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Prevalence of food taboo during pregnancy in Ethiopia: A systematic review and meta-analysis

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Abstract

Food taboos influence intake of vital nutrients which required for optimal maternal health and fetal development during pregnancy. Pregnancy is the most delicate stage of human life and targets of food taboos. Even though there are fewer studies conducted on food taboos during pregnancy, there is no pooled estimate among pregnant women in Ethiopia. The smaller studies reported the different prevalence of food taboos which were difficult to help health planning at a national level. Thus, this study was expected to provide a pooled prevalence of pregnancy related food taboos in Ethiopia. The relevant studies were identified by manual and electronic data base searching method. Important information from the original studies was presented in a table and the quantitative results were presented in the forest plots. The Cochrane Q test and I^2 test statistic were used to test heterogeneity across studies. The Pooled estimate of prevalence of food taboo was computed by a random effects model. 175 articles were identified; nine studies meet inclusion criteria. A random effect meta-analysis of the results from these nine studies was carried out to provide pooled prevalence of food taboo during pregnancy. Analysis showed, the pooled prevalence of food taboo among pregnant women in Ethiopia

was 38.50 (95% CI = 24.33-52.67); a significant heterogeneity was observed among studies (I^2 = 99%, p value <0.001). Subgroup analysis shows the highest prevalence of food taboo found in Somali region 67.38% and the lowest prevalence seen in Tigray 11.45% region. This review found pooled estimate of food taboo during pregnancy in Ethiopia. Variation in the magnitude of pregnancy related food restriction was seen across the regions. Therefore, integrating nutrition education with the basic antenatal care program was recommended in all regions of Ethiopia to prevent nutritional deficiencies associated with food taboo.

Keywords: Ethiopia food taboo, prevalence, pregnant women

Introduction

Pregnancy needs a healthier diet that includes an adequate intake of all food categories including energy, protein, vitamins, and minerals to meet increased maternal and fetal demand (1). Food taboos inflict inadequate nutritional status during pregnancy which increases likelihood of multiple negative pregnancy outcomes like; risk of preterm birth, born babies with low birth-weight, intrauterine growth restriction (IUGR), gestational anemia, miscarriages, fetal deaths, maternal mortality, and adversely effect on the development of the immune system of the newborn that put their life in numerous threats to health and survival (2-4).

Even though food taboo is a global phenomenon, it is more practiced in African countries (5) and some regions of Asia such as East , South -East Asia, and Middle East where maternal under nutrition is highly prevalent and food taboo contributes a larger account of under nutrition during pregnancy (6, 7) . Food taboo has a long history that the people employed the restriction of plants or animals sources, solids as well as liquids, hot or cold categories, wet as well as dry food items (8).

Studies conducted in South Africa and Kenya indicated, nutritional valuable foods prohibited during pregnancy include; meat products, fish, potatoes, fruits, beans, eggs, butternut and pumpkin, which are rich in essential micronutrients, protein, and carbohydrates were avoided because of the perceived effects on the mother and baby (9, 10). A study done in Sudan revealed that 43.8% of pregnant women refused to eat some types of food groups during pregnancy, 65.5% avoided red meat, 29% avoided eating eggs, 23.4% avoided eating white meat and 36.5% avoided drinking milk (11). Evidence from Ethiopia revealed that half of (49.8%) of pregnant women practiced food taboo (12).

The issues of under nutrition attracted global attention and it incorporated in sustainable development goal 2 that aimed to end all form of hunger and malnutrition by 2030 (13).WHO recommended healthy eating, energy, proteins, and minerals supplementation in many Africa and south-east Asia countries where maternal under nutrition is highly prevalent and recognized as a key determinant of poor perinatal outcomes (6). However, in many African countries including Ethiopia, more effort will be needed to ensure adequate nutrition due to cultural based food restriction among pregnant mothers (14, 15).There were many smaller studies conducted in Ethiopia regarding pregnancy related food taboo (12, 16-18) .

On the other hand, there is a huge variation in the magnitudes of food taboos across the regions. In addition, there is no pooled prevalence of food taboos at a national level. Therefore, the focus of this systematic review and meta-analysis is to provide a consolidated prevalence of food taboos at a country level that enables intervention targeted nutrition education during antenatal care visits which impacts

reduction of maternal mortality in Ethiopia.

MethodsStudy setting and search strategies

The relevant studies were searched and identified by manual and electronic database MEDDILNE via PubMed, CENAHIL, Google scholar and Google search. In addition, unpublished articles were searched in some library data base. The reviewed literature is limited to the English language and those published between 01/10/1990 to 01/10/2022 G.C. All studies incorporated in meta- analysis stated the prevalence of food taboo among pregnant women. Searching medical subject headings (MeSH) was the food taboo and synonyms for food taboo were needed. The synonyms of food taboo "restricted food", "prohibited food" and later search combination used like "food taboo" OR "cultural restricted food", "Food taboo" OR "pregnancy", restricted food" OR "pregnancy" Prohibited food "AND "pregnancy related", Food Taboo, "pregnancy" AND Ethiopia.

