

Review Article

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Effect of Educational Status on Underweight among Lactating Women in Ethiopia A Systemic Review and Meta-Analysis

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ABSTRACT

Objective: The objective of this systemic review and meta-analysis was to examine the relationship between educational status and underweight among lactating women in Ethiopia. The studies conducted before indicate in consistence association between educational status and underweight among lactating women in Ethiopia. We include 7 studies in different regions of Ethiopia.

Materials and Methods: The databases, including PubMed, Google scholar were systematically searched from 2015 to 2020. Data were extracted and tabulated by two reviewers using a table containing the following variables: author, title, date of publication, city(s)/ Region / study design, sample size, percentage women with informal education and percentage women with formal education and underweight. The Newcastle-Ottawa Scale for cross-sectional studies quality assessment tool was adapted and used to assess the quality of each study. The combined adjusted Odds ratios (OR) and 95% confidence intervals were calculated using random effect model.

Results: In the current meta-analysis seven observational studies involving 3113 lactating women's were used to estimate the pooled effect size of underweight. The result of 7 included studies indicated that the pooled odd ratio of underweight among women with informal education compared with women with formal education in Ethiopia was 2.47 (95% CI: 1.69, 3.83). Publication bias for estimating the odd ratio of underweight for women with informal education compared to women with formal education ($p = 0.881$) and ($p = 0.649$) respectively. Heterogeneity was statistically significant ($I^2 = 76\%$ $Q = 25.06$; $P < 0.001$). From 54.35% (1692) women who have informal education 16.35% (509) women have underweight. The overall proportion of underweight was 16.35% and 6.58% for those having informal education and formal education respectively.

Conclusions: There was evidence that lactating mothers with informal education are more likely to experience underweight. Based on our findings, we strongly recommended that the health education activities about nutrition should be targeted among lactating women with informal education through health extension workers.

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Introduction

Globally, 14 million adolescent girls become lactating mothers each year [1]. In Sub-Saharan Africa the prevalence of chronic energy deficiency among women is 10-20% [2]. In low income countries including Ethiopia, 20-25% of women are underweight [3-4]. Household food insecurity and low level of educational were reported as determinants of maternal under nutrition in Ethiopia [4].

Lactating mothers from low-income countries are nutritionally vulnerable group. The maternal nutrition requirement varies with respect to physiological changes like pregnancy and lactation [5-6]. Maternal under-nutrition remains a persistent problem in developing countries, where women usually fall behind men in

having access to food, health care, and education [7].

Identifying immediate, underlying and basic causes of under-nutrition background has new knowledge and evidence on the causes and influences of under-nutrition [8,9]. The Ministry of Health of Ethiopia developed the National Nutrition Program (NNP) with the aim of reducing the magnitude of malnutrition among lactating mother [10]. Awareness rising was continuously given to lactating mothers using Female Development Army. Nutritional support is being given for lactating mothers exposed to underweight after screening in the selected places of a country [11]. Few studies in Ethiopia conducted concerning nutritional status among lactating mothers. No previous meta-analysis was conducted to examine the relationship between educational status and underweight among lactating women in Ethiopia. The outcome of this study is important to verify relationship between educational status and underweight among lactating women and

this will be used for health care providers and any concerned bodies to plan health education activities in specific subgroups of population

Method

Searching Strategies

The current systematic review and meta-analysis was reported by using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) [12]. Guideline to determine combined effect size for the association between educational status underweight among lactating women in Ethiopia. The databases, including PubMed, Google scholar were systematically searched. The search was conducted using the following keywords “underweight”, “educational status”, “lactating women”, and “Ethiopia” The search terms were used separately and in combination using Boolean operators like “OR” or “AND”. The search was conducted from January 4, 2021 to January 30 2021. All articles published until January 30 2021 were included in this review.

Eligibility Criteria

Inclusion Criteria

Study area: Only studies conducted in Ethiopia. Study design: All observational study designs (Cross-- sectional, case-control and cohort) reporting the associations between educational status and underweight were considered. Outcome of interest: underweight were considered. Language: Articles reported in the English language were considered

Exclusion Criteria

Studies reported underweight as continuous variable without categories as underweight and normal. Studies not reporting underweight according to educational status.

Outcome Measurement

This systematic review has one dependent variable that is underweight. Outcome variable was dichotomous outcome either they are undernourished or not. Lactating women with BMI<18.5 kg/m² will be coded as “1” and those with BMI≥18.5 kg/m² was coded “0”. Underweight: mothers whose body weight was low from cut point, which is BMI < 18.5 kg/m² [13].

