



Effect of Educational Status on Underweight among Lactating Women in Ethiopia

Bagajjo WS¹, Tegegne KT^{2*}, Bifato B² and Assefa AA²

¹Dean of Hawassa College of Health Science, Ethiopia

²Department of Public Health, Hawassa College of Health Science, Ethiopia

*Corresponding author: Kaleab Tesfaye Tegegne, Department of Public Health, Hawassa College of Health Science, Hawassa, Ethiopia, Email: kaleabtesfaye35@gmail.com

Review Article

Volume 5 Issue 1

Received Date: February 03, 2021

Published Date: February 26, 2021

DOI: 10.23880/eoij-16000264

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.

Keywords: Educational Status; Underweight; Meta-Analysis; Lactating Women; Systematic Reviews

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 statuses 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 was 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 was 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 (Figure 1).

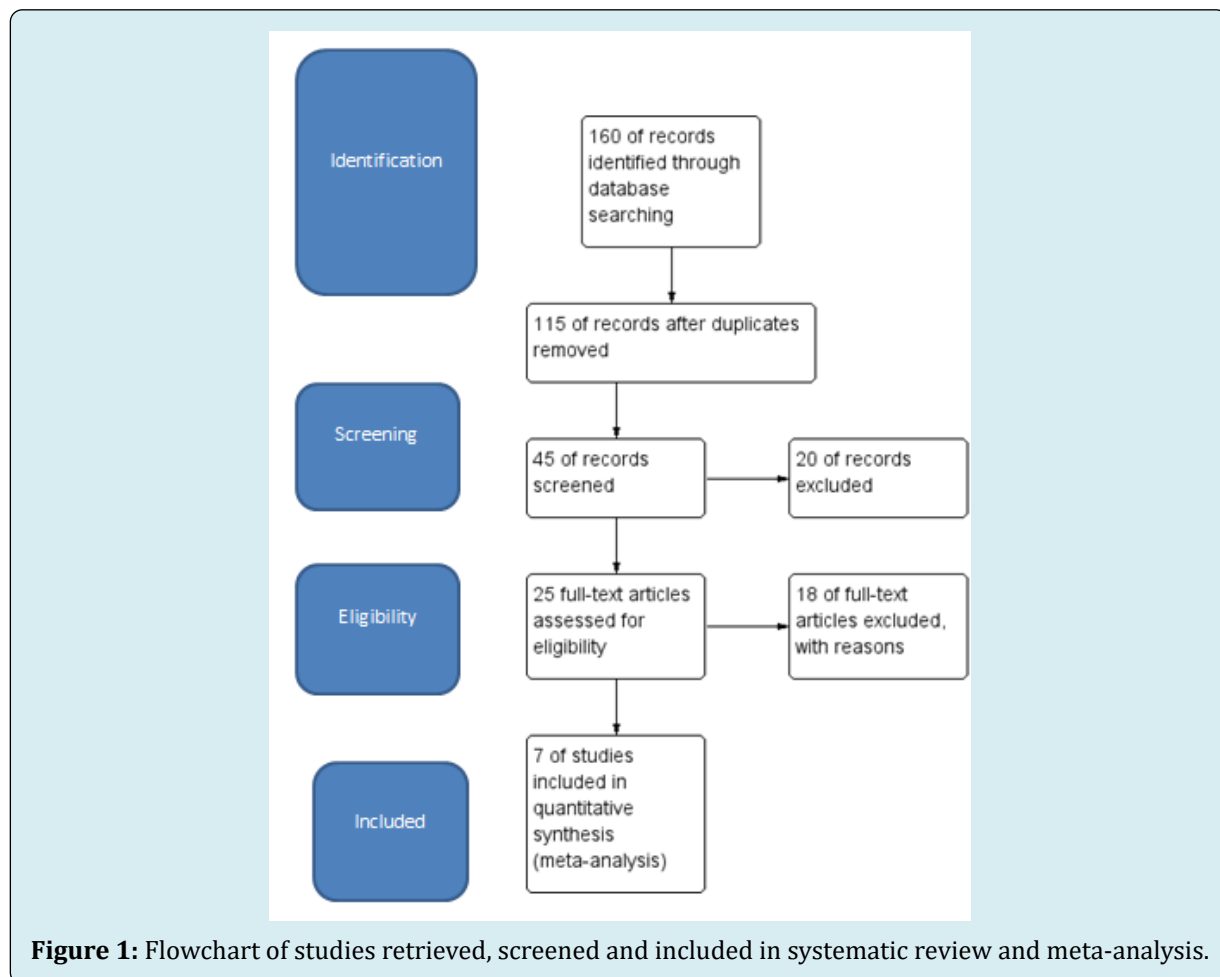


Figure 1: Flowchart of studies retrieved, screened and included in systematic review and meta-analysis.

