Pregnant mothers' knowledge, attitude, practice and its predictors towards nutrition in public hospitals of Southern Ethiopia: A multicenter cross-sectional study

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Abstract

Objectives: Insufficient nutrition can predisposes women to infection, pregnancy losses, preeclampsia and anaemia as well birth of underweight baby whose survival is threatened. Therefore, this study was aimed to assess pregnant mothers' nutrition knowledge, attitude, practice and associated factors.

Methods: A multicenter cross-sectional study was conducted among 378 participants who were selected using a systematic random sampling technique. Quantitative data were collected using a structured and interviewer-administered questionnaire, which consisted of questions on sociodemographic features, obstetrics characteristics and pregnant women's nutrition knowledge, attitude and practice. Data entry and analysis were done using Statistical Package for the Social Sciences statistical version 23. Binary logistic regression analysis was done to identify associated factors. All variables with p-value of < 0.23 in bivariate analysis were included in multivariate analysis, and finally, statistical significance was declared at p-value < 0.05 with 95% confidence interval.

Result: From 378 women participated, a total of 231 (61.1%) respondents were in age range of 25–34 years. About 148 (39.1%) of women were not knowledgeable, 153 (40.5%) had an unfavourable attitude, and 47.7% had poor dietary practice. Knowledge (adjusted odds ratio = 4.5; 95% confidence interval: 2.88, 10.06, $p = 0.03$), attitude (adjusted odds ratio = 3.6; 95% confidence interval: 2.43, 6.66, $p = 0.04$) and practice (adjusted odds ratio = 3.6; 95% confidence interval: 2.43, 6.66, $p = 0.036$) were all significantly associated with maternal education. Regarding their occupation, merchant women were seven times (adjusted odds ratio = 7.02; 95% confidence interval: 2.88, 17.09, $p = 0.01$) more likely to have knowledge and government employees were six times (adjusted odds ratio = 6.05; 95% confidence interval: 3.58, 13.05, $p = 0.04$) more likely to be knowable than housewives. Moreover, multiparous women were 4.77 times (adjusted odds ratio = 4.77; 95% confidence interval: 1.15, 8.66, $p = 0.002$) more likely to be knowledgeable compared to primigravida women. Monthly income was also associated to attitude (adjusted odds ratio = 0.45, 95% confidence interval: 0.10, 1.66, $p = 0.03$). Women who had a favourable attitude were five times (adjusted odds ratio = 5.25; 95% confidence interval: 2.36, 9.62, $p = 0.04$) more likely to have good nutritional practices during pregnancy.

Conclusion: Pregnant women's knowledge, attitude and practice towards nutrition in this area were low. The educational status of women was associated with knowledge; attitude and practice. Likewise, occupation and parity were associated with knowledge; and attitude was also found to be a determinant factor of nutritional practice. Therefore, community nutritional education and antenatal nutritional counselling need to be strengthened in the area.

Keywords

Knowledge, attitude, practice, nutrition, pregnant women, Kaffa zone, Ethiopia

Introduction

In the antenatal period, the nutritional demand of women upsurges to compensate for physiological and psychological changes and nutritional computations by the growing foetus for energy, macro and micro nutrients.[1–3] However, many

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women, whether in preconception or even during pregnancy, do not get enough nutrients in their diets, a problem that is particularly prevalent in the world's poorest regions, including sub-Saharan Africa.[4]

Women's malnutrition (of any kind) not only affects their health but also has the potential to harm the health of their infants.[1,5,6] Nutritional deficiency was responsible for 1.5 million deaths in women and children worldwide.[7,8] Despite the fact that maternal under nutrition has decreased over the last 16 years, from 30% in 2000 to 22% in 2016, Ethiopia remains one of the countries with the highest burden of maternal malnutrition.[9]

Nutrition knowledge is essential in creating cognizance of ample nutrition intake among pregnant women.[10] Lack of knowledge of sufficient nutrition is stated as an instant cause of malnutrition.[3] Evidence has shown that nutrition knowledge is predictive of change in dietary habits and is one of the contributing factors to having a better nutritional practice. Thus, pregnant women are expected to have adequate knowledge to meet their increased dietary demands and attain optimal nutritional status during pregnancy.[11–13]

