

Assessment of nutritional practice of pregnant women and associated factors following ANC services in Yeka sub city health centers, Addis Ababa.

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Research Article

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Abstract

Background

Pregnant mothers especially in developing countries do not get a balanced and diverse diet to meet their nutrient and energy requirements. This problem in Ethiopia is extensive in combination with repeated drought and food insecurity. Due to insufficient counseling of pregnant women on the importance of nutrition practices during antenatal care visits and other factors, pregnant mothers have poor nutritional practices that result in adverse birth outcomes.

Methods

Institutional based cross-sectional study designed was employed to collect the data from 404 pregnant women following ANC services in Yeka sub-city health centers from 6 June to 15 July 2022. Five health centers were selected using simple random sampling and pregnant women were selected using systematic random sampling after proportional allocation of the total sample. Structured questioner was used to collect the data and a 24-hour recall of dietary diversity questioner was also used to assess their dietary diversity. The data was entered into EpiData version 3.1 and exported to SPSS version 25. We used frequency, mean, and rang as descriptive statistics and bivariate and multivariate binary logistic regression was used to identify risk factors affecting the nutritional practices of pregnant women.

Result

In this study, we found that 179(44.31%) of pregnant women had high dietary diversity score with mean of 4.97 ± 2.014 SD and 183(45.3%0 of pregnant women had good food frequency. Finally, only 126(31.2%) of pregnant women had good nutritional practices during pregnancy. The risk factors that affect the nutritional practice of pregnant women was husband occupational status, income of household, habit of eating snacks, partner/husband involvement in pregnancy care, women empowerment on household economy.

Conclusion

In this study, we found that less than one-third of pregnant women had good nutritional practices. This calls the collaboration effort of all parties to enhance the nutritional status of pregnant women which is corner stone of all other nutritional interventions.

Background

Nutrition is the basic aspect of life which includes the process of obtaining the necessary nutrients which promote health, physical growth, cognitive development, and productivity across all the life spans of human beings starting from conception to old age from the food ingested (1, 2). Body nutrient requirement varies according to the physiological state of being of the individual like during pregnancy, infancy, adolescence and adulthood. If there is an imbalance of nutrients called malnutrition, the body will be deprived of specific nutrients

which makes the body can have hindered physical growth, impaired cognitive development and easily attacked by disease-causing agents(3).

Maternal nutrition is a very crucial aspect of fetal growth and development which can plays a critical role in deciding birth outcome (4). During pregnancy, there are many physiological, anatomical and biochemical changes taking place that will increase both the energy and nutrient requirement of the mother for positive birth outcomes. So, the mother should get enough, diversified and balanced quantity of nutrients including vitamins, minerals, animal products, and water to meet her and the fetal nutritional demand (5, 6).

World health organization (WHO) recommends that pregnant mothers should get one extra meal than a normal adult which means four meals per day which includes at least five food groups per day Malnutrition of all forms in pregnant mothers can lead to many adverse birth outcomes like IUGR, LBW and premature birth, and big baby which may last as acute or chronic malnutrition on a child after birth through the life course called inter-generational malnutrition cycle (6, 7).

Women in developing regions of WHO namely Africa and Asian countries do not get the balanced nutrients during pregnancy and consume cereal-based diets with no animal products (5). Maternal malnutrition is due to inadequate dietary intake, poor diet quality, recurrent infection and short inter-pregnancy intervals (frequent pregnancy). Nutritional evidence indicates that up to 20% of African women have a low BMI (8).

Ethiopia is prone to repeated drought and famine which affects both food security and WASH facilities which in turn is considered the main contributing factor to the high rate of malnutrition all over the country which affects all population groups especially women and children (9). According to EDHS 2016 reports, 22% of women of reproductive age were too thin (BMI less than 18.5) and 8% of them were obese (9). According to the studies, the dietary practices of pregnant mother in Ethiopia is poor ranging from 26.9% in the Ambo area to 40.1% around Gondar and 34% in the capital Addis Ababa (10–12).

In Ethiopia, few studies showed that educational status, average house-hold income, family size, nutritional knowledge, and attitude, health workers' appropriate knowledge (5, 10). There are limitations of those studies: failure to assess practices intake of specific food items, limitation of assessment of women empowerment related factors and the impact of partner or husband involvement on pregnancy care for improvement of the nutritional practice of pregnant women (13).

