No	45
x.	If yes, than number (n=55)	
	One	49
	Two	6
xi.	Do you remember the birth weight of your first child?(n=55)	
	Yes	53
	No	2
xii.	Self reported birth weight of first child (Kg)	Mean=2.84; SD=.3; Median=3
	≤2.50	12
	2.51-2.99	11
	≥3	30
xiii.	Did you follow any different diet pattern during that period?(n=55)	
	Yes	25
	No	30
xiv.	If yes, than what were the measures you have applied?	
	Increase in frequency of meal	20
	Decrease in frequency of meal	2
	Increase in consumption of milk & milk products	3
xv.	Regular Antenatal visits (Yes)	87
xvi.	Intake of Iron and folic acids tablets (IFA) (Yes)	87
xvii.	Source of IFA (Doctor)	87
xviii.	Having diabetes/hypertension/ cardiovascular diseases	
	Yes	8
xix.	Family history of disease	
	Hypertension	15
	Diabetes	39
	Cardiovascular disease	12
xx.	Diet type (Non-vegetarian)	94

[Table/Fig-1]: Sociodemographic characteristics of the participants

Seventy one percent of the participants reported purchasing of food products on the basis of choices of family members. Eighty two percent of the participants were acquainted with standardized marks on food items and 64% of them reported checking of these marks before purchasing. Average monthly expenditure on in house groceries and eating outside were 3855 INR (SD=2478) and 1275 INR (SD=971) respectively. Majority of the participants (84%) reported eating out once in a month and preferred eating south Indian cuisine (52%). Forty percent of the participants reported buying of groceries from wholesale market. Participants average

monthly household consumption of oil and wheat flour was 1.5 liters (SD=.7) and 2.4 Kg (SD=1.2) respectively. Further, average monthly need of salt and milk was 1.2 Kg (SD=.4) and 22 liters (SD=8.5) respectively. More than half of the participants felt that to some extent higher food price is a serious problem. Thirty four percent of the participants have reduced expenditure on food items due to higher prices. Eighteen percent of the participants have stopped eating or eating lesser quantity of particular food items due to high prices [Table/Fig-2].

No.	Variables	Results
i.	How you take decision of what to purchase?	
	Accessibility	5
	Cost	13
	Choices of family member	71
	healthy food only	4
	Availability	7
ii.	Are you aware of Standardized marks on food items?	
	Yes	82
	No	18
iii.	Do you check them before purchasing?	
	Yes	64
	No	36
iv.	Monthly expenditure on food? (INR)	
	Household	Mean=3855; SD=2478; Median=3000
	Eating Outside households	Mean=1275; SD=991; Median=1000
v.	Frequency of eating outside (Monthly)	84
vi.	What kind of food do you usually eat outside home?	
	Full Thali	5
	Paratha	22
	Choley Bhature	16
	Roti and vegetables	13
	Rice curry	5
	Chinese Food	23
	South Indian (idli/vada/dosa/sambhar)	52
	Snacks	7
vii.	Place of purchase of food items	
	Wholesale market	40
	Retail shop	30
	Public distribution system outlet/own shop/super market	5
	Door to door vendor	28
viii.	Quantity of oil utilized per month(liters)	Mean=1.5; SD=.7; Median=1
	Oil Price/liter	Mean=96; SD=5; Median=98
ix.	Amount of salt utilized per month	Mean=1.2; SD=.4; Median=1
	Salt Price	Mean=23; SD=4; Median=22
x.	Wheat flour quantity (kg)	Mean=2.4; SD=1.2; Median=2
	Wheat flour price/kg	Mean=33; SD=13; Median=34
xi.	Quantity of milk (liters)	Mean=22; SD=8.5; Median=15
	Price of milk/liter	Mean=24; SD=8; Median=30
xii.	If you have stopped eating, or are eating less of, particular food(s), what are the reasons?	
	Do not like	8
	High price	18
xiii.	How serious a problem has been higher food prices for you and your household?	