Women may have myths about diet selection during the pregnancy period. According to a finding from Turin, most pregnant mothers have incorrect nutrition knowledge and wrong opinions about nutrition practices.[14] As evidenced by a large body of research, educational status, occupations and parity is a factor that influences nutrition knowledge, attitude and practice.[14–20]

The World Health Organization (WHO) endorsed antenatal nutrition education for women to reduce the birth of underweight infants and prevent maternal complications. The recommendation was context-specific and focussed on populations affected by malnutrition, especially in low- and middle-income countries.[21]

Ethiopia's ministry of health (MoH) has used different strategies, such as nutrition education via social media. Likewise, the health extension workers (HEWs) have also been striving to mitigate the deficiency in nutrition knowledge and attitude among women, especially in the rural community.[22] However, about 47% of women lacked cognizance of balanced and diversified diets during the antenatal period.[23]

Few studies on nutrition knowledge, attitudes and practice have been conducted in Ethiopia, particularly in the southern part of the country. The purpose of this study was to assess pregnant women's nutrition knowledge, attitudes and practices, as well as the factors that affect them.

Methods

Study area, design and period

From 10 August to 10 September 2021, an institutional-based cross-sectional study was conducted in public hospitals in the Kaffa Zone of Southern Ethiopia. Kaffa was one of Ethiopia's former 14 provinces. It is one of the administrative zones of Ethiopia's South Nation Nationality and Peoples Region (SNNPR). Kaffa's capital city is Bonga. It is located 451 km south-west of Addis Abeba, Ethiopia's capital city. According to Census 2017, the zone has a total population of 2,100,000 people, with 1,317,078 men and 783,022 women, and 152,036 urban residents.[24] There are four hospitals in the zone which provide antenatal services to the public in this zone and the surrounding zones of SNNPR and Jimma Zone of Oromia Regional State. The average estimated number of pregnant mothers attending antenatal care (ANC) is 326 per month.

Study participants and eligibility criteria

Pregnant mothers in their first, second and third trimesters who attended the ANC unit were included in the study, but those who refused to participate and became severely ill during data collection were excluded.

Study variables

The dependent variables in this study were mothers' nutrition knowledge, attitude and practice. Age, ethnicity, religion, occupation, marital status, level of education, husband's education level and monthly income from sociodemographic features and obstetric characteristics including gravidity, parity, ANC visit and pregnancy spacing were treated as independent variables.

Sample size and sampling procedure

The maximum sample size for this study was calculated using a single population proportion formula. A 95% confidence level (CI) and a 5% margin of error were used as assumptions.

We calculated sample sizes for nutrition knowledge (309), attitude (383) and practice (347) based on population proportions of 27%, 48.4% and 34.50%, respectively.[16] The largest calculated sample size of 383 was then chosen using the correction formula of $n = 360$. Finally, after adjusting for a 5% non-response rate, $n = 378$ were used in this study.

Based on the estimated number of clients attending an ANC unit, the calculated sample was randomly assigned to three public hospitals in the study area. The systematic random sampling technique was used to select each study subject from the ANC unit by using client registration. Then, every seventh person who registered was included until the desired sample size was reached.

Data collection tools, process and management

A structured questionnaire was developed to gather data, which was adapted after reviewing the similar literature[15,16,18,20,25,26] and modified to our circumstances. Two trained student nurses

and one supervisor collected the data. To preserve data quality, a pre-test was performed on 5% of the total sample at one hospital in our study area. The questionnaire was translated into Kaffa (the local language) and then back into English two weeks before data collection.

For 2 days, data collectors and supervisors were trained on the following objectives: study relevance, information confidentiality, interviewee rights, informed consent and interview techniques. The supervisor and principal investigators were instructed to undertake frequent checks on the data collection process to ensure the completeness and consistency of the information gathered, as well as any errors discovered during the process.

Statistical analysis

A computer programme, EpiData version 3.1, was used to enter the data. The dataset was then exported to Statistical Software for the Social Sciences (SPSS) version 24.0 for analysis. The logistic regression analysis was used to identify factors that influence nutrition knowledge, attitude and practice. To control for confounding effects, all variables associated with dependent variables in the bivariate analysis with a p-value < 0.25 were managed to enter into a multivariable logistic regression analysis. During analysis, the Hosmer–Lemeshow goodness of fit test was used to choose the optimal model. Finally, the outcome predictor variables were stated with a p-value < 0.05. Finally, the results were shown in the form of tables, graphs and figures.

