

Relationship between nutritional practices and nutritional status of pregnant adolescents in Adjumani town council. A cross-sectional study.

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Abstract Background

Uganda, like many countries in sub-Saharan Africa, grapples with a high prevalence of adolescent pregnancies. Relationship between Nutritional practices and nutritional status of pregnant adolescents in Adjumani town council.

Methodology

A cross-sectional study consisting of 288 pregnant adolescents was conducted. Data was collected on socio-demographic variables, nutritional knowledge, attitudes, practices, and nutrition status indicators such as BMI. Pearson correlation was used to establish relationships between variables.

Results

41.7% of the respondents (120/288) were aged 19 years and 62.5% (180/288) were married. Pearson correlation between dietary practice and nutritional status is 0.338 (p-value = 0.000, $X^2 = 0.000$), indicating a moderate positive and significant association between dietary practices and nutritional status. Participants with good practices are more likely to have normal nutrition status (83.3%) than those with bad practices (55.6% underweight). Participants with Good Practice 60 (83.3%) were of normal weight, while 12 (16.7%) were underweight, those with Bad Practice 96 (44.4%) were of normal weight, while 120 (55.6%) were underweight. The regression coefficient for dietary practice is ($B = -0.392$, $SE = 0.064$, $\beta = 0.340$, $t = -6.084$, and $p = 0.000$).

Conclusions

Poor dietary practices were associated with being underweight and a low monthly income was associated with poor dietary practices, food diversity, and bad nutrition status.

Recommendations

Adjumani District, through the Department of Education and Sports, can provide school-based nutrition education to target adolescents at school and impact them with nutrition knowledge earlier.

Keywords: Dietary practices, Nutrition status, Pregnant adolescents in Adjumani Town Council

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Background

Uganda, like many countries in sub-Saharan Africa, grapples with a high prevalence of adolescent pregnancies. According to the Uganda Demographic and Health Survey (UDHS) 2016, approximately 25% of adolescent girls, aged 15 to 19 in Uganda have begun childbearing, with significant regional disparities. Inadequate access to comprehensive sexuality education, limited availability of contraceptives, early marriage, and poverty contribute to the high rates of adolescent pregnancies in the country. Furthermore, malnutrition among pregnant adolescents exacerbates the risks associated with adolescent pregnancy, leading to adverse maternal and child health outcomes. Adolescents

(individuals aged 10-19 years) constitute the biggest proportion of Uganda's population standing at 25.6% (UDHS 2016). Uganda has a high adolescent childbearing rate; recent estimates indicate that 25% of 15–19-year-olds have begun childbearing (UBOS & ICF, 2018).

Adolescents often face barriers such as limited access to nutritious foods, cultural norms, and socioeconomic factors that influence their dietary practices (Chen et al., 2007). Mid Upper Arm Circumference (MUAC) is a simple and reliable tool for screening nutritional status and enables rapid assessment of large populations in epidemiological field studies. Traditionally, MUAC has served as a practical proxy measure of undernutrition and

in particular, of severe acute malnutrition among infants, children under 5 years (Goossens et al., 2012), and pregnant women (Tang et al., 2013). The nutrition status of pregnant mothers is measured by the use of MUAC. The MUAC of ≥ 23 cm is normal, ≥ 19.0 cm & < 23.0 cm is MAM and < 19.0 cm is SAM (Ververs, Antierens, Sackl, Staderini, & Captier, 2013). Relationship between Nutritional practices and nutritional status of pregnant adolescents in Adjumani town council.