This study was carried out aiming to investigate the nutritional practices of pregnant mothers and associated factors in an urban set-up and was intended to guide designing of effective and action-oriented nutrition-related health care interventions of pregnant women.

Methods

Study area and period

The study was conducted in Yeka sub city health centers, Addis Ababa from 6 June to 15 July 2022. Addis Ababa is the capital city of Ethiopia located at the foot of the highlands of Entoto with a longitude of 8.9806° N and latitude of 38.7578° E to be the hub of all Ethiopian ethnic groups as well as the cultural and commercial center(14). Yeka sub-city is one of 11 sub-cities located in the northern part of Addis Ababa which has 11

administrative woredas with a projected population of 378,509 for 2014 EFY. Considering the previous last six months data (July to December 2021), the estimated number of pregnancies is 13,764 (15).

The institution-based cross-sectional study design was employed to assess the nutritional practices of pregnant women following ANC services at Yeka sub-city health centers. Pregnant women who have visited randomly selected health centers and selected by systematic random sampling method were our study populations.

Sample size was calculated for both objectives based on the respective assumptions. For first objective, using single population proportion formula assumptions of 95% confidence level, 34.4% proportion of good nutritional practices based on a previous study (10) with 5% marginal error. The sample size calculated was 347. For second objective, we have calculated four samples for different factors from different literatures which were 378, 368, 357 and 376. So, we took the larger samples size which is 378 by considering 10% non-response rate and finally 416.

Five health centers were randomly selected from 11 health centers and the total sample were allocated proportionally. Study participants were selected by using systematic random sampling method taking the number of women who have an appointment on ANC register as sampling frame. K value was calculated based on their ANC case load.

Data collection process and technique

The structured questionnaire was designed to capture the demography, obstetrics and nutrition information-related data. A 24-hour recall of dietary diversity questionnaire was also adopted from standard FAO dietary diversity tool to collect the dietary diversity practices of pregnant mothers (16). Once the data collectors were trained, Data were collected through interviews with pregnant mothers using a structured questionnaire at the exit of ANC services. Open recall method of data collection was used to get complete information and to reduce recall bias during 24-hour dietary diversity recall.

Study variables

Dependent variables

Nutritional practices of pregnant women following ANC service

Independent variables

Age of mother, educational status, marital status, mother's occupational status, husband occupational status, house hold average income, nutrition information, number of pregnancies, number of parities, size of the family, health status(hyperemesis), hating of a food item, trimester, number of ANC visit she attended, partner support.

Operational definition

High dietary diversity score

when the pregnant mother eats five and above out of ten food groups

Low dietary diversity score

when the pregnant mother eats less than five out of ten food groups

Good food frequency

pregnant mothers eat at least four times a day

Poor food frequency; when pregnant mothers eat less than four a day

Good nutritional practice

when the mother feeding practice meets good food frequency and high dietary diversity score

Poor nutritional practice

When the mother's feeding practice becomes poor food frequency and has a low dietary diversity score

Data analysis

Once the data had been collected, cleaning has been done and encoded into EpiData version 3.1 and exported to IBM statistics SPSS version 25 for different analysis purposes. Descriptive statistics was used to calculate the frequency, mean, and range of variables. Bivariate and multivariate analysis (binary logistics regression) of variables was conducted to assess the effect of risk factors on the outcome variable. Once bivariate analysis was done, independent variables with p-value less than 0.25 were selected to run for multivariate binary logistic regression analysis.

Result

Socio-demographic characteristics

A total of 404 pregnant women were willing to participate in the study, with a 97% response rate. The mean age was 30.3 (\pm 5.7SD) years with range of 17–45 years. The majority of the participants were in the age range of 25–34 years (237(58.7%)), 251 (62.1%) of respondents were Orthodox Christian in religion, 364(90.1%) were married, 118(29.2%) of pregnant women were house wives, 142(35.1%) of partner of pregnant women were government employees, 231(57.2%) of them had an average household income of greater than 5000 birr, and 280(69.7%) respondents have 1–3 number of families.

The majority of pregnant women (346(85.6%)) are living with their husbands or partners, 259(64.1%) of pregnant women responded that their partners are involving in the care of the current pregnancy. Out of 404 study participants, 170(42.1%) of them responded that their husbands were the head of the household, only 38(9.4%) of them were the head of their household, and 232(57.4%) of them were empowered enough on the economic aspect of the household.

