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Assessment of the Nutritional Status and Eating Habits of Pregnant Women in Rural Areas (Case of the City of Man)

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Abstract Diet is an important factor for the smooth running of pregnancy and the growth of the fetus. It is the most decisive if a good adequacy of food intake to needs is respected. During our study, 90 pregnant women were interviewed in the city of Man. This is a qualitative study whose variables included in the survey are social status, professional and cultural status, state of health, food consumption, food habits, food restrictions. The results of the survey revealed that the majority of the women surveyed, i.e. 53.33%, were between 20 and 29 years old, 40 % of them were between 15 and 19 years old and only 6.67 % had the between 30 and 33 years old. The percentage of women with a normal BMI (Body Mass Index) is 76.67 % and those with overweight have a rate equivalent to 16.67%. The results of eating habits reveal that 70 % of pregnant women consume fruit and 30% do not. Regarding vegetables, 93% consume them and 7% do not consume them. The results of the survey revealed that 3.33% of respondents respect the PNNS recommendation (consume 3 meals a day) but 96.67% consume more than three meals a day, which can lead to risks of obesity. All these results describe that the food ration of the women surveyed in the city of Man is rich in fruits, vegetables, proteins, only the number of meals consumed by these women is higher than normal. This may be due to women's lack of awareness regarding diet during pregnancy. Poor consumption of a balanced diet could lead to poor weight gain during pregnancy, increasing the risk of premature delivery, low birth weight and birth defects.

Keywords: *food practice, food consumption, nutritional status, pregnant women, rural area*

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1. Introduction

Diet during pregnancy is recognized as one of the environmental factors that can have an impact on maternal health, influencing fetus and children's development and health across the whole life course [1]. Thus the identification of the factors that influence food choices is crucial for the assessment of the needs of the population and in particular for pregnant women. Indeed, maternal nutrition is essential as it forms the fundamental basis for a successful pregnancy. Therefore, the dietary habits of pregnant women are important for the proper progression of pregnancy and the development and health of the fetus [2]. According Odiwuor *et al.* [3] during pregnancy, diets should be balanced in terms of macronutrients and micronutrients. It is also reported that, the daily energy requirements for healthy women of normal weight and who have a moderately active lifestyle, increase during pregnancy and are based on the trimester of the fetus [4]. Thus, recommendations regarding the calorific value of pregnant women's diets aim to prevent the development of obesity [5]. As the pregnancy progresses, the woman's need for protein increases, peaking in the third trimester. The appropriate intake of protein in the diet supports the protein biosynthesis needed to supply the needs of maternal tissues, the placenta, and the growing fetus [5]. The total fat intake, especially in the first trimester of pregnancy, should not increase signifcantly [5]. Studies

conducted so far indicate the particular importance of micronutrients during pregnancy [6]. Others several studies also show that dietary imbalance can lead to malnutrition. Thus, in developing countries, more than 2 billion people, mainly women and children, suffer from nutritional deficiency caused by the absence of one or more important micronutrients [7,8]. In Côte d'Ivoire, about 71% of pregnant women suffer from anemia. Malnutrition, in terms of protein and calories, is clearly evident in many parts of the Africa. Malnutrition particularly affects all women in rural areas. Another form of malnutrition results in the dislike of certain foods present in some pregnant women such as meat, vegetables, milk and dairy products which are rich in essential nutrients [9]. The WHO [10] in its food and nutrition policy action plan, has broken down several areas of action, the most crucial of which is that of encouraging a healthy start in life such as promoting healthy nutrition. Adequate and safe food for pregnant women in order to improve maternal health and reduce its mortality rate by three quarters between 1990 and 2015. The problem posed in this study is to identify the factors that determine malnutrition in pregnant women in rural areas rural. Our study aims to study the prevalence of malnutrition in pregnant women in the prenatal period by determining their socio-economic profile, their dietary practices and their dietary restrictions.

2. Material and Methods

2.1. Study Framework

This is a retrospective questionnaire survey. This survey was carried out in the city of Man on 90 pregnant women who voluntarily answered a questionnaire. The data was collected using the frequency questionnaire, which we formulated and organized in stages including several elements such as: Personal information, professional situation, marital status, dietary habits and dietary restrictions. Women's dietary habits were interpreted and described with the help of the daily consumption frequency of the three African food groups [11]. The energy groups (breads, cereals, tubers and fats), builder (meat, dairy products and substitutes) and protector (fruits and vegetables) were thus explored.