Methodology

Research design

This study adopted a cross-sectional study design to collect data on Dietary Knowledge, Attitudes, Practices, and Nutritional status of pregnant adolescents. The cross-sectional study design involved the collection of data on the variables of interest at a single point in time. This design allowed for the assessment of the current practices, and nutrition status of the pregnant adolescents in Adjumani Town Council. The cross-sectional design was well suited for this study for the following reasons: The cross-sectional design provided a snapshot of the nutritional knowledge, attitudes, practices, and nutrition status of pregnant adolescents at a specific point in time. This aligned with the research objective of determining the current state of these factors. The Cross-sectional study was efficient in terms of time and resources, as data can be collected from the target population at a single point in time, rather than requiring multiple rounds of data collection over time. The cross-sectional design allowed examination of the relationships between the independent variables (Nutritional practices) and the dependent variable (nutritional status) among the pregnant adolescents. Given the constraints of time and resources, a cross-sectional study was a feasible approach to address the research objective within the given context of Adjumani Town Council. By adopting a cross-sectional study design, the researcher was able to provide a comprehensive assessment of the nutritional practices, and nutrition status of pregnant adolescents in Adjumani Town Council, which can inform the development of targeted interventions and policies to address any identified gaps or issues like on educational level, Poor cooking practices, lack of Awareness, Emotions, and thoughts then lastly Acute malnutrition.

Study population

The study targeted all pregnant adolescents (10-19 years), who satisfied the selection criteria. Adjumani Town Council is situated in Adjumani District, located in the Northern region of Uganda. The town council encompasses an area of approximately 33 square kilometers and is characterized by its diverse landscape, including plains and scattered vegetation. With an estimated population of over 100,000 inhabitants, Adjumani Town Council serves as a bustling hub within the district. It is strategically positioned approximately 40 kilometers southwest of the district headquarters, making it easily accessible via major transportation routes. Adjumani Town Council is made up of three

parishes and Twenty-five villages. Thousands of refugees in Adjumani are mainly from South Sudan and are of diverse ethnic backgrounds; Dinkas, Kuku, Nuer, Kakwa, Madi, and Siluk are housed there. These villages are home to a diverse population, consisting of various ethnic groups and cultures. Additionally, Adjumani Town Council has emerged as a significant host community for refugees fleeing conflicts in neighboring countries such as South Sudan and the Democratic Republic of the Congo. Adolescent pregnancies are associated with higher risks of adverse maternal and neonatal outcomes compared to adult pregnancies. Pregnant adolescents are a vulnerable population that requires special attention and support. By selecting the study population of pregnant adolescents aged 10-19 years in Adjumani Town Council, the researcher effectively addressed the research objectives and generated valuable insights to improve the nutritional practices and status of this vulnerable population.

Study sample computation

The sample for the study was drawn from the identified target population through a systematic sampling approach, ensuring representation across different demographic characteristics such as age, marital status, and socioeconomic status. This sampling strategy aimed to capture the diversity within the population and provide insights into the nutritional status and practices of pregnant adolescents in Adjumani Town Council. The Fisher's equation (Jung, 2014);

$$n = \left(\frac{z^2 XpXq}{d^2} \right)$$

was used to determine the sample size where the total population is greater than 10,000.

n = desired sample size

z = the standard normal deviate at the required confidence level (1.96 for a 95% confidence level)

p the proportion of the target population estimated to have the characteristics being measured (0.25 for 25%) q = complementary proportion to p ($1 - 0.25 = 0.75$) d = level of accuracy of the statistic being measured (0.05 for 5%)

The proportion of adolescent mothers either pregnant or lactating is 25%

(UBOS & ICF, 2018), hence 0.25 Plugging in the values:
 $= (1.96^2 \times 0.25 \times 0.75)$

$$0.052$$

$$n = (3.8416 \times 0.1875)$$

$$0.0025$$

$$n = (0.7206)$$

$$0.0025$$

$$= 288.24 \text{ participants}$$

The sample size (n) selected required for the study was 288.

Inclusion Criteria

The study included all pregnant adolescents (10-19 years) who had been residents of Adjumani Town Council for

six months before data collection and who consented to the study.

Exclusion Criteria

The study excluded pregnant adolescents who were above 19 years old. In addition, those who are mentally ill, very busy, and very sick were excluded.

