Nutritional Status of Postpartum Mothers and Associated Risk Factors in Shey-Bench District, Bench-Sheko Zone, Southwest Ethiopia: A Community Based Cross-Sectional Study

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ABSTRACT

BACKGROUND: Malnutrition affects millions of people in developing countries and contributes to poor health outcomes and nutritional status among women in the postpartum period. Lactation increases high nutritional demands and marks a significant life transition that can impact diet quality and subsequently predispose woman to high risk of overweight and undernutrition. Although, studies have been conducted on the nutritional status of lactating women, there is a gap especially on women's nutritional status during the postpartum period. Therefore, this study aimed to assess the nutritional status of postpartum women and associated factors in Shey-Bench District, Bench-Sheko Zone, Southwest Ethiopia, 2020.

METHOD: A community-based cross-sectional study was conducted in Shey-Bench District from March 1 to 30/2020 among 359 postpartum mothers. Bivariate analysis was employed to select candidate variables at *P*-value <.25 as a cut-off point. Multiple multinomial logistic regression analysis was used to identify variables significantly associated with nutritional status of the mother at *P* < .05 with 95% CI.

RESULTS: The study revealed that 10.3% of women were underweight and 16.7% were overweight. Employed mothers (AOR = 4.467, 95% CI [1.05-19.04]), employed husband (AOR = 0.087, 95% CI [0.021-0.370]), farmer husband (AOR = 0.084, 95% CI [0.024-0.293]), trader husband (AOR = 0.19, 95% CI [0.0614-0.616]), married mother (AOR = 0.222, 95% CI [0.088-0.560]), dietary diversity (AOR = 0.181, 95% CI [0.075-0.436]) were significantly associated with underweight and while being overweight was associated with dietary diversity, maternal age of between 15 to 24 and 25 to 34, exclusive breastfeeding, and frequency of breastfeeding.

CONCLUSION: This study found a lower prevalence of underweight compared with overweight in the study area. Occupational status, marital status, age of the mother, dietary diversity, exclusive and frequency of breastfeeding were significantly associated factors with nutritional status of postpartum mother. We recommend strengthening the provision of nutrition education on modifiable factors with collaboration of other sectors.

KEYWORDS: Postpartum, nutritional status, mothers, Shey-Bench, southwest Ethiopia

Introduction

Balanced nutrition promotes the health of women throughout the different stages of life. Inadequate dietary intake can lead to malnutrition which currently affects millions of people in developing countries and worsens the health outcomes of postpartum mothers.[1,2] The postpartum period (from childbirth to 6 weeks) is a special stage in the mother's life, during which major physical, social, and emotional changes occur, and as the mother's body restores organ function and other body systems to return to the pre-pregnancy period.[3-6] Poor diet during this period is directly related to diminished immune function and susceptibility to diseases.[7] Good postpartum care and a well-balanced diet during the puerperal period are very important for the health of postpartum mothers.[8] Eating a variety of foods can provide different essential nutrients for the normal growth of the human body and prevent any disease, while a low dietary diversity can lead to an individual being underweight or overweight.[9] The postpartum period increases nutritional demands and marks a significant life transition that can impact diet quality and subsequently predisposes women to great risk of being overweight or undernutrition.[10]

The poor nutritional status of mothers after childbirth is considered one of the greatest threats to global public health and a serious threat to the development of a country.[11,12] Globally, maternal malnutrition is a problem faced by many countries and its consequences include acute and chronic diseases, abnormal

development, and lack of economic productivity.[13] Maternal malnutrition accounts for 7% of the global disease burden. Southeast Asia, South America, and Africa are faced with widespread maternal malnutrition. In some countries in these regions, the incidence of maternal malnutrition can reach 35%.[14]

Taking into account the impact on the lives of mothers and babies, the World Health Organization (WHO) has formulated guidelines on postpartum care for mothers and their babies to reduce deaths during this critical period.[15] These guidelines are especially important for promoting short- and long-term maternal health.[16] During the postpartum period, most mothers have been consumed cultural or traditional foods that can influence the nutritional status of women in their future lifestyle and it is also a period that should receive the utmost care in the mother's diet to improve the mother's nutritional status.[8,10]

The studies conducted in different parts of Ethiopia indicate that there have been many variables that were significantly associated with the nutritional status of lactating women. These were age, family size, educational status of the mother, occupational status of the mother, wealth index, women dietary diversity (WDD), household food insecurity, meal frequency, nutritional advice, antenatal care (ANC) visit frequency, morbidity, place of delivery, and birth interval.[17-20] However, the studies conducted in Ethiopia only focused on the nutritional status of lactating mothers, especially in the post-harvesting period; there is a study gap in these 6 weeks post-partum period. This period is critical in perspective of ensuring their nutritional status. Therefore, the lack of research results on nutritional status and the lack of deterministic factors related to the deteriorated nutritional status of the mother during the neglected period was the focus area of this study.