Data Extraction

The selection of articles was done in two stages. First, two reviewers independently screened the titles and abstracts of all identified articles. Second, the full text of articles was also independently assessed using the predefined inclusion criteria. A third reviewer solved disagreements when necessary.

Data were extracted and tabulated by two reviewers using a table containing the following variables: author, title, date of publication, city(s)/ Region / study design, sample size, percentage women with informal education and percentage women with formal education and underweight.

Quality Assessment

The Newcastle-Ottawa Scale for cross-sectional studies quality assessment tool was adapted and used to assess the quality of each study [14]. The tool has three major sections. The first section focuses on the methodological quality of each study. The second section deals with comparability of the study.

The last section deals with outcome and statistical analysis of each original study. Two authors independently assessed the quality of each original study using the tool. Disagreements between the two

authors were resolved by taking the average of the two authors. Finally, studies with a scale of ≥5 out of 10 were considered as good quality and included in systemic review and meta-analysis.

Statistical Analysis

A forest plot was built for the odds ratio of underweight for women with informal education vs women with formal education among lactating women.

To obtain summary measures, we used random-effects models when the heterogeneity test was statistically significant ($P < 0.05$) and fixed-effect models when the test was statistically non-significant ($P \geq 0.05$).

In addition, to identify the possible sources of heterogeneity univariate meta-regression was conducted by considering the sample size and prevalence of informal education as covariates but prevalence of informal education were found to be statistically significant and sample size were not statistically significant.

Begg’s and Egger’s tests assessed the existence of publication bias. The effect of exclusion of each study on the combined effect was also assessed. We do not report these results because the exclusion of any one of the included studies did not attenuate or increase the effect measure significantly.

Results

Study Selection

In the initial search, we found a total of 160 records from different electronic search databases which include; PubMed and Google Scholar. From this, 115 duplicate records were removed and 20 records were excluded after screening by title and abstracts. We assessed the full texts of 25 remaining records for eligibility and 18 records were further excluded by the inclusion and exclusion criteria Finally, 7 studies were included for systemic review and meta-analysis () to estimate the Pooled Adjusted odds ratio of underweight with educational status (Fig. 1).

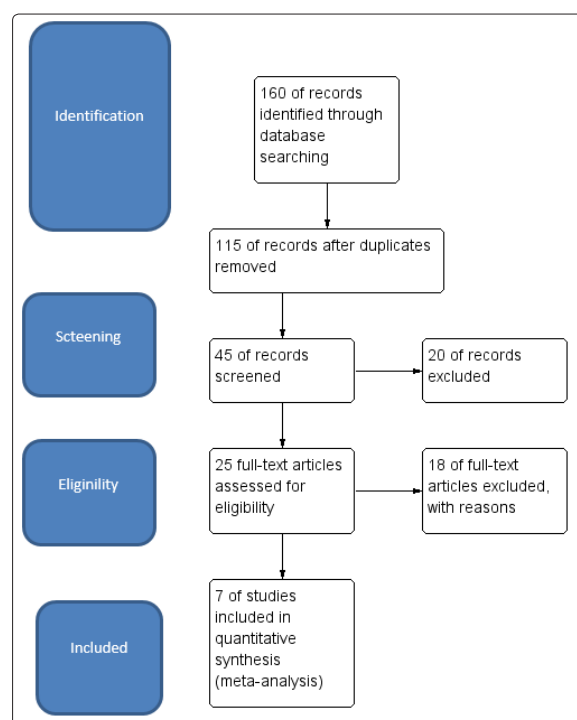


Figure 1: Flowchart of studies retrieved, screened and included in systematic review and meta-analysis

Study Characteristics

As described in Table 1, these 7 studies were published from 2015 to 2020. In the current meta-analysis, 3113 lactating women's were involved to estimate the pooled effect size of underweight. From 54.35% (1692) women who have informal education 16.35% (509) women have underweight. The overall proportion of underweight was 16.35% and 6.58% for those having informal education and formal education respectively.

In this study from total study participants 714 (22.93%) women have underweight and 1692 (54.35%) women have informal education. Regarding study design, studies are institution based cross sectional study design and other studies are community based crosssectional studies [15-21].

In this meta-analysis, three regions of the country were represented. Three of the studies were from oromia region; three studies were from southern region, one from dire dawa [15-21].