Sampling techniques

Two-stage cluster sampling technique was used. Adjumani Town Council has 7 villages from which the primary clusters were identified using simple random sampling by listing the names of the 7 villages on pieces of paper, shaking them in a handy container, throwing them on the ground, and picking the first three without replacement to ensure equal chance of participation. Also, the primary clusters were households from the villages selected having pregnant adolescents. Since there was a list of households to be used as a guide, the researcher used a systematic random sampling technique in the selected villages. The researcher determined the sampling interval by dividing the total number of households with pregnant adolescents by the required sample size. Then randomly selected the first household to be included in the sample by generating a random number between 1 and the sampling interval. After selecting the first household, proceeded to select every g -th household (where g is the sampling interval) until the desired sample size was reached. For example, if there were 500 households with pregnant adolescents in the selected primary clusters, and the required sample size is 289, the sampling interval would be $500 / 289 = 1.73$. Rounding down, the sampling interval would be 2. The researcher then randomly selected the first household by generating a random number between 1 and 2 and then selected every 1st household thereafter until the sample of 289 pregnant adolescents was achieved.

Data collection methods

Qualitative Methods

Qualitative data were obtained through semi-structured interviews and key informant interviews. Semi-structured interviews were conducted with caregivers of pregnant adolescents to gain insights into household dynamics and support systems. Key informant interviews were conducted with healthcare providers and community leaders to understand contextual factors influencing maternal nutrition.

Structured interviews

Structured interviews using 24-hour dietary recalls were conducted to enhance the precision of estimating the usual dietary intakes of the selected respondents. This method provided detailed information on the types of food consumed throughout the day, offering a comprehensive view of their dietary practices.

Face-to-Face Structured Interviews

Face-to-face structured interviews with primary caregivers and participants were conducted to allow for an in-depth exploration of socio-demographic characteristics, feeding practices, and nutritional status. The interviews were conducted in the local language to ensure clear communication and accurate data collection.

Quantitative Methods

For the quantitative part of the study, a structured survey questionnaire was administered to both caregivers and pregnant adolescents. The questionnaire gathered information on the general characteristics, nutritional status, and dietary Practices of pregnant adolescents. Specific areas of inquiry included dietary diversity, frequency of food consumption towards healthy eating, and practices related to meal preparation and consumption. The combination of quantitative and qualitative approaches enabled the researcher to collect comprehensive and reliable data to address the research objectives effectively.

Data collection tools

Surveys and Questionnaires

A research-administered questionnaire was used for data collection on socioeconomic characteristics, dietary knowledge, attitudes and practices, and nutritional status. The level of nutritional knowledge and attitude were determined by the use of a modified questionnaire template from Marias and Glasauer (2014). The respondents were allowed to choose correct answers by indicating whether a given statement was “Yes” or “No”. The responses were then scored and computed for the nutrition knowledge and attitude variables.

Interviews

Interviews provide in-depth information on dietary practice and nutrition status among pregnant adolescents and are useful for qualitative research. They were conducted in person (face to face) and the interviews were both structured and unstructured. A 24-hour recall was used to collect information on dietary practices related information. The questionnaire also had a section for collecting data on nutrition status by use of MUAC- a recognized method to depict the nutritional status of pregnant mothers.

Data analysis

Quantitative data analysis

The raw data from the questionnaires were coded, cleaned, sorted, and then exported into the SPSS (Version 20) data analysis package which was analyzed quantitatively using descriptive statistics like frequency counts and then presented in comprehensive tables and charts showing the responses.