Ethical permission and consent to participate

The ethical approval was obtained from the Mettu university's college of health sciences' Health Research Ethics Review Committee with an approval letter (Reference Number: MeU/CHS/189/27/07/2021). After that, the letter was delivered to the Kaffa Zone Health Office. Each participant's written consent was obtained prior to the start of data collection. The anonymization of the data was done to protect the respondents' privacy and confidentiality. For the minor groups, written informed consent was obtained from legally authorized representatives of the subjects prior to the study initiation.

Operational definitions

Nutrition knowledge: Refers to the knowledge of nutrition, including an aptitude to recall nutrition and diet-related terminology. It has two outcome categories, as follows:[16,27]

Knowledgeable: If the respondent answers $\geq 70\%$ (out of 100%) to the knowledge questions.

Not knowledgeable: If the respondent answers $< 70\%$ (out of 100%) on the knowledge questions.

Attitude towards nutrition: Refers to an individual's feeding or eating behaviour that is affected by feelings, motivations, perceptions and thoughts.[16,26]

Favourable attitude: if the respondent's attitude score $>$ mean.

Unfavourable attitude: if the respondent's attitude score $<$ mean.

Nutrition practice: refers to an individual's actions that could affect his or her nutrition such as eating, feeding, cooking and selecting of foods.[16,25]

Good practice: If respondents' score is $\geq 70\%$ (out of 100%) on the practice questions.

Poor practice: If respondents' score is $< 70\%$ (out of 100%) on the questions.

Results

Sociodemographic characteristics of study participants

A total of 378 women participated in our study, yielding a 100% response rate. A total of 231 (61.1%) of participants were between the ages of 25 and 34, with a mean age of 28 (SD + 0.4). Three-fourths of the participants were married. More than half of the participants, 208 (55.02%), had completed secondary school, and 200 (52.91%) were housewives by occupation (Table 1).

The obstetric characteristics of participants

The majority of the women in this study (293, 77.5 %) were multiparous; 229 (60.6 %) gave birth between 37 and 40 weeks gestation (Table 2)

The nutritional knowledge status of mothers during pregnancy

In this study, 230 (60.9%) of participants were knowledgeable, while the remaining 148 (39.1%) were not. One-third of those surveyed mothers believed that malnutrition was caused by an inadequate supply of food. More than one-third (34%) of participants did not know about health risks when a pregnant woman's diet lacks iron (Table 3).

Mother's attitude towards nutrition during pregnancy

Two hundred twenty-five (59.5%) participants had a favourable attitude, and the remaining 153 (40.5%) had an unfavourable attitude. Regarding food intake during pregnancy, about 188 (49.7%) of participants think that it is good to eat more food. In terms of protein intake during pregnancy, 178 (47.1%) of mothers were not sure (Table 4).

Table 1. The sociodemographic characteristics of pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Variables	Categories	Frequency	Percentage (%)
Age, years	15–24	87	23.0
	25–34	231	61.1
	35–44	60	15.9
Marital status	Single	15	3.97
	Married	287	75.93
	Divorced	38	10
	Widowed	15	3.97
	Separated	23	6
Religion	Orthodox	129	34.127
	Protestant	134	35.45
	Muslim	95	25.132
	Others[a]	20	5.291
Ethnicity	Kafecho	328	86.77
	Amhara	23	6.08
	Oromo	18	4.77
	Others[b]	9	2.38
Accommodation ownership	Private	276	73
	Rent	102	27
Maternal occupation	Housewife	200	52.91
	Labour worker	57	15.08
	Government employer	53	14.02
	Merchant	51	13.49
	Others[c]	16	4.2
Husband occupation, n = 287	Farmer	175	61
	Labour worker	43	14.9
	Government employer	23	8.1
	Merchant	34	11.8
	Others[c]	12	4.2
Maternal education	Not attended school	40	10.58
	Primary school	116	30.68
	Secondary school	208	55.02
	College and above	14	3.5
Husband education, n = 287	Not attended school	29	10.1
	Primary school	113	39.4
	Secondary school	83	28.9
	College and above	62	21.6
Family size	<3	106	28
	3–5	172	45.5
	>6	100	26.5
Monthly income	<1000	103	27.25
	1000–5000	206	54.5
	>5000	69	18.25

[a]Catholic and indigenous religions.
[b]Gurage, Silte and Manja.
[c]Student and driver.