No.	Variables	Results
	Very Serious	4
	Serious	10
	Somewhat serious	53
	No problem at all	25
xiv.	<i>Approach towards the problem of high price</i>	
	Buy lower quality foods	5
	Reduced expenditure on food items	34
	Searched for extra earning sources	13

[Table/Fig-2]: Food purchasing practices of the participants

Majority of the participants had perception of eating a variety of foodstuffs (97%) is healthier than eating only few types and felt that consumption of whole wheat flour (97%) is healthier than refined flour. Hundred percent of the participants agreed that physical activity should be a part of daily routine but on the other hand majority of them perceived that if an individual eats healthy diet than there is no need of physical activity (93%). Majority of the participants were aware that drinking clean water (98%) protects against diseases and more than half of them reported at least three glass of water consumption daily. Majority of them boiled (89%) drinking water. Forty five percent of the participants considered that at least one fruit and vegetable should be consumed every day. Proportion of participants preferring fruit juice consumption (54%) was slightly higher than those who preferred to consume whole fruit (46%). One third of the total participants preferred boiling as a method of cooking vegetables at home. Majority of them used sunflower oil and 45% of them agreed that their household's cooking is oilier. Sixty four percent of the participants preferred eating of rice daily followed by chapatti (30%). More than half of the participants (52%) reported that their food should comprise of starches, dairy products, meat and beans. Seventy five percent of working participants take home based, same day morning prepared food for lunch in office same day morning prepared food for lunch in office. More than half of the participants (58%) perceived that sugar contains a lot of vitamins and minerals. Seventeen percent of the participants reported that their disease condition puts a check on their meal pattern. Majority of the participants (98%) agreed that a woman requires more nutrients at the time of pregnancy [Table/Fig-3].

No.	Variables	Frequency(%)
i.	<i>Eating a lot of different kinds of foods is healthier than eating only a few kinds</i>	
	False	3
	True	97
ii.	<i>Do you feel it's better to use whole wheat flour than refined flour</i>	
	False	3
	True	97
iii.	<i>Physical activity should be a part of everyone's daily life</i>	
	True	100
iv.	<i>If you are eating a healthy diet there is no need for you to be physically active</i>	
	False	7
	True	93
v.	<i>Drinking clean water protects you against diseases</i>	
	False	2
	True	98
vi.	<i>How much water you drink in a day (glass)</i>	
	1	8

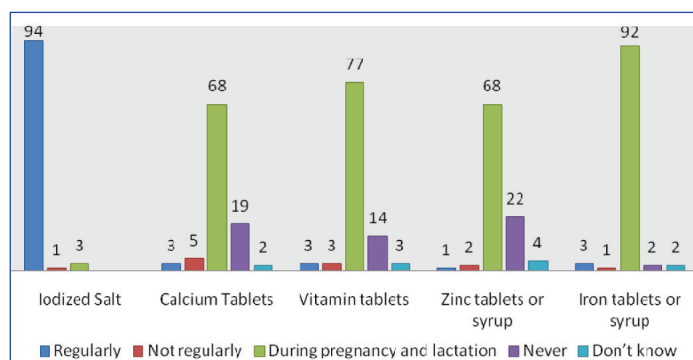
No.	Variables	Frequency(%)
	2	18
	3	74
vii.	<i>How many fruits and vegetables should be eaten</i>	
	One fruit and vegetable daily	45
	3-4 fruits and vegetables a day	34
	5 or more fruits and vegetables everyday	20
	There is no need to eat fruits and vegetables daily	1
viii.	<i>Habit of adding any of the following before eating?</i>	
	Salt	62
	Spices	12
	Ghee	39
	Sugar	2
ix.	<i>Which method you prefer for cooking vegetables at home?</i>	
	Deep frying	23
	Light frying	25
	Roasted	9
	Boil	33
	Sauté	3
x.	<i>What do you prefer to eat daily in your meals?</i>	
	Chapatti	30
	Poori/Paratha	7
	Rice	64
xi.	<i>Most of the foods you eat should be</i>	
	Starches	7
	Vegetables, fruits and dairy products	13
	Starches, dairy products, meat and beans	52
	Vegetables, fruits, meats, and beans	28
xii.	<i>Food ate in office hours (n=33)</i>	
	Prepared from home in the morning	25
	Buy/take food from workplace	4
	Take previous day's leftover food	4
xiii.	<i>Sugar contains a lot of vitamins and minerals</i>	
	False	42
	True	58
xiv.	<i>Which of the following food item is fortified with iodine?</i>	
	Rice	14
	Salt	63
	Bread	17
	Milk	6
xv.	<i>A woman needs more nutrients when she is pregnant</i>	
	False	2
	True	98
xvi.	<i>Which oil you use at home for cooking?</i>	
	Groundnut oil	9
	Mustard oil	1
	Sunflower oil	97
xvii.	<i>What do you prefer to have?</i>	
	Whole fruit	46
	Fruit juice	54
xviii.	<i>How do you identify your own or your household's cooking in terms of oil?</i>	
	More oily	45
	Less oily	55