Methods

Study design, area, and period

A community-based cross-sectional survey was conducted in Shey-Bench District, southwest Ethiopia, from March 1 to 30, 2020. The district is located 595 km from Addis Ababa, the capital city of Ethiopia, and 870 km from Hawassa, the central city of South, Nation, Nationality and People Region (SNNPR). It consists of 20 kebeles (the smallest administrative unit of Ethiopia) and has a total population of 160 618 of whom 81 112 are women. According to the Shey-Bench district reports, there were a total population of 500 postpartum mothers during the data collection period. Six health centers and 20 health posts offer health services to this community.

Source and study population

All postpartum mothers who had lived in the Shey-Bench District for at least 6 months were the source population. Postpartum mothers resident in the selected kebeles (the smallest administrative unit in Ethiopia) were study populations. All selected postpartum mothers who fulfilled the inclusion criteria were study units.

Sample size determination and sampling procedure

The required sample size was determined using the single-population proportion formula considering 50% malnutrition among postpartum mothers, 95% confidence interval (CI), and 5% margin of error. The obtained sample size was adjusted by finite population correction formula and multiplied by a 1.5 design effect. After a 10% non-response rate was considered, the final sample size was 359. Out of 20 kebeles, 6 were randomly selected by using the lottery method. A unique identification number was assigned to each participating household with postpartum mothers, with the assistance of health extension workers during a preliminary survey. Proportional allocation was carried out. A sampling frame was prepared using the identification number of households with postpartum mothers. A simple random sampling technique was employed to select the postpartum mothers to include in the study.

Data collection tools and procedures

A semi-structured interviewer-administered questionnaire was developed after reviewing related literature. The tool included questions related to socio-demographic variables, household wealth index, obstetric history, nutritional and morbidity related questions, 24 hours women dietary diversity recall of 10 food groups, Household Food Insecurity Access Scale (HFIAS).

Anthropometric measurements

Bodyweight: The weight of the women was measured using a portable battery-operated Seca digital scale (Seca Germany). The weighing scale was checked for zero reading before the mother was asked to calibrate. In addition, the proper performance of each scale was checked regularly by measuring known weights before measuring the women's weight. During the procedure, the subjects wore light clothes and removed their shoes. The weight was recorded to the nearest 0.1 kg.

Height: The height of the mother was measured using a portable stadiometer (Seca Germany). All respondents were have been measured against the wall in an upright position, without shoes and with heels together and their heads positioned and eyes looking straight ahead (Frankfurt plane). The height was measured and recorded to the nearest 0.1 cm. When it was difficult to measure height due to inability to erect in Frankfurt plane position height was intended to estimate from arm span or demi span or knee height position. The respondent's weight and height were measured at least twice and the average value of each measurement was taken for further analysis.

Data quality

Six Diploma nurses and 2 degreed nurse supervisors, who were not employed in health facilities in the actual research area and were fluent in the local language and Amharic, were recruited to collect data. A structured questionnaire was pretested among 18 (5%) postpartum women out of the study area. Relative Technical Error of Measurement (TEM) was calculated to minimize a random anthropometric measurement error. The data collectors' accuracy of the measurements was standardized with their trainer during training and pretesting.

A respondent's weight and height were measured at least twice and when the difference between the 2 weight measures was greater than 0.1 kg and when the difference between the 2 height measures was greater than 0.1 cm, the average value was taken. In addition to providing materials, the supervisor also verified the completeness and consistency of the questionnaire responses. The lead researcher conducted a comprehensive and in-depth follow-up of the data collection.

Data processing and analysis

After coding and checking by the principal investigator the data were entered and cleaned using Epi data version 3.1 before being exported to Statistical package for social science (SPSS) version 22.0 for analysis. The women-dietary diversity score was calculated by minimum dietary diversity (MDD-W) which was adapted from the Food and Agriculture Organization of the United Nations (FAO) 2016. The dietary diversity questionnaire had 10 different food groups: (1) grains (white roots, tubers, and plantains), (2) pulses (beans, peas, and lentils), (3) nuts and seeds, (4) dairy, (5) meat and fish (poultry and fish), (6) eggs, (7) dark green leafy vegetables, (8) vitamin A-rich fruits and vegetables, (9) others 146 vegetables, and (10) others fruits. It was assessed by using 24-hour dietary recall methods; 1 point was given to each food group consumed over the past 24 hours before the survey period. The participants were asked about all foods and beverages consumed during the past 24 hours and the interviewer probed for any food types that might have been forgotten by participants.[21]

