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Determinants of Undernutrition Among Pregnant Mothers Receiving ANC at Mubende Regional Referral Hospital

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ABSTRACT

Pregnancy and lactation are crucial periods for a woman's health, as they require increased nutrient intake to meet their needs. This study aimed to identify factors associated with undernutrition among pregnant mothers at Mubende Regional Referral Hospital. A descriptive cross-sectional study used qualitative and quantitative data collection methods, with survey questionnaires administered to pregnant mothers. Data analysis was performed using SPSS version 22.0, with descriptive statistics used for summary and organization. The study found a 17.9% prevalence of undernutrition among pregnant mothers. Predictors of undernutrition included regular consumption of fruits and vegetables, taking fish at least 1-2 times a week, and receiving nutritional education during pregnancy. Maternal undernutrition remains a significant health issue during pregnancy. Predictors of undernutrition include eating 2-3 portions of fruits/vegetables daily, taking fish at least 1-2 times a week, and receiving nutritional education.

Keywords: Pregnancy, lactation, undernutrition and predictors

INTRODUCTION

There are heightened nutrient needs during pregnancy and lactation. Without an increase in energy and other nutrient intake to meet the increased needs during this time, the woman's body uses its own reserves, leaving her weakened and vulnerable to pregnancy-related complications [1-5]. Adequate maternal nutrition during the first 1,000 days is especially critical from conception through the first 6 months of life to improve the nutritional status of the woman and the infant and reduce the risk of adverse birth outcomes [6-10]. Maternal Undernutrition, including macro- and micro nutrient deficiencies is a significant public health problem in many developing countries [11-13]. Many women are undernourished at birth, stunted during childhood, become pregnant during adolescence, are underfed as well as overworked during pregnancy and lactation, and, consequently, give birth to low-birth-weight babies. It is these children who eventually become stunted women, perpetuating the intergeneration cycle of malnutrition among women [14-20]. Undernutrition weakens a woman's ability to survive childbirth and give birth to a healthy baby, translating into increased morbidity and mortality of mothers and their infants [21-23]. Micronutrient intake is another element in assessing Undernutrition in Africa [24-26]. Pregnant women still have issue with proper nutrition even when government has put guidelines on how to feed during pregnancy period. families have enough food to feed [27-30]. The researcher's interest in this study was prompted by social consequences maternal mortality presents on families and especially the impact on surviving children who lack maternal care.

METHODOLOGY

Study design

The research was a descriptive cross-sectional study.

Study Area

The study was done in Mubende district made up of 14 sub counties, 96 parishes and 600 villages.:

Study population

The study population were women attending ANC at MRRH annually

Inclusion criteria

Pregnant mothers that consented to take part in the study.

Exclusion criteria

Pregnant mothers that did not consent to the study.

Sample size determination

The sample size was determined using the Kish-Leslie (1965) formula $n = z^2 p (1-p) / E^2$

Where n=Estimated minimum sample size required.

P=proportion of 50% prevalence of Undernutrition and micronutrient deficiency among pregnantwomen.

Z=1.96(for 95% confidence interval)

E=margin of error set at 5%

n = 384

Sampling Procedures

Systematic sample random sampling method using ANC register was used to get respondents to avoid bias.

Data collection methods and management

This study employed face to face interview using questionnaires which were open and closed ended. Anthropometric measurements were taken and recorded.

Data Analysis

Data was analyzed using SPSS statistical software exploratory data was used at the initial stages of analysis and cover the structure of data and identify outliers or unusual entered values, quantitative data was coded and processed using SPSS version 22.0. Descriptive statistics such as frequency were used to summarize, organize and simplify the data collected

Quantitative data was presented using frequency tables

The qualitative data generated from the interview and observation guide was categorized in themes in accordance with research objectives and was reported in a narrative form along with quantitative presentation and was used to enforce the quantitative data.

Ethical consideration.

- Consent for the interview was taken before starting the interview from each participant who in this case is pregnant mother. The participants i.e. the women had the right to refuse or withdraw any time during the interview.
- Participant information was highly confidential. Before any procedure the process was explained to the mother for cooperation during the interview and measurements.
- Letter of introduction was obtained from Dean School of Clinical Medicine And Dentistry and endorsed by IREC Kampala International University, Western Campus which was taken to the district health officer (DHO)

- Any mother identified with malnutrition appropriate care was advised.
- No compensation was promised to the participant but nutrition education was offered to mother as necessarily.