2.2. Determination of Body Mass Index (BMI)

Body Mass Index (BMI) using formula of Quételet [12].

$$BMI = Weight\ in\ Kg\ /\ Height\ in\ (m)^2 \qquad (1)$$

2.3. Statistical Analysis

Data processing was done using EXCEL, SPSS and WORD software. Data were entered using Excel software and then exported to Statistical Package for the Social Sciences software [13]. The statistical analysis of the results was carried out on the EXCEL and SPSS software which was used on the one hand for the presentation of the graphs and tables and on the other hand, for the calculation of the percentages and averages.

3. Results and Discussion

3.1. Sociodemographic Characteristics of Pregnant Women Surveyed

Our study aims to assess the prevalence of malnutrition in pregnant women in the prenatal period by determining their socio-economic profile, their dietary practices and their dietary restrictions. With regard to the socio-demographic profile, the results revealed that the majority of the women surveyed, i.e. 53.33 %, were between 20 and 29 years old, 40 % of them were between 15 and 19 years old and only 6.67 % were between 30 and 33 years old (Figure 1). These results are slightly similar to those obtained by [14] where 64.51 % of the pregnant women surveyed were between 20 and 29 years old and 12.9 % between 30 and 40 years old. 62.65 % of the women were educated and 36.66 % of them were illiterate (Figure 2). This would be explained by the fact that the schooling rate in Côte d'Ivoire is increasing. This rate is clearly close to the 39.7 % [15] on studies carried out in Bamako. In our sample, 66.67% of respondents lived with family and 33.33% lived alone (Figure 3). From the latter, we divided it according to the number of children. We found different forms of parity which are Primiparous with a percentage of 63.33% and Multiparous with a percentage of 33.66% (Figure 4). The high rate of women living with a family could be explained by the fact that the majority of these women were young. This result is accordance of those reported by Dadi and Desyibelew [16]. These authors revealed that most the study participants were married and are living with a family. Regarding the body mass index (BMI) which was used to assess the nutritional status of the women surveyed in the city of Man. The percentage of women with a normal BMI is 76.67%, the percentage of undernourished women is 6.67% (Table 1). Those with overweight have a rate equivalent to 16.67%. These results are different from those of Abdelhakh [17] or the majority of respondents were overweight (42.59%).