By considering the locally available household assets and using Principal Component Analysis (PCA) the families' wealth index was constructed after assumptions were checked. The HIFAS was calculated for each household by summing the code for each frequency of occurrence question. The maximum score for a household was 27 if the households response to all 9 frequencies of occurrence questions was "three" (3). The minimum score was 0, which represented the household response of "no" to all occurrence questions. The Household Food Insecurity Access Scale scores were categorized as a food secured, mildly food insecure, moderately food insecure, and severely food insecure based on the indicator guideline.[22,23]

Based on the coefficient output the presence of multicollinearity was cheeked and the maximum Variance Inflation Factor (VIF) was 2 indicating no collinearity. The minimum number of cases per independent variable ratio of 10:1 was satisfied, in this study with a ratio of 13:1. The model fitting information was seen on the likelihood ratio test showed $P < .001$, Goodness of fit test with Pearson chi-square $P = .83$, and deviance $P = 1$, $P > .05$ for best model fitness. The outcome variable was categorized as underweight, normal, overweight. In the bivariate multinomial logistic regression model independent variables at $P < .25$ were considered for further multiple multinomial logistic regression analysis. In multiple multinomial logistic regression adjusted odds ratios (AOR), along with 95% CI were presented to indicate the association *i* between the risk factors associated with the outcome variable at the level of statistical significance $P < .05$. The reference sub-population for nutritional status of postpartum mothers used in the multiple multinomial logistic regression model was "Normal weight" which was compared with the sub-populations "underweight" and "overweight" for each of the identified risks factors.

Definitions of terms

Postpartum period: period between births to 6 weeks

Body mass index (BMI): Weight in kilogram/height in meter squared

Underweight: BMI < 18.5 kg/m^2

Normal weight: BMI from 18.5 to 24.9 kg/m^2

Overweight: BMI from 25 to 29.9 kg/m^2[24]

Optimum meal frequency: Meal taken ≥ 4 meals/day

Sub-optimum meal frequency: Meal taken < 4 meals/day

Instrumental delivery: SVD assisted delivery

Food insecurities categories: Categorized as Food secure (< 2), mildly secured (2-10), moderately (11-17), and while severely (> 17) food insecured based on HFIAS[25]

Dietary diversity: is a measure of the number of food groups consumed over a reference period, 24 hours before the time of data collection.

High women dietary diversity score: postpartum mothers who consumed ≥ 5 food groups intake out of 10.

Low women dietary diversity score: postpartum mothers who consumed < 5 food groups intake out of 10.[21]

Results

Socio-demographic characteristics

The study was conducted among 359 postpartum mothers and all were willing to respond to the interview making a 100% response rate. The mean ($\pm$SD) age of participants was 28.7 ± 6.4 years with a range of 18 to 45 years. A higher proportion of the postpartum mothers, 221 (61.6%) were married and living with their husbands. One-fourth of the respondents, 95 (26.5%) and 82 (22.2%) of their husbands

Table 1. Socio-demographic characteristics of the study participants in Shey-Bench District, Bench Sheko zone, southwest Ethiopia, 2020 (N = 359).

PREDICTORS	NUTRITIONAL STATUS (BMI)			TOTAL
	CATEGORY	UNDERWEIGHT 37 (10.3%)	NORMAL 262 (73%)	OVERWEIGHT 60 (16.7%)
Age	15-24	23 (6.4%)	68 (26%)	12 (20%)	103 (28.6%)
	25-34	10 (2.7%)	142 (39.6%)	14 (3.9%)	166 (46.3%)
	>34	4 (1.1%)	52 (14.5%)	34 (9.5%)	90 (25.1%)
Mother education	Can read and write	15 (4.2%)	90 (25.1%)	15 (4.2%)	120 (33.4%)
	Can't read and write	13 (3.6%)	105 (29.2%)	26 (7.2%)	144 (40.1%)
	Formal education	9 (2.5%)	67 (18.7%)	19 (5.3%)	95 (26.5%)
Husband education	Read and write	20 (5.6%)	136 (37.9%)	25 (7%)	181 (50.4%)
	Can't read and write	8 (2.2%)	71 (19.8%)	17 (4.7%)	96 (26.7%)
	Formal education	9 (2.5%)	55 (15.3%)	18 (5%)	82 (22.2%)
Mother occupation	Formally Employed	7 (1.9%)	32 (8.9)	8 (2.2%)	47 (13.1%)
	Farmer	13 (3.6%)	127 (35.4%)	13 (3.6%)	153 (42.6%)
	Trader	10 (2.8%)	50 (13.9%)	25 (7%)	85 (23.7%)
	Housewife	7 (1.9%)	53 (14.8%)	14 (3.9%)	74 (20.6%)
Husband occupation	Formally Employed	5 (1.4%)	45 (12.5%)	19 (5.3%)	69 (19.2%)
	Farmer	7 (1.9%)	130 (36.2%)	15 (4.2%)	152 (42.3%)
	Trader	11 (3.1%)	66 (18.4%)	17 (4.7%)	94 (26.2%)
	Daily laborer	14 (3.9%)	21 (5.8%)	9 (2.5%)	44 (12.3%)
Marital status	Married and live together	15 (4.2%)	167 (46.55%)	39 (10.9%)	221 (61.6%)
	Married and not together	22 (6.1%)	95 (26.5%)	21 (5.8%)	138 (38.4%)
Family size	≤5	24 (6.7%)	158 (44%)	31 (8.6%)	213 (59.3%)
	>5	13 (3.6%)	104 (29%)	29 (8.1%)	146 (40.7%)
Residence	Rural	25 (7%)	178 (49.6%)	47 (13.1%)	250 (69.9%)
	Urban	12 (3.3%)	84 (23.4%)	13 (3.6%)	109 (30.4%)
Wealth index	Richest	4 (1.1%)	33 (9.2%)	5 (1.4%)	42 (11.7%)
	Richer	10 (2.7%)	69 (19.2%)	23 (6.4%)	102 (28.4%)
	Middle	9 (2.5%)	54 (15%)	8 (2.2%)	71 (19.8%)
	Poorer	6 (1.7%)	56 (15.6%)	11 (3.1%)	73 (20.3%)
	Poorest	8 (2.2%)	50 (13.9%)	13 (3.6%)	71 (19.8%)