Table 1: Describes the characteristics of the included studies

Primary author	Publication Year	Study area	Study design	Sample size	Quality score
Bekele H et ale (15)	2020	Moyale District	Community based crosssectional	531	8
Tariku Z et ale (16)	2019	Dire Dawa Health Facilities	Institution based crosssectional	401	6
Kejela G et ale (17)	2020	Arba Minch Zuria district health centers	Institution based crosssectional	441	9
Alemayehu M et ale (18)	2015	Dedo and Seqa-Chekorsa Districts	Community based crosssectional	334	8
Hassen H et ale (19)	2018	Arba Minch Zuria District	Community based crosssectional	478	8
Abeya SG et ale (20)	2018	Adama District	Community based crosssectional	662	7
Eramo A et ale (21)	2018	ANLEMO WOREDA	Community based crosssectional	266	6

Table 2: Describes the characteristics of the included studies

Primary Author	Educational status	Under weight		Prevalence of informal education (%)	Prevalence of under weight (%)	Response rate (%)
Bekele H et ale (15)	Informal	57	241	56	18	97.6
	Formal	37	196			
Tariku Z et ale (16)	Informal	53	109	40	22	95
	Formal	35	204			
Kejela G et ale (17)	Informal	87	129	49	26	99.1
	Formal	28	197			
Alemayehu M et ale (18)	Informal	108	143	75	42	96.3
	Formal	31	52			
Hassen H et ale (19)	Informal	60	202	55	17	100
	Formal	23	193			
Abeya SG et ale (20)	Informal	101	292	59	20	100
	Formal	28	241			
Eramo A et ale (21)	Informal	43	67	41	25	100
	Formal	23	133			

Underweight was assessed similarly using BMI in all included studies. Data analyses were performed using Rev Man statistical software version 5.1 and Meta essential software.

Meta-Analysis

The result of 7 included studies indicated that the pooled odd ratio of underweight among women with informal education compared with women with formal education in Ethiopia was 2.47 (95% CI: 1.69, 3.83) (Fig. 2). In this meta-analysis, Gemechu Kejela1, et al. (4.75) reported the highest odd ratio of underweight, whereas Hailu Bekele, et al. (1.25) reported the lowest odd ratio of underweight [15,17].

Heterogeneity was statistically significant ($Q=25.06$; $P<0.001$).

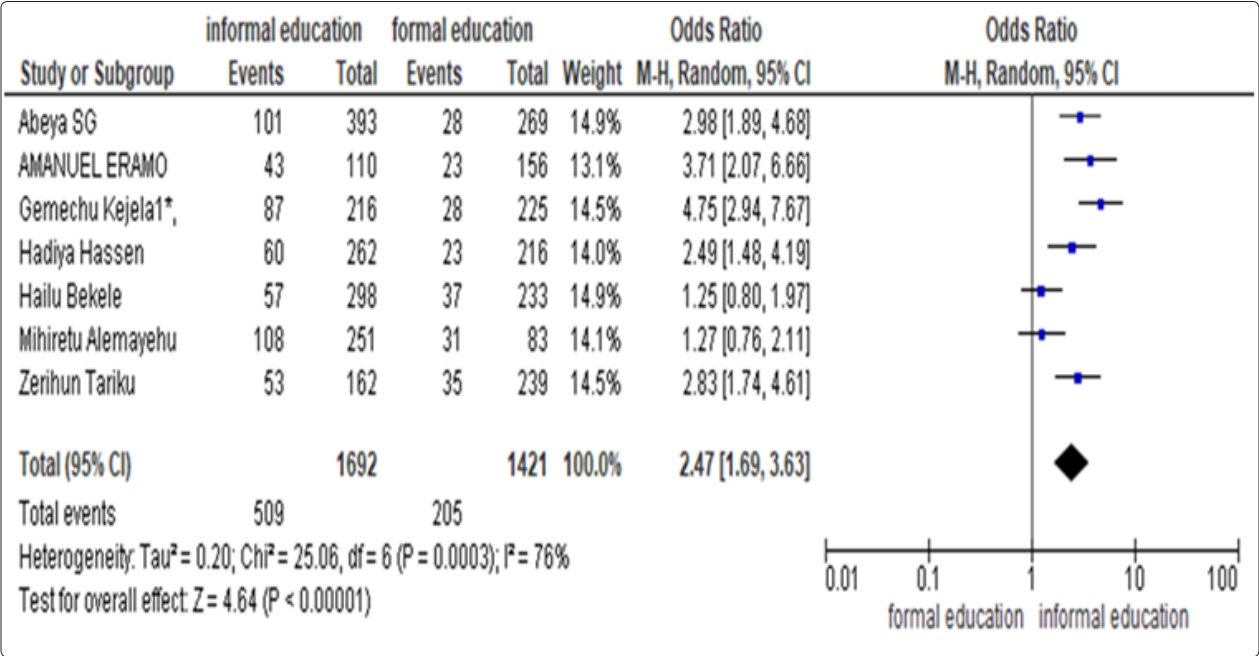


Figure 2: Forest plot for the effect of educational status on underweight among lactating women in Ethiopia