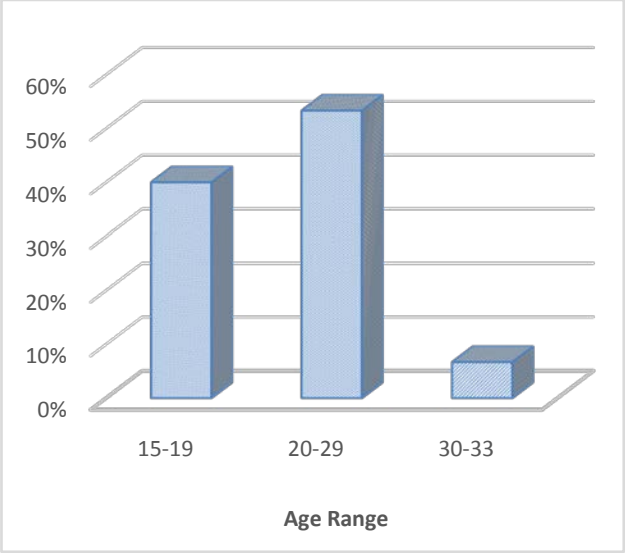

Figure 1. Distribution of pregnant women by age

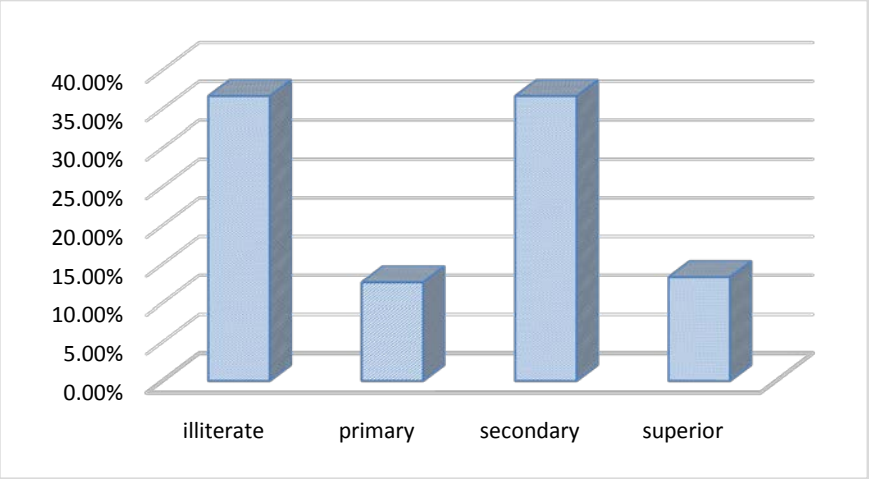

Figure 2. Distribution of pregnant women by their education levels

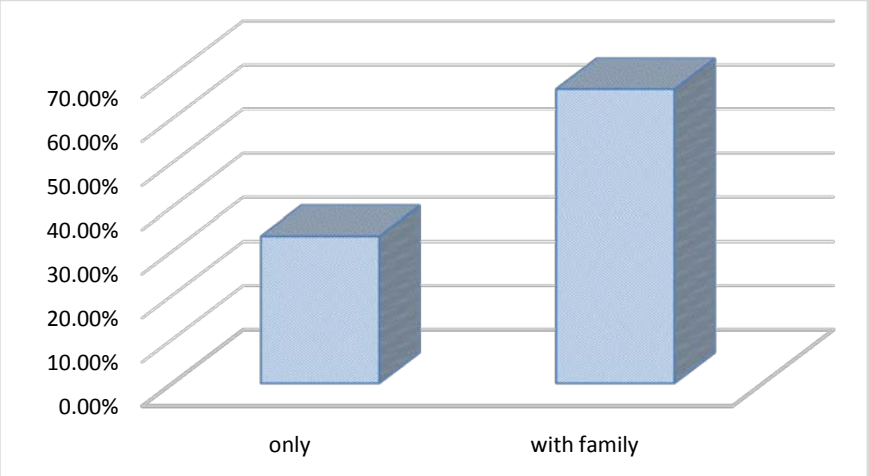

Figure 3. Distribution of pregnant women by marital status

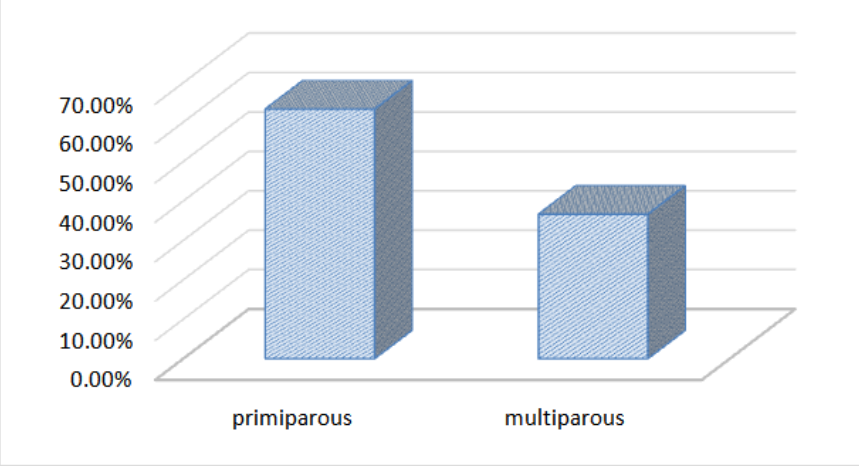

Figure 4. Distribution of pregnant women by their parities

Table 1. Distribution of pregnant women by BMI

BMI (Kg/m^2)	Number of women pregnant	Percentage	P value
Underweight (<18.50)	10	6.67%	*0.000
Normal weight (18.5-22.99)	62	76.67%	*0.000
Overweight (23.00- 27.49)	18	16.67%	0.102
Obese (≥ 27.50)	0	0	-

P value from paired sample t-test (*P<0.05).