Abbreviations: BMI, body mass indexing; N, sample size.

had attained formal education. In addition, 152 (42.3%) of husbands and 153 (42.6%) postpartum mothers were farmers. A large number 213 (59.3%) of participants had a family size of up to 5 members. More than two-thirds (69.6%) of mothers were rural residents. More than one-quarter 102 (28.4%) of the mothers were in the richer percentile group whilst comparable proportions were found in middle and

below that percentile groups 71 (19.8%) and 73 (20.3%) respectively (Table 1).

Obstetric related factors

Two hundred eighty-eight (80.2%) of the mothers gave birth at health institutions and 63 (17.6%) of respondents had a

Table 2. Obstetric related factors of the study participants in Shey-Bench District, Bench-Sheko zone, southwest Ethiopia, 2020 (N = 359).

PREDICTORS	CATEGORY	NUTRITIONAL STATUS			TOTAL
		UNDERWEIGHT	NORMAL	OVERWEIGHT	
Place of delivery	Health facility	27 (7.5%)	210 (58.5%)	51 (14.2%)	288 (80.2%)
	At home	10 (2.8%)	52 (14.5%)	9 (2.5%)	71 (19.8%)
Birth interval	First birth	9 (2.5%)	46 (12.8%)	9 (2.5%)	64 (17.8%)
	<2 y	8 (2.2%)	44 (12.3%)	11 (3.1%)	63 (17.6%)
	≥2 y	14 (3.9%)	116 (32.3%)	32 (8.9%)	162 (45%)
	I don't know	6 (1.7%)	56 (15.6%)	8 (2.2%)	70 (19.5%)
Antenatal visit	Yes	29 (8.1%)	211 (58.8%)	48 (13.4%)	288 (80.2%)
	No	8 (2.2%)	51 (14.2%)	12 (3.3%)	71 (19.8%)
Frequency of antenatal visit	<3 visit	17 (5.9%)	108 (37.5%)	23 (8%)	148 (51.4%)
	≥4 visit	12 (4.1%)	103 (35.8%)	25 (8.7%)	140 (48.6%)
Postnatal care	Yes	31 (8.6%)	181 (50.4%)	39 (10.9%)	251 (70%)
	No	6 (1.7%)	81 (22.6%)	21 (5.9%)	108 (30.1%)
Mode of delivery	Spontaneous vaginal delivery	30 (8.4%)	198 (55.2%)	43 (12%)	271 (75.5%)
	SVD assisted with instrument	7 (2%)	64 (17.8%)	17 (4.7%)	88 (24.5%)

Abbreviations: N, sample size; SVD, spontaneous vaginal delivery.

birth interval of less than 2 years. More than 75% of participants gave birth by spontaneous vaginal delivery. Seventy-one (19.8%) of the mothers did not attend antenatal care. One hundred forty (48.6%) of the mother had visited a health facility for ANC > 4 times. After delivery, 108 (30.1%) mothers attended postnatal care services. One hundred seventy-five (48.7%) mothers stayed in the health facilities >23 days after delivery (Table 2).