RESULTS

A total of 384 pregnant women attending ANC at MRRH who met the eligibility criteria were selected using a systematic sample random sampling method after sensitizing and signing of the informed consent.

Table 1: Baseline Sociodemographic Characteristics of the Study Participants

Variable	Frequency (n)	Percent (%)
Age group		
18 years and below	49	12.8
19-34 years	284	73.9
Above 34 years	51	13.3
Education level of respondents		
No formal education	82	21.4
Primary level	90	23.4
Secondary level	153	39.8
Tertiary/university	59	15.4
Occupation of respondents		
Peasant	175	45.5
Business	101	26.3
Salaried or wage	38	9.9
Housewife/unemployed	72	18.3
Marital status of respondents		
Married	340	88.6
Single	38	9.9
Divorced/widowed/separated	6	1.5
Residence of respondents		
Rural	265	69.0
Urban	119	31.0

Table 1 above shows the baseline socio-demographic characteristics of the study participants. It can be observed from the table that the majority of the participants 73.9% (284/384) were in the age group of 19 – 34 years and many were coming from rural areas of residence 69.0%

(265/384). Many 88.6% (340/384) of the study participants were being married. Regarding the occupation of study participants, the majority 45.5% (175/384) were found to be peasants with 39.8% (153/464) having secondary level of education.

Prevalence of undernutrition among pregnant mothers at Mubende hospital.