Nutritional practice of mothers during pregnancy

Nearly half of the participants (198, 52.3%) had good nutritional habits. Almost three-quarters of the participants took iron supplements. One day before admission, about 200 (52.9 %) of the participants consumed dark green leafy vegetables. In comparison to their non-pregnancy state, estimated 234 (61.9 %) consumed more food (Table 5).

Factors associated with pregnant mothers' nutrition knowledge

The results of logistic regression revealed that the likelihood of knowledge was 2.5 (adjusted odds ratio (AOR)=2.5, 95% CI: 1.22, 7.75) times greater among secondary school participants than among those who did not attend school at all. In terms of occupation, merchant women were seven

Table 2. Obstetric characteristics of pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Variables	Categories	Frequency	Percentage (%)
Number of births (gravidity)	Primiparous	85	22.5
	Multiparous	293	77.5
Inter-pregnancy interval, years	<1	23	6.1
	1–2	188	49.7
	>2	167	44.2
Total gestational weight gain	Within recommended range	166	43.9
	Gained less than the required	124	32.8
	Gained more than the required	88	23.3
Gestational age in weeks	Less than 37	51	13.5
	37–40	229	60.6
	>40	98	25.9
Haemoglobin cut-off level	Less than 11 g/dL	110	29.1
	≥11 g/dL	268	70.9

Table 3. Nutrition knowledge of pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Knowledge questions	Responses	Frequency	Percentage (%)
What do you think are the causes of malnutrition?	Not getting enough food	125	33
	Food which does not contain enough nutrients	94	24.9
	Diseases	61	16.1
	I do not know	98	26
What supplements do you think pregnant women need during pregnancy?	Iron supplement	189	50
	Others (multi-vitamins, calcium supplement)	89	23.5
	Do not know	100	26.5
How do you identify anaemia?	Dizziness	93	24.5
	Paleness	74	19.5
	Low energy/weakness	140	37
	Do not know	73	19
What are the health risks when pregnant women's diet lacks iron?	Anaemia	88	23.3
	Difficult delivery	33	8.7
	General weakness	79	21
	Low birth weight	49	13
	Do not know	129	34
What are the health risks when infants' diet lacks iron	Delay of mental and physical development	46	12.2
	Malnutrition	127	33.6
	Anaemia	80	21.2
	Do not know	125	33
What do you think are the prevention measures of anaemia?	Eat iron-rich foods	167	44
	Disease prevention, avoid tea consumption	34	9
	Do not know	177	47
What are iron-rich foods?	Heme iron food	120	31.7
	Non-heme iron food	56	14.9
	Heme iron food and non-heme iron food	44	11.6
	Do not know	158	41.8
What enhances iron absorption when taken with meals	Vitamin-C-rich foods, such as fresh citrus fruits	179	47.4
	Do not know	199	52.6
Which beverages inhibit iron absorption when taken with meals?	Coffee, tea, carbonated beverages	183	48.4
	Do not know	195	51.6
Who/what is your source for nutritional information?	From healthcare workers	167	44.2
	Neighbours/family/friends	67	17.7
	TV/radio	60	15.9
	Nothing	84	22.2

Table 4. The attitude towards nutrition among pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Attitude questions	Responses	Frequency	Percentage (%)
How good do you think it is to eat more food during pregnancy?	Not good	110	29.1
	Not sure	80	21.2
	Good	188	49.7
How good do you think it is to eat more carbohydrate than non-pregnancy?	Not good	71	18.8
	Not sure	102	27
	Good	205	54.2
How good do you think it is to eat more proteins or beans during pregnancy?	Not good	36	9.5
	Not sure	178	47.1
	Good	164	43.4
How good do you think it is to have more milk and its products during Pregnancy?	Not good	97	25.6
	Not sure	167	44.2
	Good	114	30.2
How good do you think it is to prepare meals with iron-rich foods such as beef, chicken or liver?	Not good	79	21
	Not sure	38	10
	Good	261	69
How much do you like the taste of meat and other iron-rich food item or meals	Dislike	78	20.6
	Not sure	43	11.4
	Like	257	68
How much do you like the taste of omega 3 rich foods like: olive oils, fish. . .?	Dislike	118	31.2
	Not sure	111	29.4
	Like	149	39.4
How much do you like the taste of milk and milk products?	Dislike	77	20.4
	Not sure	34	9
	Like	267	70.6
How good do you think it is to prepare meals with iodized salt?	Not good	92	24.3
	Not sure	133	35.2
	Good	153	40.5

(AOR = 7.02; 95% CI: 2.88, 17.09) times more likely to be knowledgeable than housewives. Furthermore, compared to primigravida women, multiparous women were 4.8 (AOR = 4.77; 95% CI: 1.15–8.66) times more likely to be knowledgeable (Table 6).