Dietary characteristics and health-related factors

More than half of the subjects 197 (54.9%) had more than 4 meals per day. Findings of this study showed that 190 (52.9%) mothers had high dietary diversity with a mean dietary diversity score (DDS) of 4.6 ± 1.2 SD. One hundred fifty-two (60.3%) mothers had received health education from health workers. All mothers were currently breastfeeding their children with more than half of postpartum mothers 211 (58.8%) were exclusively breastfeeding their children. Of the total mothers, 196 (54.6%) mothers breastfed >8 times per day. Greater than 20% of mothers 76 (21.2%) had a history of illness. Ninety-eight (27.3%) mothers reported food taboo practices during the postpartum period (Table 3). More than two-thirds of mothers 247 (68.8%) were food secure while 46 (12.8%), 53 (14.7%), and 13 (3.6%) were mildly, moderately, and severely food insecure respectively.

Anthropometric measurements

Findings of this study showed that 37 (10.3%) of the mother were underweight while 60 (16.7%) were overweight. The mean weight and height of participants were 57.73 ± 5.5 kg and 160.5 ± 6.1 cm respectively.

Bivariate analysis results of factors associated with nutritional status of the study participants

The bivariate analysis that indicated variables with *P*-value <.25 included the age of mothers, mothers occupation, husband occupation, marital status, exclusive breastfeeding, frequency of breastfeeding per day, dietary diversity score, stay after delivery, and meal frequency. These were further subjected to multiple multinomial logistic regression analysis (Table 4).

Factors associated with postpartum nutritional status

In multivariable multinomial logistic regression analysis except for health facilities stay after delivery and meal frequency; the rest of the 7 variables were significantly associated with the outcome variables. This study showed that mothers who were government employed compared to housewives were 4.5 times more likely (AOR = 4.467, 95% CI: [1.048-19.044]) to be underweight than normal.

Table 3. Dietary characteristics and health-related factors of the study participants in Shey-Bench District, Bench-Sheko zone, southwest Ethiopia, 2020 (N = 359).

PREDICTORS	CATEGORY	NUTRITIONAL STATUS			TOTAL
		UNDERWEIGHT	NORMAL	OVERWEIGHT	
Meal frequency	≥4 times/d	13 (3.6%)	150 (41.8%)	34 (9.5%)	197 (54.9%)
	<4 times/d	24 (6.7%)	112 (31.2%)	26 (7.2%)	162 (45%)
Nutritional advice	Yes	27 (7.5%)	183 (51%)	42 (11.7%)	252 (70.2%)
	No	10 (2.8%)	79 (22%)	18 (5%)	107 (29.8%)
Source of nutritional advice	Mass media	8 (3.2%)	33 (13.1%)	5 (2%)	46 (18.3%)
	Health workers	17 (6.7%)	105 (41.7%)	30 (11.9%)	152 (60.3%)
	From both	2 (0.8%)	45 (17.9%)	7 (2.8%)	54 (21.4%)
Exclusive breastfeeding	Yes	23 (6.4%)	165 (46%)	23 (6.4%)	211 (58.8%)
	No	14 (4%)	97 (27%)	37 (10.3%)	148 (41.2%)
Brest feeding/day	<8 times/d	19 (5.3%)	97 (27%)	47 (13%)	163 (45.4%)
	≥8 times/d	18 (5%)	165 (46%)	13 (3.6%)	196 (54.6%)
History of illness	Yes	7 (2%)	53 (14.8%)	16 (4.5%)	76 (21.2%)
	No	30 (8.4%)	209 (58.2%)	44 (12.3%)	283 (78.8%)
Food taboo	Yes	8 (2.2%)	73 (20.3%)	17 (4.7%)	98 (27.3%)
	No	29 (8.1%)	189 (52.6%)	43 (12%)	261 (72.7%)
Cultural food	Yes	18 (5%)	142 (39.6%)	26 (7.2%)	186 (51.8%)
	No	19 (5.3%)	120 (33.4%)	34 (9.5%)	173 (48.2%)
Workload	Yes	9 (2.5%)	71 (19.8%)	11 (3.1%)	91 (25.3%)
	No	28 (7.8%)	191 (53.2%)	49 (13.7%)	268 (74.7%)
Dietary diversity	High	11 (3.1%)	160 (44.6%)	19 (5.3%)	190 (52.9%)
	Low	26 (7.2%)	102 (28.4%)	41 (11.4%)	169 (47.1%)
Fluid intake	<8 times/d	19 (5.3%)	163 (45.4%)	39 (10.9%)	221 (61.6%)
	≥8 times/d	18 (5%)	99 (27.6%)	21 (5.8%)	138 (38.4%)

Abbreviation: N, sample size.

The finding of the study also identified that mothers having government-employed husbands compared to daily laborers were less likely 91.3% (AOR = 0.087, 95% CI [0.021-0.370]) to be underweight than normal. Mothers who had farmer husbands compared to daily laborers were 91.6% less likely (AOR = 0.084 95% CI [0.024-0.293]) to be underweight than normal. Likewise, mothers who had trader husbands as compared to daily laborers were 81% less likely (AOR = 0.19 95% CI [0.0614-0.616]) to be underweight than normal (Table 5).