No.	Variables	Frequency(%)
xix	<i>Do you boil water before drinking?</i>	
	Yes	89
	No	11
xx. a	<i>Is any disease condition is restricting your meal pattern at home?</i>	
	Yes	17
	No	83
xx. b	<i>If yes what is that?</i>	
	Diabetes	14
	Hypertension	2
	Cardiovascular	2

[Table/Fig-3]: Nutrition related knowledge, attitude and practices of the participants

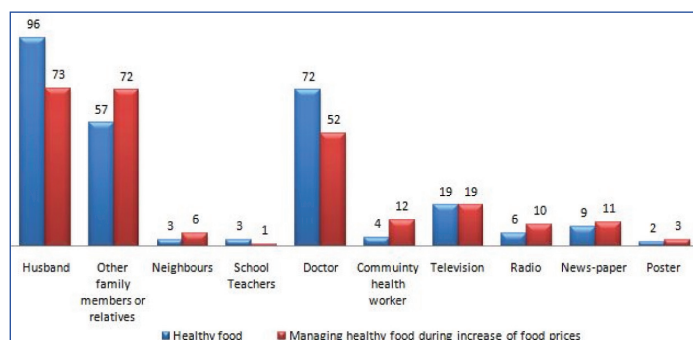
Majority of the participants had an insight of washing fruits (97%), legumes (98%), rice (97%) and meat (99%) before cooking/ consumption. Majority of the participants reported washing of green leafy vegetables (99%), roots (99%) and tubers (99%) before chopping.

Majority of the participants reported regular consumption of iodized salt. Consumption of calcium (68%) and vitamins (77%) tablets was reported highest during pregnancy and lactation. Twenty two percent of the participants have never had supplementary zinc tablets or syrup. Proportion of participants consuming Iron in the form of tablets or syrup was highest during pregnancy and lactation (92%) [Table/Fig-4].



[Table/Fig-4]: Illustrates the intake of iodized salt, calcium, vitamin, zinc and iron supplements by the participants

Ninety six percent of the participants reported that they have received advice for eating healthy food from their husbands and 72% reported doctor as an advisory source for healthy food. Husband (73%), other family members/relatives (72%) and doctor (52%) were reported as major advisors for management of healthy food during inflation [Table/Fig-5].



[Table/Fig-5]: Depicts the guiding sources for health food and its management

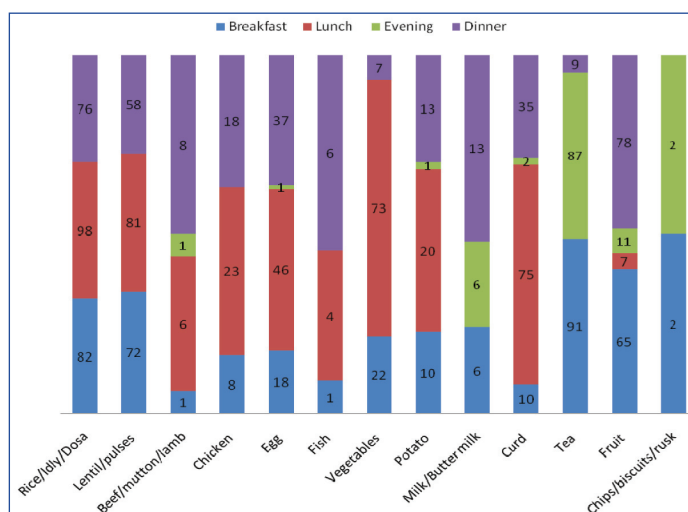
Balance Diet

One in every three study participants reported that they do not know (32%) about the balance diet. Nineteen percent of the