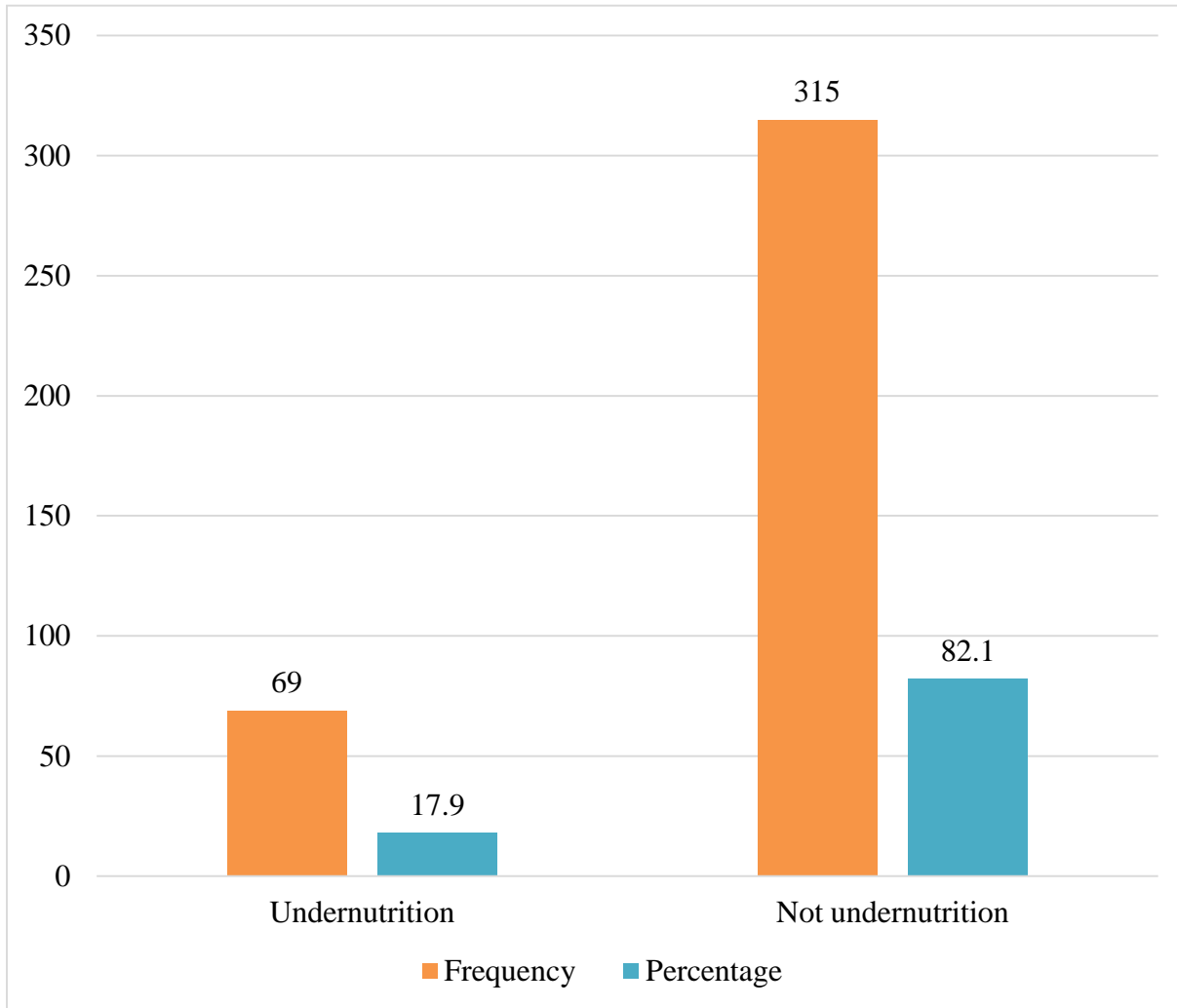


Figure 1: Prevalence of undernutrition among pregnant mothers at Mubende hospital

Figure 1 above shows the prevalence of undernutrition among pregnant mothers at Mubende hospital. It can be observed from the figure that the prevalence of undernutrition among pregnant mothers was 17.9%.

Table 2: Bivariate logistic regression to determine maternal associated factors that lead to Undernutrition during pregnancy at Mubende hospital

Variables	Undernutrition		cOR	95% CI	P-Value
	Yes	No			
Age group					
18 years and below	12 (46.1%)	14 (60.3%)	0.57	0.18-1.86	0.35
19-35 years	77 (41.4%)	109 (58.6%)	0.47	0.18-1.21	0.12
Above 34 years	12 (60.0%)	8 (40.0%)	Reference		
Education level					
No formal education	8 (32.0%)	17 (68.0%)	0.75	0.29-1.86	0.53
Primary level	19 (45.3%)	23 (54.7%)	1.31	0.65-2.65	0.46
Secondary level	21 (61.8%)	13 (38.2%)	2.56	0.97-5.58	0.25
Tertiary/University level	48 (38.7%)	76 (61.3%)	Reference		
Occupation					
Peasant	51 (48.1%)	55 (51.9%)	1.24	0.60-2.54	0.56
Business	23 (36.5%)	40 (63.4%)	0.77	0.35-1.70	0.51
Salaried or wage	9 (42.8%)	12 (57.2%)	1.00	0.35-2.88	1.00
Housewife/unemployed	18 (40.8%)	24 (57.2%)	Reference		
Marital status					
Single	18 (62.0%)	11 (38.0%)	2.34	1.05-5.23	0.04
Divorced/widowed/separated	2 (33.3%)	4 (66.7%)	0.72	0.13-4.00	0.70
Married	81 (41.1%)	116 (58.9%)	Reference		
Residence					
Rural	75 (44.9%)	92 (55.1%)	1.22	0.68-2.19	0.49
Urban	26 (40.0%)	39 (60.0%)	Reference		
Monthly income					
<150000	71 (44.6%)	88 (55.4%)	1.16	0.66-2.03	0.61
≥ 150000	30 (41.0%)	43 (59.0%)	Reference		
Take folic acid supplements					
Yes	10 (71.4%)	4 (28.6%)	3.49	1.06-11.47	0.04
No	91 (41.7%)	127 (58.3%)	Reference		
Ever smoked tobacco					
Yes	14 (37.8%)	23 (62.2%)	0.76	0.37-1.56	0.45
No	87 (55.3%)	108 (44.7%)	Reference		
Ever took alcohol					
Yes	13 (38.2%)	21 (61.8%)	0.79	0.38-1.67	0.54
No	86 (43.8%)	110 (56.2%)	Reference		
Take meat or chicken 2-3 times a week					
Yes	6 (54.5%)	5 (45.5%)	1.57	0.46-5.29	0.47
No	95 (43.3%)	124 (56.7%)	Reference		
Gravidity					
Primi-gravida	52 (48.5%)	55 (51.5%)	1.47	0.87-2.47	0.15
Multi-gravida	49 (39.2%)	76 (60.8%)	Reference		