Eligibility criteria

The Condition, Context, and Population (CoCoPop) (19) approach of prevalence studies were applied to settle inclusion and exclusion criteria.

Inclusion criteria

Studies done on prevalence or magnitude of food taboo among pregnant women in Ethiopia were enrolled. Further, all full-text studies written in the English language, with cross-sectional and case-control study design, and published after September 01/1990 were included in the meta-analysis.

Exclusion criteria

Studies conducted on non-pregnant women, studies with no prevalence report, and qualitative study design were excluded in this systematic review and meta-analysis.

The outcome variable

The outcome variable in this meta-analysis was to estimate the pooled prevalence of food taboo during pregnancy in Ethiopia.

Study selection and data collection

All the studies those were searched and reviewed via various electronic databases and manual methods were combined, exported, and managed using Endnote version X7.2 (20) software. All duplicated studies were removed and full-text studies downloaded using Endnote software and manual method. The eligibility of each study was assessed in detail based on eligibility criteria and any inconvenience was assessed and managed careful.

Assessment of the quality of each study

The quality of the studies were assessed by the validated modified version of a quality assessment tool for prevalence studies (21). The quality was assessed by nine-questions. Based on the score of the quality assessment tool the highest score had the minimum risk of bias. The overall scores range from (7–9), (4–6), and (0–3), which are stated as low, moderate, and high risk of bias respectively (21).

Data extraction and management

All-important parameters extracted from each study were documented in Microsoft Excel. The data extraction format was prepared using the assistance of the Joanna Briggs Institute (JBI) data extraction tool for prevalence studies (22). For each study, authors, years of publication, study region, residence of the participants, study design, sample size, cases, response rate and quality individual study were extracted.

Statistical analysis

The extracted data were exported to STATA version 14 software for analysis. The pooled prevalence of food taboo was analyzed by the random effects model using the Der Simonian-Laird model weight (23). Heterogeneity in meta-analysis is mostly inevitable due to differences in study quality, its sample size, method, and different outcome measurements across studies (24, 25). Statistically, significant heterogeneity was checked by Cochrane Q-test and I2 statistics (26). The estimated pooled prevalence rate with its 95 % confidence interval (CI) was presented. To minimize the variance of estimated points between primary studies, a subgroup analysis was carried out in reference to the region. Publication bias was checked by funnel plot (27).

Results

Study selection and identification

From 175 studies identified, 58 were excluded due to duplication. By reading topics and abstracts, 89 studies excluded as they were irrelevant for review. Again, by reading the full text of the articles, 19 studies excluded, because of not fulfill inclusion criteria. Lastly, nine essential articles those met eligibility criteria were included in systematic review and meta-analysis as summarized in the PRISMA flow diagram (28) *(**See Figure1**)*.