Obstetrics and Medical Characteristics

More than half of (250(61.9%)) pregnant women were multigravida from which 224(89.6%) of them had a normal previous delivery outcome, and 166(41.1%) of respondents were nulliparous. Among all respondents, 212(52.2%) of them have started their ANC follow-up visit before 16 weeks of gestation, 158(39.1%) of the respondents were

in the third trimester, 340(84.2%) of them have no comorbidity, and 225(55.7%) of them have hyperemesis gravidarum.

Nutritional practice of pregnant women

Nutrition related information

Table 1 Practice of dietary diversity of pregnant women following ANC services in Yeka sub-city health centers based on 24-hour recall, Addis Ababa (N = 404)

| Types of food groups | Consumed | Not consumed |
|--|------------------|------------------|
| | Number (Percent) | Number (Percent) |
| Food made from grains, white roots, tubers and plantains | 369(91.3%) | 35(8.7%) |
| Food made from peas, beans and lentils | 287(71.0%) | 117(29.0%) |
| Food made from nuts and seeds | 110(27.2%) | 294(72.8) |
| Food made from milk and milk products | 134(33.2%) | 270(66.8%) |
| Food made from meat products of any type including fish | 155(38.4%) | 249(61.6%) |
| Food made from eggs | 172(42.6%) | 232(57.4%) |
| Food made from dark green leafy vegetables | 243(60.1%) | 161(39.9%) |
| Food Made from Vitamin A rich fruits and vegetables | 186(46.0%) | 218(54.0) |
| Food made from other vegetables | 203(50.2%) | 201(49.8%) |
| Food made from other fruits | 149(36.9%) | 255(63.1%) |

The majority of pregnant women (338(83.3%)) had discussed with health care workers on maternal nutrition during their ANC visit, and among those who discussed

maternal nutrition, only 180(53.1%) of pregnant women responded that the health care workers were using visual counseling aid/flip chart during counseling. Among all study participants, 276(68.3%) of them had enough information or awareness about maternal nutrition, and among those who had enough awareness, 150(54.3%) study participants got information from HWs or HEWs. Among all study participants, only 72(17.8%) of them reported pregnancy-related food taboos within the community, 110(27.2%) of them avoid or hate one or more food items during pregnancy, and 211(52.2%) of the study participants have food cravings related to the current pregnancy.

Dietary diversity practice

Only 162(40.1%) of the study participants had a habit of eating snacks between meals.

As shown by table 1 above, majority of (369(91.3%)) of pregnant women had consumed food group made from grains, white tubers and plantains which is the most consumed food group followed by food made from peas, beans and lentils (287(71%)) and food group made from dark green-leaf vegetables (243(60.1%)). Food group made from nuts and seeds is the least consumed food group by pregnant women (110(27.2%)) followed by food group made from milk and milk products (134(33.2%)) and food group made from other fruits (149(36.9%)).

As shown by Fig. 1 below, the mean dietary diversity score of pregnant women following ANC services in Yeka sub city health centers is 4.97 ± 2.014 SD and range of 8.

Out of 404 study participants, below half (179(44.31%)) of the pregnant women

consumed five and above food groups per day and the rest 225(55.69%) of them consumed less than five food groups per day within 24 hours prior to the day of data collection.

About 183(45.3%) of them had eaten four and above times per day and 221(54.7%) of them had eaten less than 4 times per day. The overall nutritional practice of pregnant women following ANC service showed that about 126(31.2%) of the study participants consumed at least 4 times a day and consumed five and above food groups per day.

Finally, the proportion of pregnant women who had good nutritional practice in Yeka sub city health centers is 31.2%.

Factors affecting nutritional practice of pregnant women

In bivariate regression analysis, college and above education level, occupational status of private business and employee (gov't or private), husband/partner occupational status of private business and employee (gov't or private), average household monthly income of > 5000 ETB, discussion of HWs about maternal nutrition during ANC visit, using counseling aid during counseling session, habit of eating snacks, partner support or involvement in pregnancy care, head of the household and women empowerment on household economy was significantly associated with good nutritional practice of pregnant women ($p < 0.05$).

Independent variables showing p-value less than 0.25 in bivariate analysis was selected to run multivariate analysis. In multivariate analysis, husband/partner occupational status of an employee gov't and private, average monthly income of the household > 5000 ETB, use of counseling aid or flip char during ANC visit, the habit of eating a snack, husband/partner involvement/support on pregnancy care, head of the household, and women empowerment on the household economy had a significant association with the nutritional practice of pregnant women ($p < 0.05$).