Sources of Heterogeneity

Table 3: Related factors with heterogeneity of underweight effect size in the current meta-analysis (based on univariate meta-regression)

Variables	Coefficient	p- value
Sample size	0.00	0.895
Prevalence of informal education	-0.03	0.001

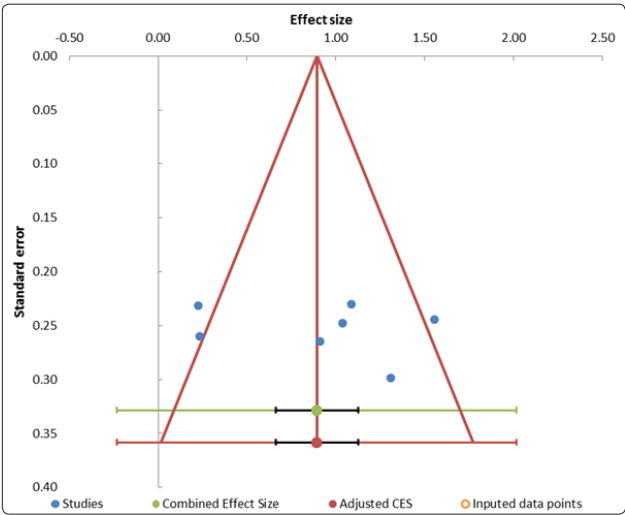
According to meta regression analysis Prevalence of informal education were found to be statistically significant and sample size were not statistically significant. Similarly, sensitivity analyses excluding two (16) and (21) studies with high risk of bias (score 6) showed an OR of underweight by educational status of lactating women 2.24 (95% CI 1•10, 4•57).

Quality Assessment

The quality assessment of the included studies is shown in table (2). Most of the studies had > 7 NOS score and two studies with 6 NOS score

Publication Bias

Publication bias was assessed using Begg’s and Egger’s tests, showing no statistical significant Publication bias for estimating the odd ratio of underweight for women with informal education compared to women with formal education (p = 0.881) and (p = 0.649) respectively These results were confirmed by funnel plot symmetry.



Egger Regression				
	Estimate	SE	CI LL	CI UL
Intercept	5.01	10.34	-20.29	30.30
Slope	-0.36	2.60	-6.73	6.00
t test	0.48			
p-value	0.649			
Begg & Mazumdar				
Δ_{xy}	1.00			
Kendall's Tau a	0.05			
z	0.15			
p	0.881			

Figure 3: Funnel plot for effect of educational status on underweight among lactating women in Ethiopia

Discussion

Women who have informal education were more likely vulnerable to underweight than women who have formal education. This is similar with studies in developing countries, in Bangladesh, in Ghana in Ethiopia [16,17,19-28]. Previous studies indicated that education is a key determinant of individual opportunities, attitudes, economic and social status [29]. The possible explanation may be women who are able to read and write can get nutritional information through reading books, posters and magazines than those who are unable to read and write.

In addition women who have informal education face unemployment, low income and low decision making power this all leads to reduced access to nutritious food. Women with higher educational level had better nutrition knowledge and nutritional status. There is increased awareness of self-care, health service utilization and recognizing the importance of extra meal during lactation among educated women. According to education may enable women to make independent decisions to be accepted by other household members and to have greater access to household resources and women who receive even a minimal education are generally more aware than those who have no education of how to utilize available resources for the improvement of their own nutritional status and that of their families [30].

Women with no education were also more likely to be thin (31%) compared to those with a secondary or more education 17% [31]. But previous studies revealed that education of women were not significantly associated with underweight of the lactating mothers [15,18,32]. The possible explanation for this inconsistency may be difference in methodology, time period and prevalence of informal education in study areas

Conclusion

There was evidence that lactating mothers with informal education are more likely to experience underweight. Based on our findings, we strongly recommended that the health education activities about nutrition should be targeted among lactating women with informal education through health extension workers.

Acknowledgments

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