3.2. Eating Habits

In the urban or rural environment, pregnant women more frequently consumed vegetables, milk and dairy products, sea fish and wholemeal cereal product. Previous studies have shown that the effect of consuming different foods on birth outcomes varies according to the stage of pregnancy. Thus, the results obtained concerning the eating habits of the women surveyed, revealed that 56.67% of women had no eating problems and 43.33 % of women had a eating problem (Table 2). The number of meals that are consumed by the women who give birth each day indicates whether this consumption is insufficient, sufficient or even more than the norm. This survey covered 96.67 % of pregnant women who eat four or more meals a day, 3.33 % of women eat three meals a day and 0 % of pregnant women eat one to two meals a day (Figure 5). The results of the survey revealed that 3.33% of respondents meet the NHNP (National Health Nutrition Program) recommendation (consume 3 meals a day) but, 96.67% consume more than three meals a day, which can lead to risks of obesity. Our results are different from the results obtained by Monwanou [18], where the majority of women met the recommendation of NHNP (48.66%). The results also show that 70 % of them consume fruit and 30 % do not (Figure 6). Concerning vegetables, 93% consume them and 7 % do not consume them for reasons of degouts, allergies and restrictions (Figure 7). Based on our results, we find that more than half of the women surveyed consume dairy products (57%) and 43% do not (Figure 8). We can therefore say that a large number of women respect the recommendations of the NHNP in the consumption of dairy products. Our results were lower than that of another study performed by Emara [19]. who indicated that 42.7% ate red meat two to three times per week and 36.7 % of pregnant women ate chicken three to four times per week. Meanwhile consistent with our study, the majority of them rarely practice sport during pregnancy. Also, disagreeing with our results half of the women (50.0%) reported eating fruits and vegetables rarely per week, and a partially equal percentage drank one cup of milk per day (48.7%). This finding in the same line with Zelalem *et al.* [20] study in Addis Abeba who reported that 204 (50.2%) were in line with meat (protein foods), 172 (42.4%) in line with dairy products, and 187 (46.1%) in line with vegetable servings. Less than half (44.1%) of the pregnant women reported eating at least two fruits per day. Starches are part of a healthy diet for individuals and an essential source of energy for the body. Starches are one of the three main types of carbohydrates and belong to the category of complex carbohydrates, where starches are a good source of energy. In addition to being a major source of a range of nutrients in our diet, such as fiber, calcium, iron and B vitamins [21]. Through this survey, women who consume starch at each meal have a percentage of 100% (Figure 9). This result is not surprising, as the Man region is known for its high level of starch production and also for its culinary identity. Throughout the year the products (starches) are available, hence the supply of food does not pose a problem. We also know that our bodies need protein, especially for pregnant women, because protein is used to build the fetus. The results reveal that parturient consumption for red meat is 7 % more than 3 times a week, 28 % 1-2 times a week and 65% does not consume red meat. As for white meat (poultry) 2% more than 3 times a week, 18% 1-2 times a week and 80% does not consume poultry. Fish, 0% do not consume fish, 55% consume fish 1-2 times a week and 45% consume fish more than 3 times a week (Figure 10). There is a great lack of meat and fish consumption as a result of the NHNP recommendations. Indeed, this could be explained by the hormonal context of pregnancy, which would lead to a better perception of tastes and smells, because some women had disgusts on the other hand others cravings [22]. Contrary to our results, Suliga [23] reported that the diet of women from the rural environment was poorer from the aspect of quality, compared to the diet of pregnant women living in the urban areas. The differences in the mode of nutrition among the inhabitants of urban and rural areas in Poland, on the one hand, are due to a greater attachment to the traditional way of nutrition and smaller susceptibility to the beneficial nutritional changes [24], and on the other hand, greater impoverishment in rural areas and, in consequence, smaller possibilities to satisfy nutritional needs [25]. Rural inhabitants more frequently than urban inhabitants mentioned the necessity to resign, for financial reasons, from the purchase of such groups of foods as: fish and fish products (24 % of rural households), confectionery (18%), stimulants (17%), meat and poultry (16%), as well as fruits and fruit products (14%) [13]. In addition, for women with dietary bans, their rate is 37% while 63% have no dietary bans (Figure 11). These results are somewhat similar to the results of Abdelhakh [17]. who also found that the number of women with no difficulties was higher than those with difficulties. All these results describe that the food ration of the women surveyed in the city of Man is rich in fruit, vegetable, protein. Only, the number of meals consumed by these women is higher than normal. This may be due to women's lack of awareness of nutrition during pregnancy. For this reason, a study on delivery of prenatal health education and pregnancy outcomes in Baatan concluded that prenatal education had a significant relationship with pregnancy outcomes and, therefore, prenatal education must be an essential component in upholding the overall health status for pregnant women [26]. This is an indication that a healthy pregnancy starts with proper nutrition to bring out positive pregnancy outcomes. A study to determine level of nutrition awareness showed that it would be desirable to set up an awareness raising program with the aim of increasing the level of education of pregnant women in terms of eating behaviour and nutrition status [27]. Another study concluded that nutrition education could improve knowledge and practices of women during pregnancy and that attention should be given to promote nutrition education or eating habits during the Ante-natal clinic (ANC) visits for pregnant women [28]. All the studies reviewed here indicate that nutrition education has positive and significant effects on nutrient intake and pregnancy outcomes and supports this study that found significant effects of nutrition education on nutrient intake and pregnancy outcomes. It is essential, therefore, that the health system recognize nutrition education as a need and priority area for women who are pregnant. Thus, several studies show that dietary counselling interventions aimed