Factors associated with mothers' attitude towards nutrition during pregnancy

The results of logistic regression analysis showed that age, maternal and husband education and monthly income were found to be associated with an attitude towards nutrition and diet during pregnancy in a bivariate analysis. After controlling for cofounders, women who went to college or higher were four times more likely (AOR = 4.43; 95% CI: 2.05, 7.86) to have a positive attitude than those who did not go to college. Mothers earning 5000 Ethiopian Birr per month are 55% more likely to have a favourable attitude than mothers earning less than 1000 birr per month (AOR = 0.45; 95% CI: 0.10, 1.66) (Table 7).

Factors associated with nutritional practice during pregnancy

Women who attended college and above 3.6 times (AOR = 3.63.6; 95% CI: 2.43, 6.66) were likely to have good

practice compared to those who did not attend school. Mothers who had a favourable attitude had a significant association with practice. Consequently, those women who had a favourable attitude were five times (AOR = 5.25; 2.36, 9.62) more likely to have good nutritional and dietary practices during pregnancy (Table 8).

Discussion

This study aimed to assess the knowledge, attitude, practice and determinant factors of nutrition during pregnancy. Accordingly, 39.1% of the population were not knowledgeable. This finding is less than previous studies conducted on Syrian refugees, rural Punjab, Malaysia, Tanta City, Egypt, Kenya and Addis Ababa, where 56%, 77.7%, 48%, and 54%, 47.5%, 73% of participants had no knowledge, respectively.[16–18,20,25,28] This dissimilarity could be due to variations in study time and settings. In addition, it could be due to sociodemographic variations among the study population. But the current finding is greater than studies conducted in northeast Malaysia (36.4%),[29] Logos State (13.11%)[30] and a similar study conducted in east Wollega where 35.6% of participants were not knowledge.[15] This discrepancy could be attributed to sociodemographic variations among the two populations.

In this study, maternal educational status, occupation and parity were found to be factors associated with nutritional

Table 5. The nutrition practice of pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Nutrition practice questions	Responses	Frequency	Percentage (%)
Alcohol consumption during pregnancy	Yes	12	3.2
	No	366	96.8
Smoking during pregnancy	Yes	4	1.1
	No	374	98.9
Daily use of iron supplementation	Yes	278	73.5
	No	100	26.5
Consumption of animal products 1 day before admission	Yes	211	55.2
	No	167	44.2
Consumption of dark green leafy vegetable 1 day before admission	Yes	200	52.9
	No	178	47.1
More food consumed during pregnancy as compared to before getting pregnant	Yes	234	61.9
	No	144	38.1
Daily breakfast consumption	Yes	368	97.4
	No	10	2.6
Daily lunch consumption	Yes	372	98.4
	No	6	1.6
Daily dinner consumption	Yes	374	99
	No	4	1
Add citrus fruits to dark green leafy vegetables	Yes	132	34.9
	No	246	65.1
Reason for adding citrus fruit to dark green leafy vegetables	Healthy	233	61.6
	Others[a]	145	38.4
Coffee//tea consumption during pregnancy	Yes	256	68.0
	No	122	32.0
Timing of coffee/tea consumption during pregnancy ($n = 256$)	2h before or after meal	56	21.9
	One hour before or after meal	104	40.6
	During the meal	96	37.5

[a]For better taste, culturally known.