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 [16,17] are institution based cross sectional study design and other studies [15,18-21] are community based cross-sectional studies.

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

Table 1: Describes the characteristics of the included studies.

In this meta-analysis, three regions of the country were represented. Three of the studies were from oromia region [15,18,20]; three studies were from southern region [17,19,21], one from dire dawa [16]. 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.

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) (Figure 2). In this meta-analysis, Gemechu Kejela, et al. [17] (4.75) reported the highest odd ratio of underweight, whereas Hailu Bekele, et al. [15] (1.25) reported the lowest odd ratio of underweight. Heterogeneity was statistically significant ($Q=25.06$; $P<0.001$).

Meta-Analysis

The result of 7 included studies indicated that the

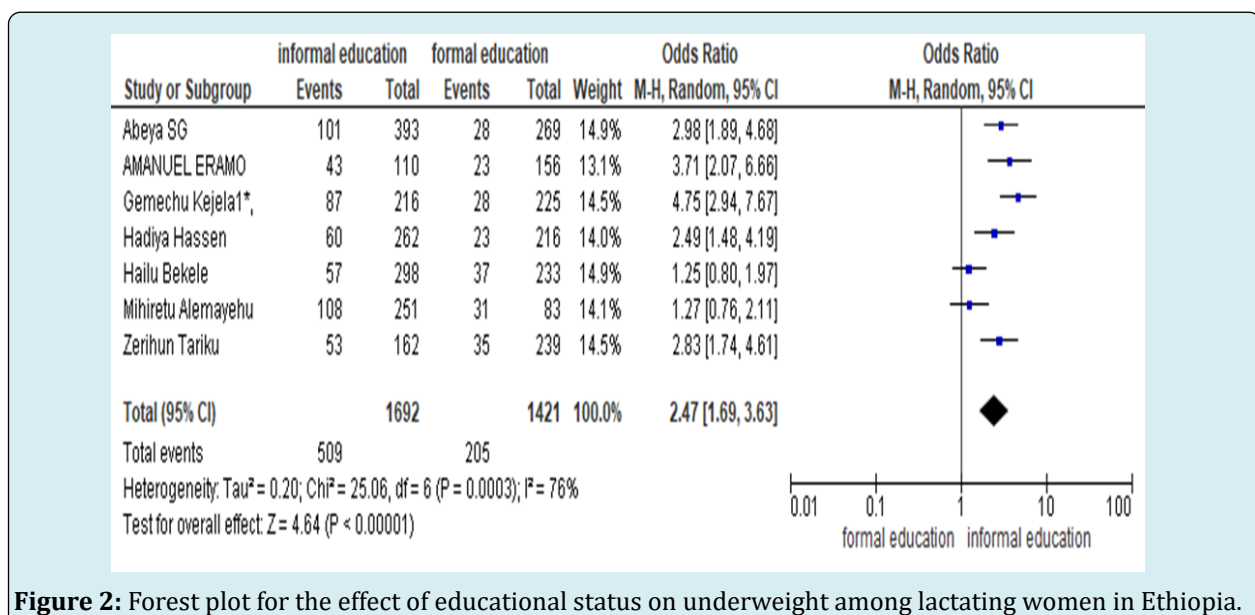


Figure 2: Forest plot for the effect of educational status on underweight among lactating women in Ethiopia.

Sources of Heterogeneity

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 and 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) [16,21].

Variables	Coefficient	p- value
Sample size	0	0.895
Prevalence of informal education	-0.03	0.001

Table 2: Related factors with heterogeneity of underweight effect size in the current meta-analysis (based on univariate meta-regression).

Quality Assessment

The quality assessment of the included studies is shown

in table 3. Most of the studies had > 7 NOS score and two studies with 6 NOS score.

Primary Author	Educational status	Underweight		Prevalence of informal education (%)	Prevalence of underweight (%)	Response rate (%)
		Yes	No			
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			

Table 3: Describes the characteristics of the included studies.

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.