Parity					
Nulli-para	66 (44.2%)	83 (55.8%)	0.79	0.267-2.38	0.68
multipara	28 (40.5%)	41 (59.5%)	0.68	0.22-2.16	0.52
Grand-para	7 (50.0%)	7 (50.0%)	Reference		
HIV status					
Positive	12 (57.1%)	9 (42.9%)	1.81	0.73-4.49	0.20
Negative	89 (42.3%)	121 (57.7%)	Reference		
History of diabetes mellitus					
Yes	6 (85.7%)	1 (14.3%)	8.21	0.97-69.33	0.35
No	95 (42.2%)	130 (57.8%)	Reference		
History of hypertension					
Yes	54 (44.6%)	67 (55.4%)	1.10	0.65-1.85	0.73
No	47 (42.3%)	64 (57.7%)	Reference		
Regularly eat 2-3 portion of fruit/vegetables per day					
No	72 (57.1%)	54 (42.9%)	3.54	2.04-6.16	0.01
Yes	29 (27.3%)	77 (72.7%)	Reference		
Take fish at least 1-2 times a week					
No	84 (39.8%)	127 (60.2%)	0.18	0.06-0.55	0.003
Yes	15 (78.9%)	4 (21.1%)	Reference		
Consume dairy products					
Yes	9 (69.2%)	4 (30.8%)	3.12	0.93-10.43	0.07
No	91 (41.9%)	126 (58.1%)	Reference		
Eat whole grain carbohydrate foods at least once a day					
Yes	49 (56.3%)	38 (43.7%)	2.28	1.33-3.93	0.003
No	52 (45.6%)	92 (54.4%)	Reference		
Do you regularly exposure to the sun					
No	78 (40.6%)	114 (59.4%)	0.48	0.24-0.96	0.241
Yes	23 (58.9%)	16 (41.1%)	Reference		

P value = significant value, cOR= Crude odd ratio, CI= Confidence interval.

Shown in table 3 above is the result of the bivariate logistic regression which was run to determine maternal associated factors that lead to Undernutrition during pregnancy at Mubende hospital. Results of the analysis revealed that age group, marital status, taking folic acid supplements, regularly eating 2-3 portion of fruit/vegetables per day, taking fish at least 1-2 times a week, consuming dairy products and eating whole grain carbohydrate foods at least once a day had p- values less than 0.2. Thus, they were proceeded for the next stage (multivariate stage).

Table 3: Bivariate logistic regression to determine health care system factors which contribute towards maternal under nutrition during pregnancy

Variables	Undernutrition		95% CI	P-Value	Yes	No
	n	cRR				
Delay						
<2 hours	13 (7.9)	151 (92.1)	Reference			
≥2 hours	2 (3.9)	49 (96.1)	0.5	0.10-2.17		0.337
Distance to the hospital						
<10 km	6 (13.0)	40 (87.0)	Reference			
≥10 km	9 (5.3)	160 (94.7)	0.4	0.13-1.11		0.078
Received medical care during pregnancy						
Yes	9 (5.7)	149 (94.3)	Reference			
No	6 (10.5)	51 (89.5)	1.9	0.66-5.74		0.277
Number of hospital to during pregnancy						
1-3 visits	4 (8.0)	46 (92.0)	Reference			
More than 3 visits	11 (6.7)	154 (93.3)	0.8	0.25-2.70		0.746
Received any form nutritional education during pregnancy						
Yes	9 (4.5)	193 (95.5)	Reference			
No	6 (46.2)	7 (53.8)	18.4	5.12-66.04		0.001
Received any form nutritional supplements during pregnancy						
Yes	11(6.0)	171(94.0)	Reference			
No	4(13.8)	29(83.2)	2.1	0.64-7.19		0.217

Shown in table 5 above is the result of the bivariate logistic regression which was run to determine health care system factors which contribute towards maternal under nutrition during pregnancy at at Mubende Regional Referral Hospital. Results of the analysis revealed that distance to the hospital, and receiving any form nutritional education during pregnancy of newborn had p-values less than 0.2. Thus, they were proceeded for the next stage (multivariate stage).