Table 2

Bivariate and multivariate analysis of factors affecting the nutritional practices of pregnant women following ANC service in Yeka sub city health centers in Addis Ababa, 2022 (N = 404)

| Variables | | Nutritional Practice | | COR (95% CI) | | AOR (95% CI) | |
|---|------------------------------|------------------------------|---------------------------------|------------------------|-----------|---------------------------------------|---------|
| | | Poor (< 5 food groups) | Good (≥ 5 food groups) | | P-value | | P-value |
| Educational level | No formal education | 76(18.8%) | 45(11.1%) | 1 | | 1 | |
| | Primary and Secondary school | 111(27.5%) | 70(17.3%) | 1.065 (0.663–1.712) | 0.795 | 0.488 (0.224–1.064) | 0.071 |
| | College and above | 38(9.4%) | 64(15.8%) | 2.844 (1.649–4.906) | < 0.001 | 0.477 (0.172–1.321) | 0.154 |
| Occupational status | House wife and daily laborer | 103(25.5) | 36(8.9%) | 1 | | 1 | |
| | Private business | 42(10.4%) | 55(13.6%) | 3.747 (2.156–6.511) | < 0.001 | 2.297 (0.968–5.449) | 0.059 |
| | Employee (gov't and private) | 80(19.8%) | 88(21.8%) | 3.147 (1.937–5.114) | < 0.001 | 2.479 (1.00–6.149) | 0.050 |
| Husbands'/Partners' occupational status | Jobless and daily laborer | 35(8.7%) | 9(2.2%) | 1 | | 1 | |
| | Private business | 74(18.3%) | 57(14.1%) | 2.995 (1.333–6.733) | 0.008 | 1.973 (0.611–6.371) | 0.256 |
| | Employee (gov't and private) | 116(28.7%) | 113(28.0%) | 3.788 (1.742–8.239) | 0.001 | 3.294 (1.056–10.276) | 0.040 |
| Average house hold monthly income | < 2000 ETB | 20(8.9%) | 1(0.6%) | 1 | | 1 | |
| | 2000–5000 ETB | 105(46.7%) | 29(16.2%) | 5.524 (0.711–42.9) | 0.102 | 4.098 (0.415–40.43) | 0.227 |
| | > 5000 ETB | 100(44.4%) | 149(83.2%) | 29.8(3.936–225.6) | 0.001 | 9.993 (1.012–98.72) | 0.049 |

Table 7

Bivariate and multivariate analysis of factors affecting the nutritional practices of pregnant women following ANC service in Yeka sub city health centers in Addis Ababa, 2022 (N = 404) (continued)

| | | | | | | | |
|--|---------|------------|------------|----------------------|---------|----------------------------|---------|
| Do the health worker use counseling aid or flip chart during counseling | Yes | 62(35.8%) | 118(71.5%) | 4.90 (3.028–7.485) | < 0.001 | 2.551 (1.329–4.897) | 0.005 |
| | No | 111(64.2%) | 47(28.5%) | 1 | | 1 | |
| Do you have a habit of eating snacks | Yes | 52(12.9%) | 110(27.2%) | 5.304 (3.443–8.170) | < 0.001 | 4.286 (2.253–8.152) | < 0.001 |
| | No | 173(42.8%) | 69(17.1%) | 1 | | 1 | |
| Do your partner involved the pregnancy care | Yes | 109(27.0%) | 151(37.4%) | 5.739 (3.549–9.281) | < 0.001 | 3.908 (1.848–8.263) | < 0.001 |
| | No | 116(28.7%) | 28(6.9%) | 1 | | 1 | |
| The head of the house hold | Wife | 17(4.2%) | 21(5.2%) | 1 | | 1 | |
| | Husband | 131(32.4%) | 39(9.7%) | 0.241 (0.116–0.501) | < 0.001 | 0.139 (0.048–0.401) | < 0.001 |
| | Both | 65(16.1%) | 117(29.0%) | 1.457 (0.718–2.957) | 0.297 | 0.436 (0.155–1.223) | 0.115 |
| | Other | 12(3.0%) | 2(0.5%) | 0.135 (0.026–0.867) | 0.016 | 0.353 (0.055–2.280) | 0.274 |
| Are you empowered enough to lead your house hold economy | Yes | 71(17.6%) | 161(39.9%) | 19.40(11.055–34.047) | < 0.001 | 9.603 (4.879–18.90) | < 0.001 |
| | No | 154(38.1%) | 18(4.5%) | 1 | | 1 | |
| COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio, CI = Confidence Interval HWs = Health workers, gov't = Government | | | | | | | |