Qualitative data analysis

All collected data were sorted by checking for any errors, grouped into themes, and analyzed as postulated in the research objectives. Coding was done to aid in labeling and organization of qualitative data collected using an interview guide to identify different themes and the relationships between them. The exact verbal responses of the respondents were quoted directly. A descriptive analysis of socio-demographic information was carried out using Statistical Package for the Social Sciences (SPSS) Version 20.0. Simple frequencies were computed on sex, age, income, knowledge, and attitude scores. Pearson correlation was used to establish the relationships between socio-demographic and economic variables and the nutrition status of pregnant adolescents. Dietary diversity data was entered into SPSS software version 20.0 and described using mean, maximum, minimum, standard deviation, and percentages. After removing irrelevant parts of the data, further, cross-analysis of the study variables was carried out using the SPSS version 20.0, and thereafter the data was presented in charts and tables. The chi-square (χ^2) test was used to assess differentials' existing associations between dietary practices and nutritional status. Cross-tabulation was used to test whether there is a significant association between factors and nutritional status. Spearman rho correlation was conducted to test whether there is a significant relationship between socio-demographic characteristics, dietary knowledge, attitudes and practices, and the nutritional status of pregnant adolescents. After the analysis, a p-value of less than 0.05 was considered statistically significant. The results were presented using frequency distribution tables and indicated as frequencies or percentages in tables and figures.

Validity and reliability

Content Validity

Content validity was ensured by involving a panel of experts in the development of the questionnaire. This panel provided feedback on the relevance, clarity, and simplicity of the items, and the questionnaire was modified accordingly.

Construct Validity

Construct validity was assessed through statistical methods to determine whether the items in the questionnaire measured the constructs they were intended to measure accurately. The questionnaire used in the study was approved by a supervisor to ensure that it is appropriate for the research question and that it measures the constructs it is intended to measure accurately. Research assistants (VHTs) were thoroughly

trained to ensure that they understood the questionnaire and the procedures for administering it. This helped to minimize errors and ensured that the data collected was reliable. Statistical Analysis was done. Statistical methods were used to assess the correlation between different variables and to ensure that the findings were statistically valid.

Reliability

It is a crucial aspect of quantitative research, as it ensures that the data collected is accurate and can be replicated. The reliability of the questionnaire was based on the pilot results. The questionnaire was piloted on pregnant adolescents aged 15 – 19 years in Adjumani town council, Adjumani district. The piloted results were entered into SPSS Version 20 and a reliability analysis was conducted and revised to ensure that the data collected in this study is consistent, stable, and can be replicated, thereby enhancing the overall quality and trustworthiness of the research findings.

Quality control

The researcher (nutrition student) collected accurate data and ensured ethical considerations were followed. The respondents were taken through the process of understanding the research purpose the risks of being involved in the study, and the definition of the terms that were used. Research assistants (VHTs) were trained especially on how to collect more accurate data and how to ensure ethical considerations are followed. Data tools were reviewed for completeness and accuracy. Data collection tools were pre-tested to ensure accuracy.

Ethical considerations

The study was for academic purposes and the information obtained from the respondents was treated with confidentiality and anonymity. After approval of this research proposal, permission to collect data and information was facilitated through a letter of introduction from the Faculty of Agricultural Sciences, in the Uganda Christian University. In addition to this, permission from local Government Authorities was obtained. Informed consent was sought from each participant before the commencement of an interview. Also, participants were free to answer some of the questions or end the interview at any time when they felt to do so. Moreover, all information gathered was handled with utmost confidentiality.

Results

Univariate Analysis: Demographic and socio-economic characteristics of pregnant adolescents.

Table 1: Demographic and Socio-Economic characteristics of the participants.

Variable	Frequency (n=288)	Percentages (%)
Age		
15 years	24	8.3
16 years	24	8.3
17 years	36	12.5
18 years	84	29.2
19 years	120	41.7
Religion		
Anglican	36	12.5
Muslim	72	37.5
Catholic	96	33.3
Born Again	48	16.7
Marital status		
Single	72	25.0
Divorced	36	12.5
Married	180	62.5
Education Level		
Undergraduate	12	4.2
Certificate	72	25.0
Secondary	84	29.2
Primary	120	41.7
Occupation		
shop attendant	72	25.0
Farmer	98	33.3
Market Vendor	48	16.7
Cleaner	12	4.2
Home keepers/No job	60	20.8
Monthly Income Level		
<50,000shs	120	41.7
50,000-<100,000shs	72	25.0
100,000-<200,000shs	12	4.2
200,000-<400,000shs	72	25.0
400,000-<600,000shs	12	4.2

Table 1, about half of the participants 41.7% (120/288) were aged 19 years, and 62.5% (180/288) of the participants were married. 41.7% (120/288) had a

primary level of education and the majority 33.3% (98/288) were farmers with 41.7% (120/288) having a monthly income level of <50,000shs.