A postpartum mother married and living together with their husband compared to those not living together was 78% less likely (AOR: 0.222 95% CI [0.088-0.560]) to be underweight than normal. According to this finding, mothers whose age groups were between 15 and 24 years compared to age

group >34 years were 89% less likely (AOR = 0.11, 95% CI [0.040-0.304]) to be overweight than normal weight. Moreover, mothers within the age group of 25 to 34 years compared to age group >34 years were also 90.5% less likely (AOR = 0.095, 95% CI [0.039-0.234]) to be overweight than normal weight.

Dietary diversity is also another important independent variable that described the nutritional status of overweight mothers (Table 5). The study demonstrated that postpartum mothers who ate a highly diversified diet compared to those who did not were 83% (AOR = 0.170, 95% CI [0.077-0.376]) less likely to be overweight than normal. On the other hand, postpartum mothers who consume a highly diversified diet compared to a low diversified diet were 82% less likely (AOR = 0.181, 95% CI [0.075-0.436]) to be underweight than

Table 4. Bivariate multinomial logistic regression model for a factor associated with nutritional status of the study participants in Shey-Bench District, Bench-Sheko zone, southwest Ethiopia, 2020 (N=359).

VARIABLE	UNDERWEIGHT				OVERWEIGHT			
	B	*P*	OR	95% CI	*B*	*P*	OR	95% CI
Age 15-24	.443	.353	1.557	(0.611-3.965)	−1.697	.000*	0.183	(0.086-0.391)
Age 25-34	−.991	.064*	0.371	(0.130-1.058)	−2.130	.000*	0.119	(0.058-0.243)
Age >34	*R*							
Gov't employed mothers	.686	.232*	1.985	(0.645-6.115)	−279	.575	0.756	(0.285-2.007)
Farmer mothers	−.248	.635	0.780	(0.280-2.175)	−1.096	.010*	0.334	(0.146-0.765)
trader mothers	.152	.788	0.788	(0.386-3.510)	.326	.401	1.385	(0.647-2.967)
Housewife mothers	*R*							
Gov't employed Husband	−1.792	.002*	0.167	(0.053-0.524)	−.015	.975	0.985	(0.382-2.540)
Farmer husband	−2.516	.000*	0.081	(0.029-0.223)	−1.312	.007*	0.269	(0.105-0.694)
Trader husband	−1.386	.003*	0.250	(0.099-0.634)	−.509	.291	0.601	(0.233-1.547)
Daily laborer husband	*R*							
Married and together	−1.476	.000*	0.229	(0.106-0.492)	.446	.155*	1.561	(0.845-2.886)
Married not together	*R*							
High dietary diversity	−1.310	.001*	0.270	(0.128-0.570)	−1.219	.000*	0.295	(0.162-0.537)
Low dietary diversity	*R*							
Exclusively breastfed	−.035	.923	0.966	(0.475-1.965)	−1.007	.001*	0.369	(0.205-0.651)
Not exclusively breastfed	*R*							
Breast feeding <8/d	.585	.097*	1.796	(0.899-3.586)	1.816	.000*	6.150	(3.168-11.939)
Breast feeding ≥8/d	*R*							
<23 d stay after delivery	.343	.341	1.410	(0.695-2.860)	−628	.032*	0.533	(0.300-0.947)
>23 d stay after delivery	*R*							
Meal frequency ≥4/d	−.905	.013*	0.404	(0.197-0.829)	−.024	.930	0.976	(0.554-1.720)
Meal frequency ≤3/d	*R*							

Abbreviations: B, Logistic coefficient; CI, Confidence interval; Gov't, Government; N, sample size; OR, odd ratio; P, Probability value; R, reference category of 18.5-24.999 (normal).
*Candidate at *P*-value <.25.

normal. Postpartum mothers who exclusively breastfed compared to those who did not exclusively breastfeed were 71% less likely (AOR = 0.29, 95% CI [0.134-0.625]) to be overweight than normal. This finding also showed that postpartum mothers who had a practice of feeding breast milk <8 times/day compared to those who breastfed >8 times/day were 4.9 times more likely (AOR = 4.869, 95% CI [2.219-10.686] to be overweight than normal (Table 5).

Discussion

Postpartum mothers are at risk of malnutrition.[10] This study found that the prevalence of underweight and overweight were

10.3% and 16.7% respectively. It found a lower prevalence of underweight compared with overweight in the study area. The possible explanation for this variation might be due to a retention of weight gain during a postpartum period of the study participants, which leads to a higher obesity.[26] As compared to the current study, findings from Nekemte, there were a higher proportion of underweight (20%) and a lower prevalence of overweight (4.7%).[18] In a study done in Ambo and Arba Minch Zuria district, Ethiopia, a higher prevalence of underweight was reported, 21.5% and 17.4%; while the prevalence of overweight is almost similar, 10% and 18.8% respectively with the current study.[19,27] Likewise, the study conducted in Debre

Table 5. Multiple multinomial logistic regression model for factors associated with nutritional status of the study participants in Shey Bench District, Bench-Sheko zone, southwest Ethiopia, 2020 (N = 359).