participants reported that the balance diet consist of all essential nutrients in adequate amount and 14% of them described balance diet as energy and strength giving food. One in ten of the total study participants reported that foodstuff having lesser fat and oils as balance diet. Fourteen percent of the participants reported vegetables as essential component of balance diet and six percent of them reported fruits as a constituent of balance diet. Five percent of the participants reported the balance diet comprise of adequate carbohydrates, proteins and fats. One participant reported that balance diet consist of iron and minerals.

Diet recall

Majority of the participants reported consumption of rice and its products during breakfast (82%), lunch (98%) and dinner (76%). Twenty percent of the participants reported consumption of potato during lunch. Proportion of participants consuming lentils or other pulses was highest during lunch (81%), followed by breakfast (72%) and dinner (58%). More than half of the participants reported consumption of vegetables during lunch (73%). Proportion of the participants reporting consumption of egg during lunch and dinner was 46% and 37% respectively. Seventy five percent of the participants reported consumption of curd during lunch and 13% of them reported consumption of milk/buttermilk after dinner. Overall 91% of the participants consumed tea during breakfast and 87% percent consumed it in evening. Majority of the participants included fruits during breakfast (65%) and dinner (78%) [Table/Fig-6].

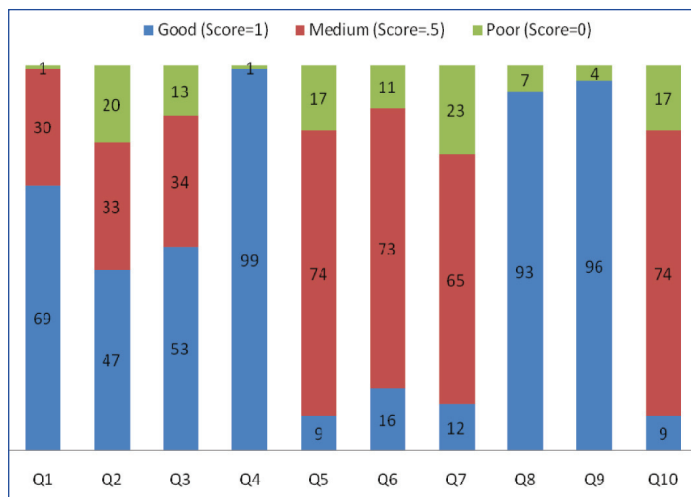


[Table/Fig-6]: Distribution of dietary intake for breakfast, lunch, evening time and dinner

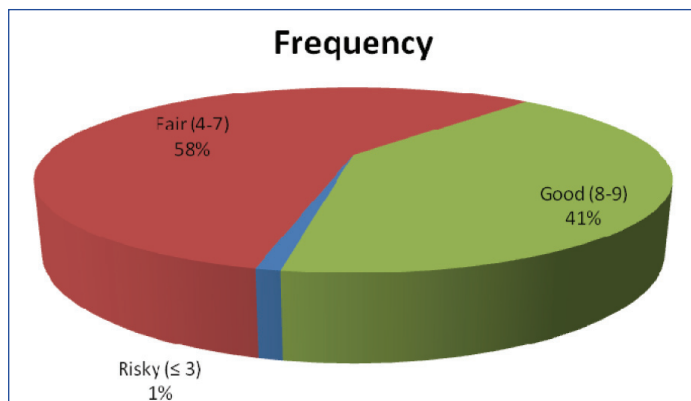
Sixty nine percent of the participants reported eating of at least six servings from cereal and potato group. Eating of at least 5 servings from fruit and vegetable group was reported by 47% of the participants. Majority of the participants (99%) reported consumption of at least one serving from meat and alternatives group and more than half of them ate at least two serving from milk products group. Nine percent of the participants consumed fewer than two servings from fat, oils and sugars group. Eating of at least two different varieties of food items in all four groups was reported by 16% of the participants. More than half of the participants reported consumption of one fresh vegetable (65%). Majority of the participants (93%) ate one or more fruits. Ninety six percent of the participants did not eat any snacks and nine percent reported consumption of low fat content food [Table/Fig-7].