Figure 2: Percentages of pregnant adolescents and their pregnancy age.

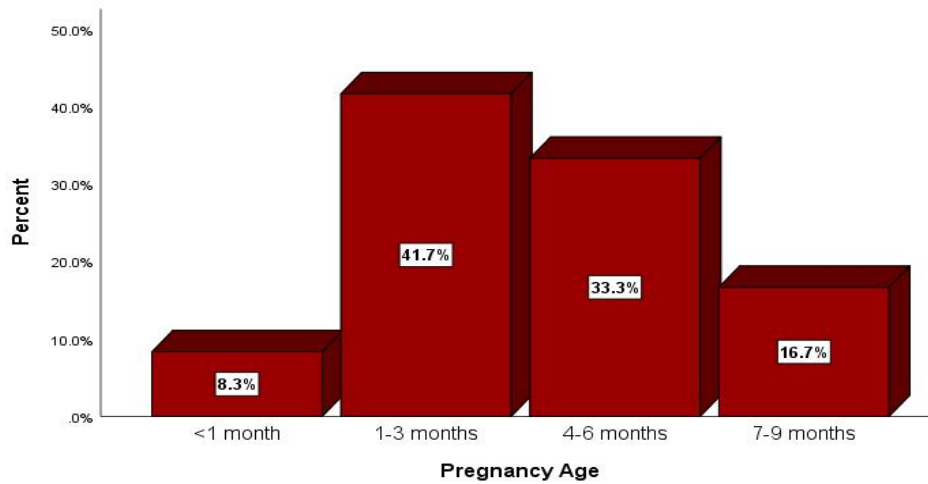


Figure 2 shows the pregnancy age of the adolescents. About half 41.7% (120/288) participants had a pregnancy of 1-3 months.

Number of ANC Visits among pregnant adolescents.

Figure 3: Number of ANC Visits among pregnant adolescents in Adjumani District.

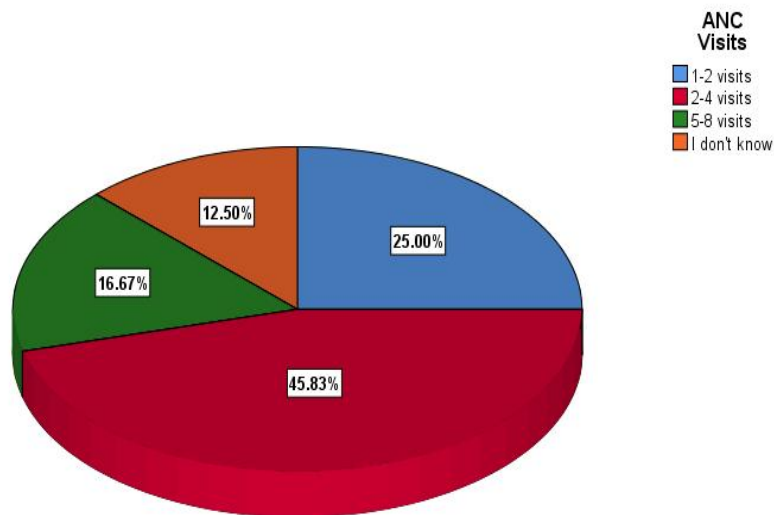


Figure 3 shows the number of ANC Visits among pregnant adolescents. 25% (72/288) of the pregnant adolescents attended at least 12 visits, 45.83% (132/288)

attended 2-4 visits, 16.67% (48/288) attended 5-8 visits and 12.5% (36/288) didn't know the number of visits that they attended.