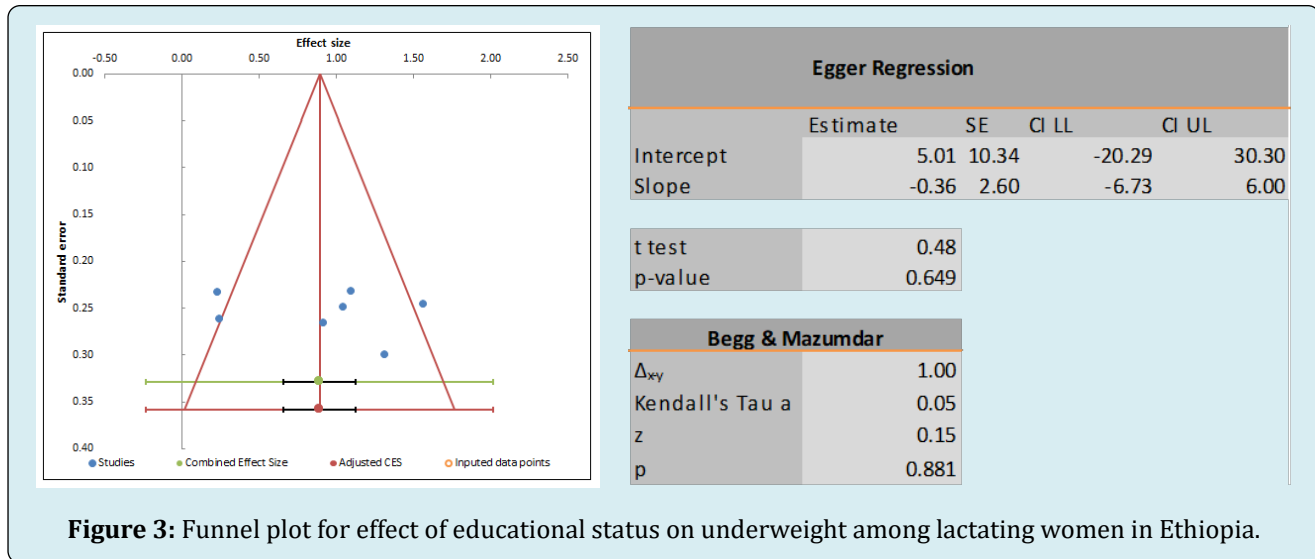


Figure 3: Funnel plot for effect of educational status on underweight among lactating women in Ethiopia.

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 [16,17,19-27]. 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 Girma W, et al. [30] 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.

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.

Data Availability: All data are included in the paper.

Conflicts of Interest: The authors declare that they have no conflicts of interest.

Authors' Contributions

- Kaleab Tesfaye Tegegne and Wosenyeh Semeon Bagajjo was responsible for conceptualization, project administration, software, supervision, and development of the original drafting of the manuscript.
- Kaleab Tesfaye Tegegne, Abiyu Ayalew Assefa. Berhanu Bifato. Wosenyeh Semeon Bagajjo were participated in quality assessment of articles, methodology, validation, and screening of research papers.
- All authors contributed with data analysis, critically revised the paper, and agreed to be accountable for their contribution.

Acknowledgment

We would like to thank all the primary authors of the included articles.

Competing of Interest

The authors have declared that there is no competing interest.