MODEL	UNDERWEIGHT				OVERWEIGHT			
	B	*P*	AOR	95% CI	*B*	*P*	AOR	95% CI
Age 15-24					−2.205	.000*	0.110	(0.040-0.304)
Age 25-34					−2.352	.000*	0.095	(0.039-0.234)
Age >34					*R*			
Gov't employed mother	1.497	.043*	4.467	(1.048-19.044)				
Farmer mother								
Trader mother								
Housewife mother	*R*							
Gov't employed Husband	−2.440	.001*	0.087	(0.021-0.370)				
Farmer husband	−2.478	.000*	0.084	(0.024-0.293)				
Trader husband	−1.638	.005*	0.194	(0.061-0.616)				
Daily laborer husband	*R*							
Married and together	−1.504	.001*	0.222	(0.088-0.560)				
Married not together	*R*							
High dietary diversity	−1.707	.000*	0.181	(0.075-0.436)	−1.772	.000*	0.170	(0.077-0.376)
Low dietary diversity	*R*				*R*			
Exclusively breastfed					−1.240	.002*	0.290	(0.134-0.625)
Not exclusively breastfed					*R*			
Breastfeeding <8/d					1.583	.000*	4.869	(2.219-10.686)
Breast feeding ≥8/d					*R*			

Abbreviations: AOR, Adjusted odd ratio; B, Logistic coefficient; CI, Confidence interval; Gov't, Government; N, Sample size; P, Probability value; R, Reference category of 18.5-24.999 (normal).
*P-value <.05.

Tabor showed a higher proportion of underweight (17.6%), and while a lower proportion of overweight (6.3%) as compared to the current study.[28] In Tigray[17] and Dedo and Seqa-Chekorsa districts of Ethiopia[29] higher underweight prevalence, 25% and 40.6% were reported respectively. A study from Nigeria reported lower underweight (1.25%) and higher overweight proportions (52.1%) compared to those reported in this study.[30] The education on the importance of adequate nutrition given to the mothers in the current study might be the cause of the differences observed. The differences could also be due to the effect of inadequate nutritional intake, socio-demographic, socio-economic factors, study period, and considerable gaps in knowledge in recognizing the vital nutrients in the postpartum period.

World Health Organization recommended universal and context-specific interventions to improve the utilization and quality of antenatal care (ANC).[15] One of the intervention is routine antenatal nutrition. Hence, an antenatal visit is important for managing pre-existing conditions that exacerbate the mothers' health and the consequences of an unhealthy lifestyle before delivery. The ANC also offers relevant information and guidance for a successful postnatal recovery to women and their families. The WHO recommends a minimum of 8 contacts: 5 contacts in the third trimester, 1 contact in the first trimester, and 2 contacts in the second trimester.[15] Even though ANC is critical, our research showed that almost half (48.6%) of women visited a health facility for antenatal care at least 4 times which is below the WHO recommended visit.[15] But the report from the mini demographic health survey of Ethiopia showed that the proportion of women who had at least 4 ANC visits during their last pregnancy was 43% while 26% of women had no ANC visits.[31] A study conducted in the Rayitu district reported a higher prevalence of malnutrition in mothers that did not receive antenatal care (ANC) during their pregnancy as compared to mothers who received ANC.[32] However, in Tigray, the number of antenatal visits had no association with maternal

nutritional status which is similar to the current study.[33] The effect of poor antenatal visiting was might be due to residence area variation, age, socioeconomic difference, level of education. In other words, relevant interventions on the effectiveness of ANC, increase food consumption during the postnatal period and enhance the behaviors that benefit maternal nutritional status.

The care given to the mother and her newborn baby immediately after birth and for the first 6 weeks of life is referred to as postnatal care (PNC). The early neonatal era, particularly the first 24 hours after birth and the first 7 days after delivery, is when mothers and their newborn babies are most at risk of dying. The WHO recommends that mothers receive postnatal treatment as soon as possible after birth, with 3 additional visits on day 3 (48-72 hours), days 7 to 14, and at 6 weeks.[15,34] However, in our study, only a small number of postpartum mothers used postnatal care facilities. In Debre Markos town, a comparable finding was reported,[35] and in Adwa, a higher proportion was reported.[36] Our findings imply that the majority of postpartum mothers disregarded the postnatal care which might be due to lack of awareness, mode of delivery, educational level, and antenatal visiting frequency.[36] However, although they disregarded the PNC services, our finding demonstrated that the absence of PNC was not associated with maternal nutritional status.