Table 6. Bivariate and multivariate analysis of factors associated with nutrition knowledge among pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Variables		Nutrition knowledge		COR, 95% CI	AOR, 95% CI p-value
		Not knowledgeable	Knowledgeable		
Maternal education	Collage and above	10 (62.5%)	6 (37.5%)	5.0 (2.34, 10.02)	4.5 (2.88, 10.06)*
	Secondary school	111 (53.4%)	97 (46.6%)	3.4 (1.02, 7.04)	2.5 (1.22, 7.75)*
	Primary school	38 (32.8%)	78 (67.2%)	1.5 (0.94, 2.09)	1.04 (0.86, 2.84)
	Not attended school	10 (25%)	30 (75%)	1	1
Husband education	Collage and above	41 (66.1%)	21 (38.9%)	6.51 (2.89, 16.04)	5.25 (2.99, 16.65)
	Secondary school	44 (53.0%)	39 (47.0%)	4.30 (1.76, 8.65)	2.04 (1.45, 8.88)
	Primary school	31 (27.4%)	82 (72.6%)	1.45 (0.89, 3.77)	1.05 (0.60, 3.98)
	Not attended school	6 (20.7%)	23 (79.3%)	1	1
Maternal occupation	Others[a]	5 (31.2%)	11 (68.8%)	1.3 (0.34, 4.87)	1.03 (0.48, 4.05)
	Merchant	39 (76.5%)	12 (23.5%)	9.76 (2.08, 18.06)	7.02 (2.88, 17.09)*
	Government employee	38 (71.7%)	15 (28.3%)	7.60 (3.85, 13.66)	6.05 (3.58, 13.05)*
	Labour worker	21 (36.8%)	36 (63.2%)	1.75 (0.85, 6.08)	1.25 (0.55, 5.90)
	Housewife	50 (25.0%)	150 (75.0%)	1	1
Parity	Multiparous	187 (63.8%)	106 (36.2%)	5.04 (1.36, 11.09)	4.77 (1.15, 8.66)**
	Primiparous	22 (25.9%)	63 (74.1%)	1	1

AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio.
[a]Students and small private workers.
*Significant association at p-value < 0.05.
**Significant association at p-value < 0.01.

Table 7. Bivariate and multivariate analysis of factors associated with attitude towards nutrition among pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Variables	Category	Attitude		COR, 95% CI	AOR, 95% CI
		Unfavourable attitude	Favourable attitude		
Maternal education	Collage and above	9 (64.2%)	5 (35.8%)	5.37 (2.07, 7.05)	4.43 (2.05, 7.86)**
	Secondary school	119 (57.2%)	89 (42.8%)	4.00 (1.02, 6.05)	3.05 (1.45, 6.55)
	Primary school	38 (32.8%)	78 (67.2%)	1.46 (0.50, 3.045)	0.97 (0.42, 2.99)
	Not attended school	10 (25%)	30 (75%)	1	1
Husband education	Collage and above	58 (93.5%)	4 (6.5%)	4.77 (1.94, 7.78)	4.05 (1.33, 7.05)
	Secondary school	43 (51.8%)	40 (48.2%)	4.1 (1.05, 9.45)	3.9 (1.74, 9.03)
	Primary school	31 (27.4%)	82 (72.6%)	1.44 (0.79, 5.05)	1.05 (0.75, 5.33)
	Not attended school	6 (20.7%)	23 (79.3%)	1	1
Monthly income	>5000	11 (16%)	58 (84%)	0.12 (0.09, 1.45)	0.45 (0.10, 1.66)*
	1000–5000	83 (40.3%)	123 (59.7%)	0.44 (0.05, 0.85)	0.35 (0.03, 0.10)
	<1000	62 (60.2%)	41 (39.8%)	1	1

AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio.
*Significant association at p-value < 0.05.
**Significant association at p-value < 0.01.

Table 8. Bivariate and multivariate analysis of factors associated with nutrition practice of pregnant mothers in public hospitals of Kaffa zone, Southern Ethiopia, from 10 August to 10 September 2021.

Variables	Category	Nutritional practice		COR (95% CI)	AOR (95% CI)
		Poor practice	Good practice		
Maternal education	Collage and above	8 (57.1%)	6 (42.9%)	3.9 (2.03, 6.32)	3.6 (2.43, 6.66)*
	Secondary school	99 (47.6%)	109 (52.4%)	2.7 (1.34, 5.45)	2.00 (1.52, 5.76)
	Primary school	38 (32.8%)	78 (67.2%)	1.46 (0.56, 3.25)	1.60 (0.87, 3.90)
	Not attended school	10 (25%)	30 (75%)	1	1
Monthly income	>5000	11 (16%)	58 (84%)	0.12 (0.08, 0.79)	0.10 (0.11, 0.95)
	1000–5000	83 (40.3%)	123 (59.7%)	0.44 (0.09, 1.01)	0.25 (0.13, 1.12)
	<1000	62 (60.2%)	41 (39.8%)	1	1
Attitude	Favourable	170 (75.6%)	55 (24.4%)	5.85 (2.54, 8.45)	5.25 (2.36, 9.62)*
	Unfavourable	53 (34.6%)	100 (65.4%)	1	1

AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio.
*Significant association at p-value < 0.05.

knowledge. Accordingly, participants who attended college and above were 4.5 times more likely to be knowledgeable, and likewise, those who attended secondary school were 2.5 times more likely to be knowledgeable compared to participants who did not attend school at all. This result is supported by previous studies conducted in Malaysia, Egypt, Wollega and Addis Ababa.[15–18,29] The probability of merchant participants to having had knowledge was seven times higher compared to housewives. Likewise, in the present study, the government employees were six times more knowledgeable than housewives. These findings are supported by a previous study done in northeast Malaysia and Tanata city of Egypt in which the nutrition knowledge was associated with women's occupation.[18,29] This association could be attributed to the fact that women who work outside are more likely to have access to nutrition information than housewives. In the present study, the odds of nutrition

knowledge among multiparous women were 4.8 times higher than among primigravida women. This finding is congruent with a previous study conducted in rural Punjab.[19,20] This association may be related to mothers' increased nutrition knowledge as a result of repeated exposure to nutrition information during antenatal follow-up, where primigravida women are deficient.

In this study, 40.5% of participants had an unfavourable attitude towards nutrition during pregnancy. This finding is less than studies conducted in Kigeme refugee camp-Rwanda (67.2%) and Addis Ababa (51.6%).[16,26] However, it is greater than a previous study conducted on Syrian refugees (25%) and Lagos state, Nigeria (0.8%).[25,30] Time change and various sociodemographic factors could be the contributing factors of this disparity.

In our study, an attitude towards nutrition was significantly associated with a woman's educational status and

monthly income. Accordingly, women who attended college and above had a 4.43 times greater likelihood of having a favourable attitude than those who did not attend school at all. This finding is in keeping with a study conducted in Lagos state.[30] The reason for this association might be due to the fact that education has the potential to change the attitude of an individual. In addition, the odds of having had a favourable attitude were 55 times higher among participants who earn more than 5000 Ethiopian Birr per month. Previous research did not support this association. However, it could be related to an increase in women's nutrition knowledge as they earn more and can afford to buy the diet they require.

Regarding nutritional practice, 47.7% of participants had poor practice. This finding is lower than previous studies conducted in Syria refugee (53%), Kigeme refugee camp-Rwanda (71.8%), Addis Ababa (65.5%) and Misha district (70.5%).[16,17,25,27] The possible reasons for this dissimilarity may be the feasibility of accessing nutritional information and sociodemographic variations among the study populations.

An attitude and maternal education were variables shown to have independent associations with participants' nutritional practices in the current study. Accordingly, participants who had a favourable attitude were five times more likely to have had good practice than those who had an unfavourable attitude. This finding is in line with a study conducted at Kigeme refugee camp in Rwanda.[26] The possible reason for this similarity might be the effect of women's feelings and perceptions of dietary diversities in the antenatal period. The odds of good practice were about 3.6 times higher among participants who attended college or above when compared to those who did not attend school. This finding was supported by studies conducted among refugee women in Syria and Malaysia where maternal education was shown to be associated with and practice score.[17,25] This association could be linked to the effect of education on nutritional information, which could help women access different readable sources. Because of this design issue, the study cannot guarantee a cause-effect relationship. Besides that, there may be hidden cultural factors influencing pregnant women's knowledge, attitudes and nutritional practices.

Conclusion and recommendation

Among this study population, the knowledge, attitude and practice towards nutrition were low. Maternal education was found to be a significant factor affecting knowledge, attitude and practice of nutrition during pregnancy. Parity also affects women's knowledge of women. Monthly income is shown to be associated with attitude, and moreover, the attitude of mothers is found to be an independent predictor of nutrition practice. Therefore, the regional and zonal health bureaus should disseminate nutrition information to the community by using different media besides the advancement of antenatal maternal education about nutritional and dietary importance during pregnancy.

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Supplemental material

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