Table 4: Multivariate logistic regression to establish factors which contribute towards maternal under nutrition during pregnancy at Mubende Regional Referral Hospital

Variables	aOR	95% CI	P-Value
Age group			
18 years and below	0.77	0.12-4.72	0.774
19-35 years	0.44	0.11-1.82	0.254
above 34 years	Reference		
Marital status of respondents			
Single	2.12	0.69-6.41	0.185
Divorced/widowed/separated	1.86	0.26-13.09	0.535
Married	Reference		
Take folic acid supplements			
Yes	1.06	0.19-5.95	0.950
No	Reference		
Gravidity			
Primigravida	1.97	0.91-4.29	0.088
Multigravida	Reference		
Regularly eat 2-3 portion of fruit/vegetables per day			
No	3.58	1.60-8.00	0.002
Yes	Reference		
Take fish at least 1-2 times a week			
No	0.17	0.04-0.79	0.023
Yes	Reference		
Consume dairy products			
No	0.67	0.11-4.27	0.672
Yes	Reference		
Eat whole grain carbohydrate foods at least once a day			
Yes	1.34	0.63-2.86	0.453
no	Reference		
Distance to the hospital			
<10 km	1.25	0.44-3.51	0.675
≥10 km	Reference		
Received any form nutritional education during pregnancy			
No	0.13	0.06-0.295	0.001
Yes	Reference		

Table 6 shows multivariate logistic regression analysis of factors which contribute towards maternal under nutrition during pregnancy at Mubende Regional Referral Hospital. Factors with a p-value less than 0.2 with maternal under nutrition during pregnancy at bivariate logistic regression analysis were considered for multivariate analysis. At multivariate stage, regularly eating 2-3 portion of fruit/vegetables per day, taking fish at least 1-2 times a week, and receiving any form nutritional education during pregnancy were significantly associated with maternal under nutrition during pregnancy. Women who were not regularly eating 2-3 portion of fruit/vegetables per day were 3.58 times more at risk of maternal under nutrition during pregnancy than participants who were regularly eating 2-3 portion of fruit/vegetables per day (aRR 3.58, 95%CI 1.60-8.00, P=0.002). While women who took fish at least 1-2 times a week were 83% less at risk of maternal under nutrition during pregnancy than participants who did not (aRR 0.17, 95%CI 0.04-0.79, P=0.023). On the other hand, women who did not receive any form nutritional education during pregnancy were 87% less at risk of maternal under nutrition during pregnancy than participants who received any form nutritional education during pregnancy (aRR 0.13, 95%CI 0.06-0.295, P=0.001).

DISCUSSION

In this study, the prevalence of undernutrition among pregnant mothers at Mubende hospital. It can be observed from the figure that the prevalence of undernutrition among pregnant mothers was 17.9%. It is estimated that between 10-19% of pregnant women in many developing countries are affected with (undernutrition) BMI of less than $<18.5\text{kg}/\text{m}^2$ [31]. The most recent estimates suggest that the global prevalence of anemia in 2016 among women was 33% representing total number of 613 million women with anaemia in 2016 [32]. An estimated 18% of global maternal mortality is attributable to iron deficiency [Lisa S, Laura et al. 2012] in the same research done in Ethiopia results showed that iron-folic acid (IFA) supplements were not widely consumed ($<1\%$ received the recommended 90 tablets in pregnancy). The increase in neonatal mortality points to the importance of improving family planning and maternal health services integrated maternal, newborn and child strategies have proven effective in reducing child mortality but more investment is needed. Inadequate intakes during pregnancy associated with the increase of demand makes pregnant mothers at even greater risk of iron deficiency, that may affect growth and development of the fetus and increase the risk of preterm delivery, low birth weight and post-partum hemorrhage [33-40]. A few studies reported views that pregnant women have an understanding of the need for greater food consumption during certain life stages, relaying that women should eat more or need extra food "during pregnancy or lactation [41-44]. Health education and promotion activities aimed at improving health outcomes in the general population may actually exacerbate health inequalities between low and high socioeconomic status group due to greater uptake of the intervention in high socioeconomic status group [40-44].

CONCLUSION

Maternal undernutrition is still a significant health problem during pregnancy. Predictors of undernutrition during pregnancy include; eating 2-3 portion of fruit/vegetables per day, taking fish at least 1-2 times a week, and receiving any form nutritional education during pregnancy.

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