Average calculated scores of Q1-Q10 of food record scoring sheet were .84 (SD=.24), .63 (SD=.4), .7 (SD=.35), .99 (SD=.1), .46 (SD=.25), .52 (SD=.25), .44 (SD=.29), .93 (SD=.25), .96 (SD=.2) and .46 (SD=.25) respectively. Forty one participants were in good

category with an average final score of 6.9 (SD=1). One participant scored less than 3 and was in risky category. None of the participants were able to achieve excellent category [Table/Fig-8].



[Table/Fig-7]: Depicts the categorical distribution of the participants for each question of dietary recall



[Table/Fig-8]: Shows the distribution of the participants in various categories of nutritional status

Analysis was performed to see the association of final score with independent variables. Age categories ($p=.89$), location ($p=.34$), type of family ($p=.38$), education ($p=.24$), occupation self ($p=.72$), occupation partner ($p=.71$), annual household income category ($p=.75$) and participants having at least one child ($p=.32$) have not shown statistically significant association with final dietary recall scores. Average dietary recall final score of the participants reporting checking of standardized marks on food items ($M=7$; $SD=.8$) was slightly higher than those who do not check it ($M=6.7$; $SD=1.3$) but this difference was not statistically significant ($p=.13$).

Further analysis was performed to see the correlation between continuous independent variables with annual household income and dietary recall final scores. Monthly expenditure on household food items ($r=.52$; $p<.0001$) and eating outside ($r=.66$; $p<.0001$) have shown positive correlation with annual household income. Monthly consumption of oil has shown negative association ($r=-.24$; $p=.015$) with final scores of dietary recall and it was statistically significant.

DISCUSSION

Nutritious diet is very essential for all human beings and its significance increases multiple folds during pregnancy and lactation period as it affects two lives mother and child. Present study was conducted to evaluate nutrition status of 2nd and 3rd trimester pregnant woman of Southern India.

Forty five percent of the study participants were in age group of 21-25 years and it was similar to the study conducted by

Ayesha et al., in which 44% of the participants were in this age group [13]. Majority of the participants were from nuclear family (81%). This was dissimilar to previous study, in which 45% of the participants were from nuclear family [14]. Previous study 15% of the participants had education level of graduation or above [14]. Observations of present study have shown that half of the participants had education level of graduation or above. More than half of the participants had at least one child before this pregnancy. A study in Pakistan had shown that 29% participants experienced pregnancy for the first time [13].

Ninety eight percent of the participants knew that pregnant woman requires more nutrients than non pregnant woman. These results were slightly higher than previous study in which 70% of the participants had familiarity that pregnant woman should have different food than non pregnant woman of reproductive age group [13]. Majority of the participants knew that eating of variety of food items is healthier than eating same kind of food on regular basis. Further majority of the participants perceived that if they eat healthy diet than there is no need of physical activity. Thirty two percent of the participants were not aware about the balanced diet. Near to half of the participants reported eating of at least 5 servings from fruit and vegetable group. None of the participant had scored excellent on diet recall.

LIMITATIONS

This study had certain limitations. Firstly it had a cross-sectional design with small sample size including only second and third trimester woman. Further it was a hospital based study in single location and its results cannot be generalized in other locations. We did not assess the diet in terms of calorie intake and anthropometric measurements of the participants.

CONCLUSION

Participants having higher consumption of oil had lower dietary recall scores. One third of the participants did not know about balanced diet. More than half of the participants scored fair on dietary recall. Husband and doctors were major influencers for making food choices, participants knew that there is requirement of additional nutrition during pregnancy but they were not aware about the balance diet and right food choices. So, there is a need of sensitizing about importance of choice of diet in pregnancy not only to pregnant women but also to their spouses.

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