References

- Nugussie Temesgen, Abebe Haile (2017) Determinants of Nutritional Status of Under-Five Children in SNNPR, Ethiopia. *Agriculture and Food Sciences Research* 4(2): 45-57.
- (2012) State of the World's Mothers: Nutrition in the First 1,000 Days. Save The Children.
- Chaparro C, Oot L, Sethuraman K (2014) Overview of the Nutrition Situation in Seven Countries in Southeast Asia. FANTA III.
- Ferede A, Lemessa F, Tafa M, Sisay S (2017) The prevalence of malnutrition and its associated risk factors among women of reproductive age in Ziway Dugda district, Arsi Zone, Oromia, Ethiopia. *Publ Hlth J* 152: 1-8.
- Daba G, Beyene F, Fekadu H, Garoma W (2013) Assessment of knowledge of pregnant mothers on maternal nutrition and associated factors in Guto Gida Woreda, East Wollega Zone, Ethiopia. *J Nutr Disord* 4: 130.
- Kiday H, Afework M, Meron G (2013) Feeding practices, nutritional status and associated factors of lactating women in Samre Woreda, south eastern zone of Tigray, Ethiopia. *Nutr J* 12: 28.
- Khan Y, Bhutta AZ (2010) Nutritional deficiencies in the developing world. Current status and opportunities for intervention 57(6): 1409-1441.
- (2015) UNICEF Ethiopia Humanitarian Situation Report #5. Relifweb.
- Brussels (2013) Enhancing Maternal and Child Nutrition in External Assistance: an EU Policy Framework. Staff Working Document (SWD), European Commission.
- (2008) National Nutrition Strategy. Federal Ministry of Health of Ethiopia, Addis Ababa, Ethiopia.
- (2011) Assessment of Feasibility and Potential Benefits of Food fortification in Ethiopia. Federal Ministry of Health, Addis Ababa, Ethiopia.
- Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, et al. (2009) The PRISMA statement for reporting systematic reviews and metaanalyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med* 6(7): e1000100.
- Nuttall FQ (2015) Body Mass Index BMI, Obesity and Health: A Critical Review. *Nutrition Today* 50(3): 117-128.
- Newcastle-Ottawa Scale customized for cross-sectional studies.
- Bekele H, Jima GH, Regesu AH (2020) Under nutrition and Associated Factors among Lactating Women: Community-Based Cross-Sectional Study in Moyale District, Borena Zone, Southern Ethiopia *Advances in Public Health*, Article ID 4367145.
- Tariku Z, Tefera B, Samuel S, Derese T, Melese Markos, et al. (2020) Under nutrition and Associated Factors Among Lactating Women in Dire Dawa Health Facilities, Ethiopia. *Research Square*.
- Kejela G, Gebremeskel F, Hassen H, Shewangizaw M, Desalegn MJ (2020) Under Nutrition and Associated Factors among Lactating Mothers in Southern Ethiopia: Institution Based Cross-Sectional Study. *Womens Health Safety Res* 4(2): 155-166.
- Alemayehu M, Argaw A, Mariam AG (2015) Factors Associated with Malnutrition among Lactating Women in Subsistence Farming Households from Dedo and Seqa-Chekorsa Districts, Jimma Zone, 2014. *Developing Country Studies* 5(21): 114-122.
- Tikuye HH, Gebremedhin S, Mesfin A, Whiting S (2018) Prevalence and Factors Associated with Undernutrition among Exclusively Breastfeeding Women in Arba Minch Zuriya District, Southern Ethiopia: A Cross-sectional Community-Based Study. *Ethiop J Health Sci* 29(1): 913-922.
- Abeya SG, Biru KM, Jima A (2018) Factors Associated with Underweight among Lactating Mothers in Adama District, Oromia Region, Ethiopia. *J Orthop Bone Res* 1: 101.
- Amanuel E (2018) Determinants of Underweight among Lactating Mothers: In Anlemo Woreda, Hadiya Zone, Southern Ethiopia. *AAU Institutional Repository*, pp: 1-79.
- Devgun P, Mahajan SL, Gill KP (2004) Prevalence of chronic energy deficiency and socio demographic profile of women in slums of Amritsar city, India. *Int J Res Hlth Sci* 2(2): 527-532.
- Mtumwa AH, Vuai S (2016) Determinants of undernutrition among women of reproductive age in Tanzania mainland. *S Afr J Clin Nutr* 29(2): 75-81.

24. Rezwan M, Sharif E, Tahomina J (2015) Mothers' breastfeeding practices and nutritional status in the slums of Bangladesh: A study based on Khulna city. *Int J Multidiscip Res* 2: 7-18.
25. (2005) *Nutrition of Young Children and Mothers. Measure Dhs*, Calverton, Maryland, US.
26. Eshetu Zerihun, Gudina Egata, Frehiwot Mesfin (2016) Under Nutrition and its Associated Factors among Lactating Mothers in Rural Ambo District, West Shewa Zone, Oromia Region, Ethiopia. *East African Journal of Health and Biomedical Sciences* 1(1): 39-48.
27. Teller H, Yimar G (2000) Levels and Determinants of Malnutrition in Adolescent and Adult Women in Southern Ethiopia. *Ethiopian Journal of Health and Development* 14(1): 57-66.
28. Berhanu J, Abebe H, Girma A, Solomon E, Desalegn K, et al. (2018) Chronic energy deficiency and associated factors among lactating mothers (15-49 years old) in Offa Woreda, Wolayita zone, SNNPRs, Ethiopia. *World Sci Res* 5(1): 13-23.
29. (2012) *Opportunities for Africa's Newborns*.
30. Girma W, Timotios Genebo (2002) *Determinants of Nutritional Status of Women and Children in Ethiopia. ORC Macro*, Calverton, Maryland, USA.
31. (2010) *Nutrition Baseline Survey Report for the National Nutrition Program of Ethiopia*. Ethiopian Health and Nutrition Research Institute.
32. Fikrewold HB, Telake DS (2010) *Undernutrition among Women in Ethiopia: Rural-Urban Disparity. DHS Working Papers No. 77, ICF Macr*, Calverton, Maryland, USA.