at increasing dietary intakes are most successful in increasing birth weight [7,29]. This is why Young *et al.* [30] recommends that nutrition education and counselling programs and support to women should be introduced early in pregnancy to optimize infant birth outcomes.

Table 2. Distribution of pregnant women by feeding problem

Pregnant women	Number	Percentage (%)
No difficulties	51	56.67%
Having difficulties	39	43.33%
Total	90	100%

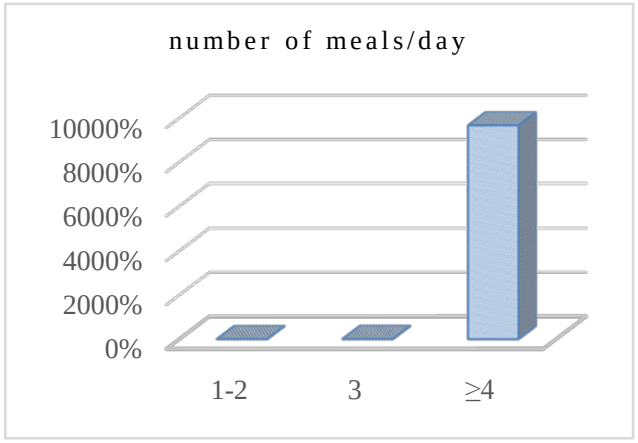

Figure 5. Distribution of pregnant women by meal consumption/day

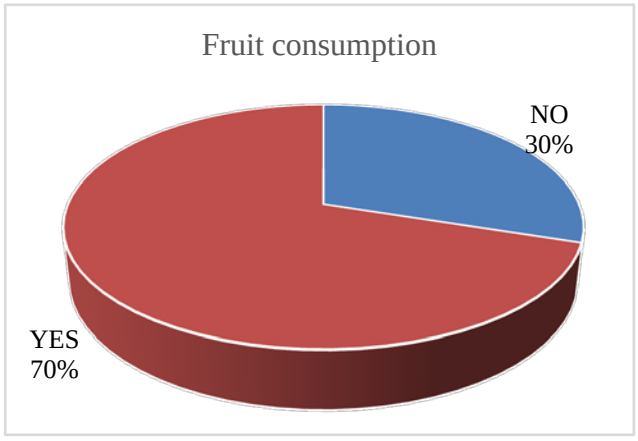

Figure 6. Distribution of fruit consumption by pregnant women

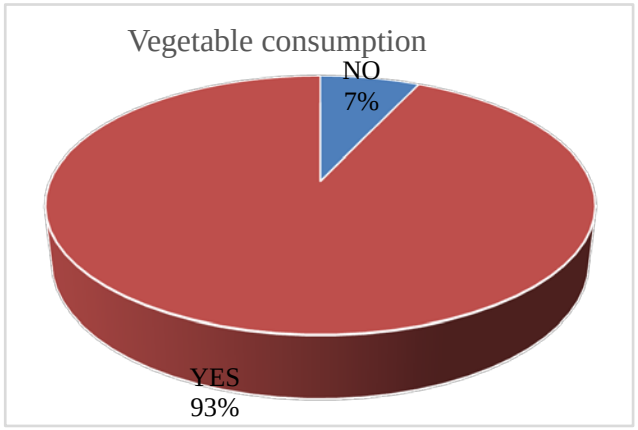

Figure 7. Distribution of pregnant women according to vegetable consumption

Figure 8. Distribution of pregnant women according to consumption of dairy products