As shown in the Table 2, in multivariate analysis, pregnant women who had a husband/partner employees of government or private were 3.3 times more likely to have good nutritional practice than pregnant women whose husband/partner was jobless and daily laborer (AOR = 3.294, 95% CI: 1.056–10.276). Likewise, pregnant women who had an average monthly household income of greater than 5000 ETB were 9.9 times more likely to have good nutritional practice than pregnant women who had average monthly income of less than 2000 ETB (AOR = 9.993, 95% CI: 1.012–98.72). Pregnant women for whom HWs were using counseling aid or flip chart during ANC follow up counseling session were 2.5 times more likely to have good nutritional practice than pregnant women for whom HWs were not using any counseling aid or flip chart during ANC visit counseling session (AOR = 2.551, 95% CI: 1.329–4.987). Pregnant women who had a habit of eating snacks between meals had 4.3 times more likely to have good nutritional practices than pregnant women who had not a habit of eating snacks between meals (AOR = 4.286, 95% CI: 2.253–8.152). Pregnant women whose husband/partner had involved or supported the pregnancy care had 3.9 times more likely to have good nutritional practice than pregnant women whose husband/partner had not supported the pregnancy care (AOR = 3.908, 95% CI: 1.848–8.263). Pregnant women

whose husband/partner was the head of the household were 0.14 times less likely to have good nutritional practice than pregnant women who led their household (AOR = 0.139, 95% CI: 0.048–0.401). Pregnant women who were empowered on their household economy were 9.6 times more likely to have good nutritional practice than pregnant women who were not empowered (AOR = 9.603, 95% CI: 4.870–18.90).

Discussion

This study showed that most (91.3%) of pregnant women consumed cereals, white roots and plantains; and 27.2% of pregnant women consumed nuts and seeds. So, the most consumed food group was cereals, white roots, tubers and plantains; and the least consumed food groups was nuts and seeds. The mean DDS was 4.97 ± 2.014 SD with range of 8. Which makes this study at the same level with study conducted in Addis Ababa public hospitals which stated that 100% of pregnant women had consumed cereals with mean DD score of 5.45 ± 1.83 SD with range of 7; and study conducted in West Gojjam, North Western Ethiopia also indicated that 100% of pregnant women consumed cereals daily (5, 10).

This study results also showed that 44.3% pregnant women have high dietary diversity score (consuming five and above food groups per day) which is higher than a systematic review conducted in India which indicated that only 17.8% of pregnant women have higher dietary diversity consuming five and above food groups per day (17). This study result showed that 31.2% of pregnant women had good nutritional practice is almost the same as the study conducted in Guto Gida Woreda in East Wollega zone which showed that 33.9% of pregnant women had good dietary practice during their pregnancy period (18).

As compared to study conducted in Ambo district, West Shoa Oromia which indicated that only 25% of pregnant women were found to have good dietary diversity practices, this study result is slightly higher result that 31.2% of pregnant women were found to have good nutritional practices. Likewise another study which was conducted in Dessie town illustrated that 45.2% of pregnant women had good dietary diversity which is much higher than this study result (11, 19).

Regarding the factors affecting the nutritional practice of pregnant women. multivariate binary logistics regression analysis showed that pregnant women's husband/partner occupational status, average monthly household income, HWs' use of nutritional counseling aid or flip chart, habit of eating snacks, husband or partner involvement and support, head of the household, and women empowerment on household economy are the factors affecting nutritional practice of pregnant women.

Conclusion

Based on this study finding, we can conclude that 44.31% pregnant women had high dietary diversity score, the mean DDS was found to be 4.97 ± 2.014 SD. The most commonly consumed food group is cereals, tubers, white roots and plantains, and the least consumed food group was nuts and seeds. The proportion of pregnant women who had good FF was 45.3%.

Finally, only 31.2% of pregnant women had good nutritional practice (having high DDS and good FF) during pregnancy. The risk factors that affect the nutritional practice of pregnant women were husband/partner occupation status, average monthly HH income, HWs' use nutritional of counseling aid during ANC visits, the

habit of eating snacks, husband/partner involvement and support on pregnancy care, head of the household, women empowerment on the economy of the HH.