Nutrition status of pregnant adolescents.

Figure 4: Nutrition status of pregnant adolescents.

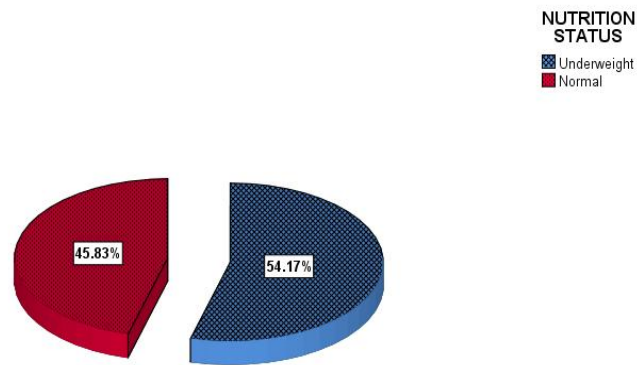


Figure 4 shows the nutrition status of pregnant adolescents. 54.17% (156/288) of the pregnant Adolescents were underweight and the rest 45.83% (132/288) had a normal nutrition status.

with a relatively lower standard deviation, indicating less variability in practices compared to other variables. The mean nutrition status score indicates that about half of the participants have a normal nutritional status, with a standard deviation indicating a moderate variation in nutritional status across the sample.

Descriptive statistics of nutrition practices of pregnant adolescents

The mean score for dietary practice shows that participants generally reported good dietary practices,

Table 2: Mean and standard deviation of nutrition practices of pregnant adolescents

Variables (N=288)	Mean	Std. deviation
Dietary practice	1.75	0.434
Nutrition status	0.54	0.499

Table 2, 75% (216/288) had bad dietary practices.

Table 3: Descriptive statistics of nutrition practices of pregnant adolescents

Variable	Frequency (n=288)	Percentages (%)
Dietary practice		
Good	72	25.0
Bad	216	75.0
Nutrition status		
Normal	132	45.8
Underweight	156	54.2

Dietary practices of pregnant adolescents

Figure 5 shows that 75% of the pregnant adolescents had poor dietary practices and only 25% had good dietary practices.

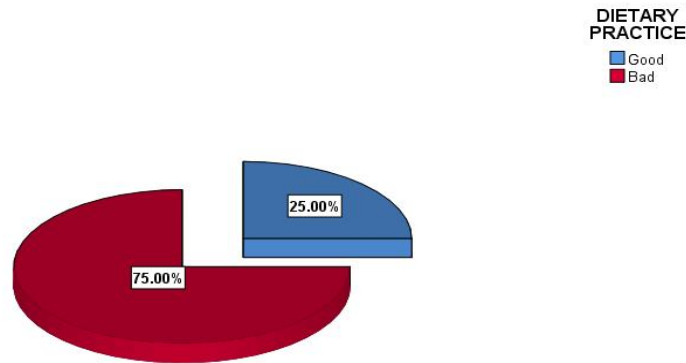


Figure 6: Dietary practice of pregnant adolescents

Bivariate analysis

Table 4: Relationship between nutrition knowledge, attitude and practices and nutrition status of pregnant adolescent

Variable (N=288)	Nutrition status		Pearson correlation	p-value	X ²
	Normal	underweight			
Dietary practice			0.338	0.000**	0.000
Good	60(83.3%)	12(16.7%)			
Bad	96(44.4%)	120(55.6%)			

**Statistically significant factor*

Nutritional Status

Among the 288 pregnant adolescents, 132 (45.8%) had a normal weight and 156 (54.2%) were underweight.

Relationship between Dietary Practice and Nutritional Status

Pearson correlation between dietary practice and nutritional status is 0.338 (p-value = 0.000, X² = 0.000), indicating a moderate positive and significant association between dietary practices and nutritional status. Therefore, participants with good practices are more likely to have normal nutrition status (83.3%) compared to those with bad practices (55.6% underweight). This significant association indicates that good dietary practices are related to better nutritional status.