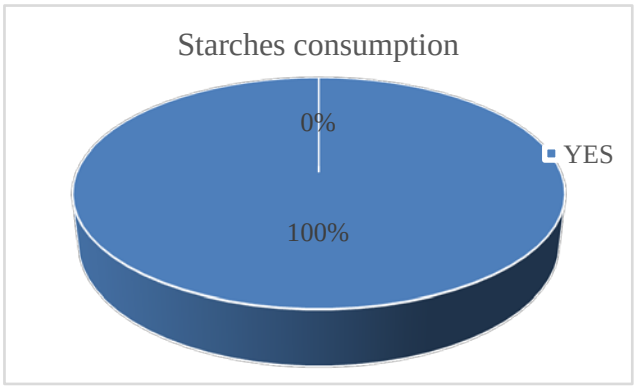

Figure 9. Distribution of pregnant women according starches consumption

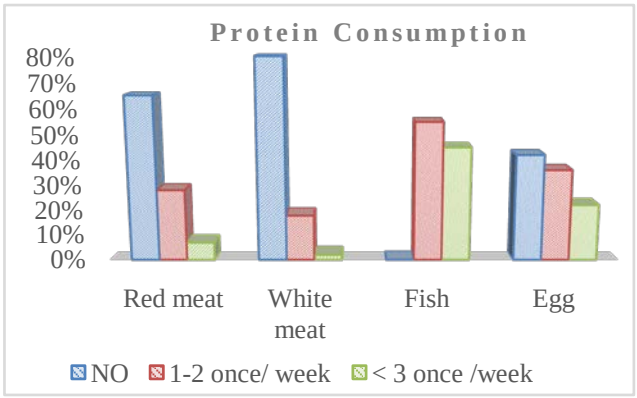

Figure 10. Distribution of pregnant women according to their protein consumption

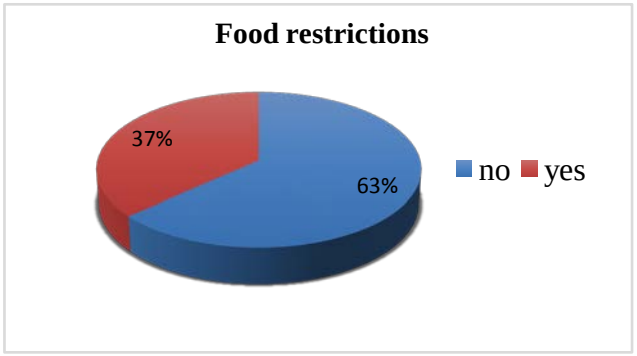

Figure 11. Distribution of pregnant women according to their dietary restrictions

4. Conclusion

Adequate and balanced diets before and during pregnancy are essential to meet nutritional needs and are positively associated with maternal and fetal health. Our study asked a sample of 90 pregnant women of different ages and trimesters to identify eating habits in pregnant women. Malnutrition in pregnant women can negatively affect child development in the early years, it can also increase the risk of obesity, diabetes and other metabolic complications such as liver disease. Micronutrient deficiencies during pregnancy can negatively affect the baby. To prevent malnutrition during pregnancy, a balanced diet can help a pregnant woman enjoy a safe pregnancy for herself and her fetus, pregnant women should eat plenty of fruits and vegetables to get vitamins, minerals and fibres. The diet should also include healthy protein sources such as fish, eggs, legumes, beans and poultry. Not to mention starchy foods such as corn semolina, pasta, noodles, bread and potatoes to meet the increased need for carbohydrates.

Acknowledgments

We thank the pregnant women of the city of Man who kindly lent themselves to the investigation.

Conflicts of Interest

The authors report no financial or any other conflicts of interest in this work.

Abbreviations

NHNP (National Health Nutrition Program), ANC (Ante-natal clinic), BMI (Body Mass Index).

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