So, this study finding recommends that focusing the importance of collaboration among all parties involved in enhancing nutritional practices during pregnancy, which is the cornerstone of enhancing the community's overall nutritional and health status. Health workers needs to re-enforce the counseling session of pregnant women with help of counseling aids, sub city health office and AA Regional health bureau should ensure the appropriate material and technical support for front line HWs, and the ministry of health needs to ensure the availability of proper monitoring and evaluation platform and the community at large should support the structures that encourage women empowerment in different activities of the societies.

Abbreviations

AA

Addis Ababa

AACAHB

Addis Ababa City Administration Health Bureau

ANC

Antenatal Care

AOR

Adjusted Odds Ratio

CI

Confidence Interval

COR

Crude Odds Ratio

DDS

Dietary Diversity Score

EFY

Ethiopian Fiscal Year

ETB

Ethiopian Birr

FF

Food Frequency

Gov't

Government

HH Household

HWs

Health Workers

SD

Standard Deviation

WHO

World Health Organization.

Declarations

Acknowledgment

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Authors contribution

MT is contributed for study design, collection, analysis and interpretation of this research and BA has contributed on editorial and refinement works

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Availability of data and materials

All the data and materials can be accessed through the corresponding authors

Ethics approval and consent to participate

Ethical clearance was obtained from Yekatit 12 Hospital Medical College and AACAHB Ethical review committee. Written consent was secured from study participants and confidentiality is maintained by excluding personal identifiers from the questionnaire.

Consent for publication

not applicable

Competing of interest

The authors declare that they have no competing of interests.

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Figures

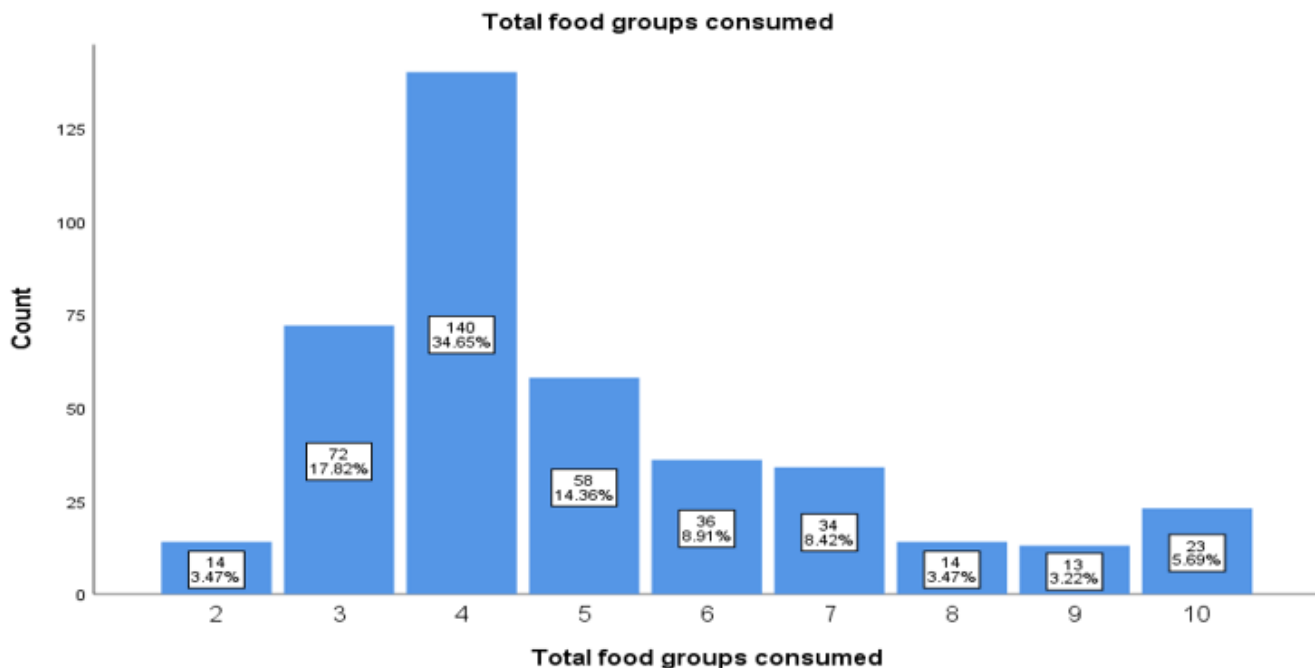


Figure 1

Graphical representation of the number of food groups consumed per day of pregnant women following ANC services in Yeka sub city health centers in Addis Ababa (N=404)