Malnutrition is influenced by 2 factors: food insecurity and a lack of variety in one's diet. Consumption of a variety of food groups provides various essential nutrients for body normal growth and disease prevention, while malnutrition results from a lack of dietary diversity. A mother's diet is thought to be a primary determinant of her health in the postpartum period. Hence, food sufficiency and a varied diet are critical during the postpartum period. In the current study, it was demonstrated that 47.1% of postpartum mothers consumed a poorly diversified diet. This was lower than that reported in a study conducted in Angecha southern Ethiopia[37] and higher than that reported in a study from Debre Tabor district northern Ethiopia.[28] This finding is however inconsistent with results from the study conducted in Dedo and Seqa-Chekorsa Jimma Zone and Tigray Axum whose proportions were higher than those reported in the present study.[29,38]

The frequency of breastfeeding made a difference among postpartum mothers. The prevalence of overweight was lower among exclusively breastfeeding mothers, this implies that the weight of postpartum mothers is directly influenced by breastfeeding practices, healthy food intake, and physical activity.[30] Underweight is also associated with poor lactation performance and poor infant growth.[39]

This study also stratified mothers by age and assessed nutritional status by age group. This result contradicted the finding from Meisso health center where mothers aged between 21 and 30 years were less likely to be underweight than mothers with age >30.[40] Similarly, inconsistent findings from Ambo showed that mothers within the aged groups of 17 to 25 years were more likely to be underweight as compared to those the aged groups of 36 to 49 years.[19] The difference could be due to the focus area of the researchers, study subjects, and time difference.

Findings from multinomial logistic regression in the current study revealed that employed postpartum women were more likely to be underweight compared to housewives. In the Bale zone, housewives were less likely to be malnourished. The finding showed that maternal occupation exerts influence over feeding practice.[32] In another study, the occupation of lactating mothers was strongly linked to their nutritional status.[18] Contrastingly; a study conducted among lactating mothers reported a lack of association of maternal occupation to their nutritional status.[41] The difference in workload and domestic responsibilities among the study subjects might also contribute to the occurrence of malnutrition. Postpartum mothers who had employed husbands, farmer husbands, and trader husbands were less likely to be underweight compared to those married to the daily laborers in our study. Similarly, a study conducted in Bangladesh reported that malnutrition is associated with occupational status.[42] The findings imply the level of undernutrition across occupational status declines as a partner's occupational status rises. A married postpartum mother who lives with her husband has a 78% lower chance of being underweight. The findings indicated that the husband's role in assisting postpartum mothers may played a significant role in reducing the risk of being underweight. Literature backs up this claim as male participation is linked to better maternal health outcomes in developing countries.[43] In contrast, a study conducted in Bangladesh revealed that mothers who were no longer living together with their husbands or separated were 60% less likely to be overweight and obese compared to married women.[44] A possible explanation for this variation might be sample size and socio-demographic differences.

In our findings breastfeeding status influenced the nutrition status of postpartum mothers. Being overweight among those mothers who frequently breastfed more than 8 times was less likely. It is a fact that weight is directly influenced by breastfeeding practices, healthy food intake, and physical activity.[30] Being underweight can also be associated with poor lactation performance and poor infant growth.[39]

Limitation

Since our study design was cross-sectional the issue of events temporality arises. It is better to identify the exact causality conducting higher design. The current nutritional status of the mother may have been affected by previous gestational weight, so incorporating a variable that is important to see the effect of previous pregnancy on lactation was crucial. The other limitation of this study is that results might have been affected by special care which was given to participants during the postpartum period.

Conclusion

The study indicated the presence of underweight and overweight among postpartum mothers with varied prevalence. The important explanatory factors of occupational status of the mother, occupational status of the husband, marital status, dietary diversity, exclusive breastfeeding, and frequency of breastfeeding were significantly associated with the nutritional status of the study subjects. Attention should be paid to the modifiable factors and allocating nutritionists in health facilities who will be responsible for scaling up nutrition education. We also recommended future studies to consider the actual cause of malnutrition which can further provide more information on the role of early identification and in the programming of later generation anthropometric profiles.

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Author Contributions

Authors A.S., A.G., and D.T. contributed significantly to the works in the creation, study design, execution, data collection, analysis, and interpretation and while the authors R.K. and E.T. took part in interpretation, drafting, revising, or critically reviewing the paper; gave final approval of the version to be published. All authors reviewed the manuscript.

Ethical Approval

Ethical clearance was taken from Jimma University IHRERC. Formal communication with Bench Sheko Zone Health department and Shey Bench District health office was made to get the letter to each selected kebeles administrators for smooth cooperation during data collection. Informed written consent was obtained from each study participant. Confidentiality of respondent was assured.

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Availability of Data and Materials

All data about the current study are available from the corresponding author on reasonable request.

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