This result is in agreement with responses from KII; *"They consume a lot of starchy foods with very few fruits and vegetables due to limited financial resources, they always report choosing cheaper, less nutritious options, making it difficult for them to afford a balanced diet", (midwife 2 from Adjumani Hospital)*

Good Practice: 60 (83.3%) were of normal weight, while 12 (16.7%) were underweight.

Bad Practice: 96 (44.4%) were of normal weight, while 120 (55.6%) were underweight.

Multiple Regression Analysis

A multi-linear regression analysis was conducted to examine the relationship between nutrition knowledge, dietary attitude, and dietary practice on the nutritional status of pregnant adolescents.

Table 5: Multi-linear regression analysis between nutrition knowledge, attitude, and practice of pregnant adolescents.

Variable	B	Coefficient Std. Error	β	t	p-value
Dietary practice	-0.392	0.064	-0.340	-6.084	0.000

*a. Dependent Variable: NUTRITION STATUS
Statistically significant factor

Dietary Practice

The regression coefficient for dietary practice is ($B=-0.392$, $SE=0.064$, $\beta=-0.340$, $t=-6.084$, and $p=0.000$). This indicates that dietary practice is a significant predictor of nutritional status, with better dietary practices associated with better nutritional outcomes.

Discussions

Dietary practices among pregnant adolescents.

The study showed bad (poor) dietary practices among pregnant adolescents (75%). The majority (45.8%) of the pregnant adolescents consumed only 2 meals per day with higher consumption of cereals, legumes (2-3 times a week), and pulses than meat, fruits, and vegetables (once a week). This finding is similar to a study in Addis Ababa, Ethiopia where 204 (63.4%) reported eating more carbohydrates between meals during their pregnancy (Zelalem, 2018).

Another study conducted in the West Arsi Zone, Central Ethiopia reported that 78% had inadequate dietary diversity practice during the preceding 24 h of the survey (95% CI (74.3%, 82.8%)). The most frequently eaten foods were pulses (79%) and starchy foods (81.3%) and the least consumed foods were, fruits (3.48%) and meats (2.8%) (Tesfaye, 2024). Eating a balanced and diversified diet is important for fetal growth and development. However, most adolescents reported not eating a balanced diet due to financial constraints to purchase a variety of foods making them consume cheap and less nutritious foods.

Nutrition status of pregnant adolescents

The study indicates that 54.17% (156/288) of the pregnant adolescents are underweight and 45.83% (132/288) have normal nutrition status. Undernutrition is detrimental to health both their health and the fetus. Studies have shown a high prevalence of underweight among pregnant adolescents, emphasizing the need for targeted interventions to improve their nutritional status.

Conclusions

Poor dietary practices were associated with being underweight and a low monthly income was associated with poor dietary practices, food diversity, and bad nutrition status.

Recommendations

Adjumani District through the Department of Education and Sports can provide school-based nutrition education

to target adolescents at school and impact them with nutrition knowledge earlier.

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List of abbreviations

ANC: Antenatal Care
BMI: Body Mass Index
ICF: International Classification of Functioning, Disability and Health
MIHS: Mildmay Institute of Health Sciences
MUAC: Mid-upper arm circumference
UBOS: Uganda Bureau of Statistics
UDHS: Uganda Demographic and Health Survey

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The study was not funded.

Conflict of interest

The author did not declare any conflict of interest.

Author Biography

Charles Serwambala is a student of Bachelor of Science in Human Nutrition and Clinical Dietetics at Uganda Christian University at Mild May Institute of Health Sciences.

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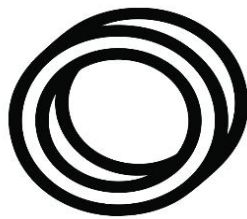
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