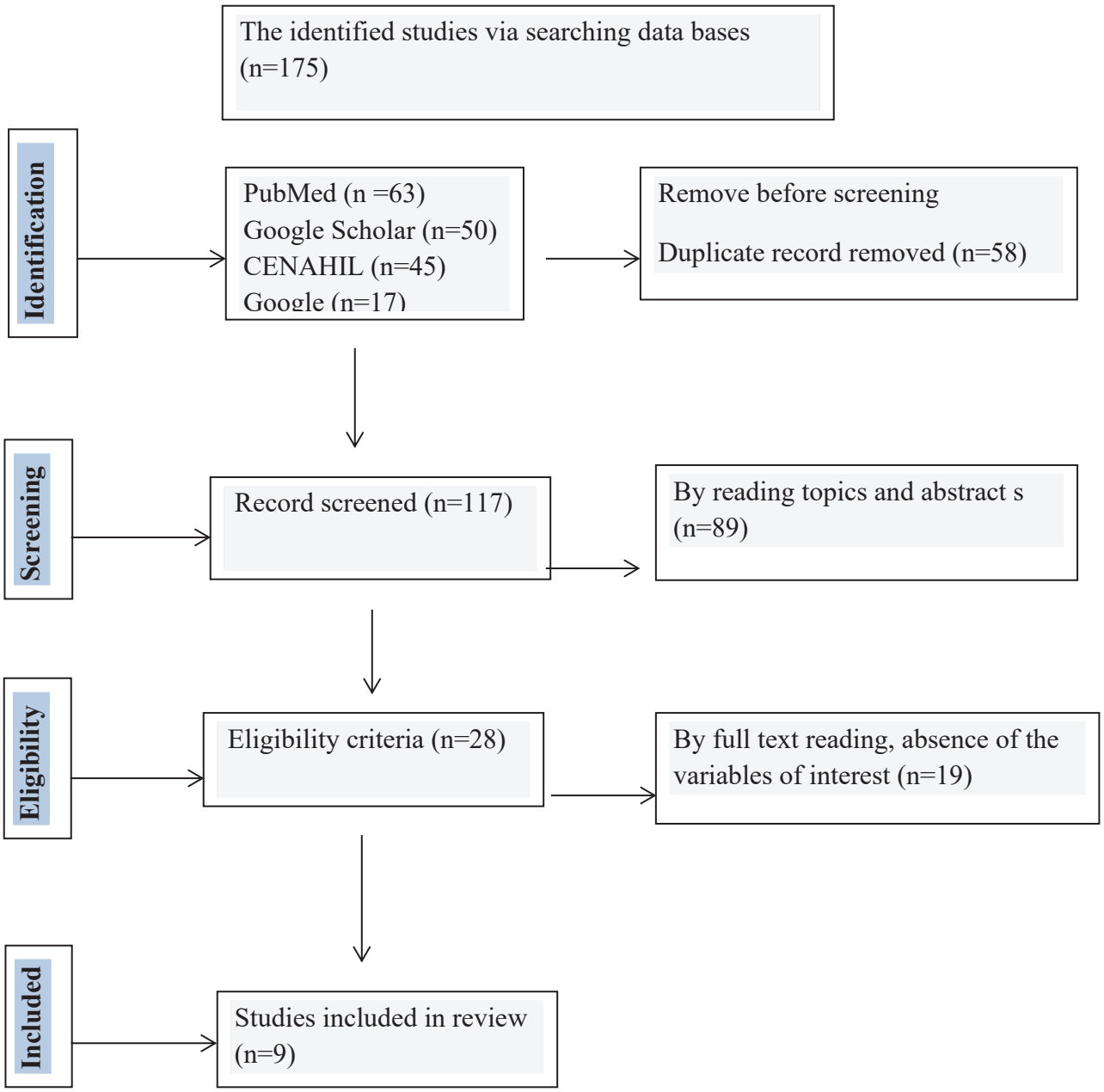

Figure1. PRISMA flow diagram for the selection of studies for systematic review and meta-analysis on the prevalence of food taboo during pregnancy in Ethiopia.

Characteristics of included studies

Out of included studies, 7(77.8%) studies published after 2018. Two articles from Oromia region (12, 16) and the rest studies from Addis Ababa (29), Tigray (17), Amhara (30), Benishangul gumuz (31), Gambella (32), SNNPR Hadiya zone (18) and Somali (33)regions of Ethiopia. However, no study from the Afar region and Dire Dawa City was included in this meta-analysis. Of the selected studies 88.9%were cross-sectional and 11.1% case-control study design. 66.7% of the studies were done among both urban and rural residents were as 33.2% of the studies include only urban residents. All selected studies in this systematic review and meta-analysis were a response rates greater than 80%.The total numbers of study participants were 3,536. The minimum and maximum sample sizes were 276 (32) and 610 (33) respectively. The minimum (11.45%) and maximum 67.38% prevalence of food taboos

reported from study done in Tigray (17) and Somali (33) regions. Overall, (100%) of the studies were in good quality which is a low risk of bias ***(See Table 1)***.

Table1. Characteristics of the included studies for the meta-analysis of prevalence of food taboo during pregnancy in Ethiopia, 2022.

S.no	Author	Year	Region of Ethiopia	Study design	Residence	Response rate	Sample	Cases	Q. Score
1	Freweini G et al	2020	Tigray	Cross sectional	Urban	100%	332	38	0
2	Shimels H et al	2019	Addis ababa	Case-control	Urban	100%	592	108	0
3	Robert W et al	2021	Oromia	Cross sectional	Urban	96.45%	407	225	0
4	Wollelaw G et al	2018	Amahar	Cross sectional	Urban and rural	97.7%	307	83	0
5	Nejimu Biza Zepro	2015	Oromia	Cross sectional	Urban and rural	100%	295	147	0
6	Ageze T et al	2020	Gambella	Cross sectional	Urban and rural	100%	276	96	0
7	Tesfa Mengie et al	2022	Somali region	Cross sectional	Urban and rural	95.9%	610	411	0
8	Ayru, Alga	2020	BGumuzi	Cross sectional	Urban and rural	100%	422	233	0
9	Tsegaye Demissie et al	2017	SNNPR	Cross sectional	Urban and rural	100%	295	81	0

Heterogeneity of the studies

The included studies show high heterogeneity according to Cochrane Q test (Q test p = 0.001) and I^2 test (I^2 = 99 %), which is suggestive to using random effects model.

The pooled prevalence of food taboo in Ethiopia

In random effects model, the pooled prevalence of food taboo among pregnant women in Ethiopia was 38.50 (95% CI = 24.33-52.67); significant heterogeneity observed among studies (I^2 = 99%, p value <0.001). The highest weight observed among studies conducted by Shimelis et al.(29), Friwine et al (17) and Tesfa M et al (33) ***(See Figure2)***.

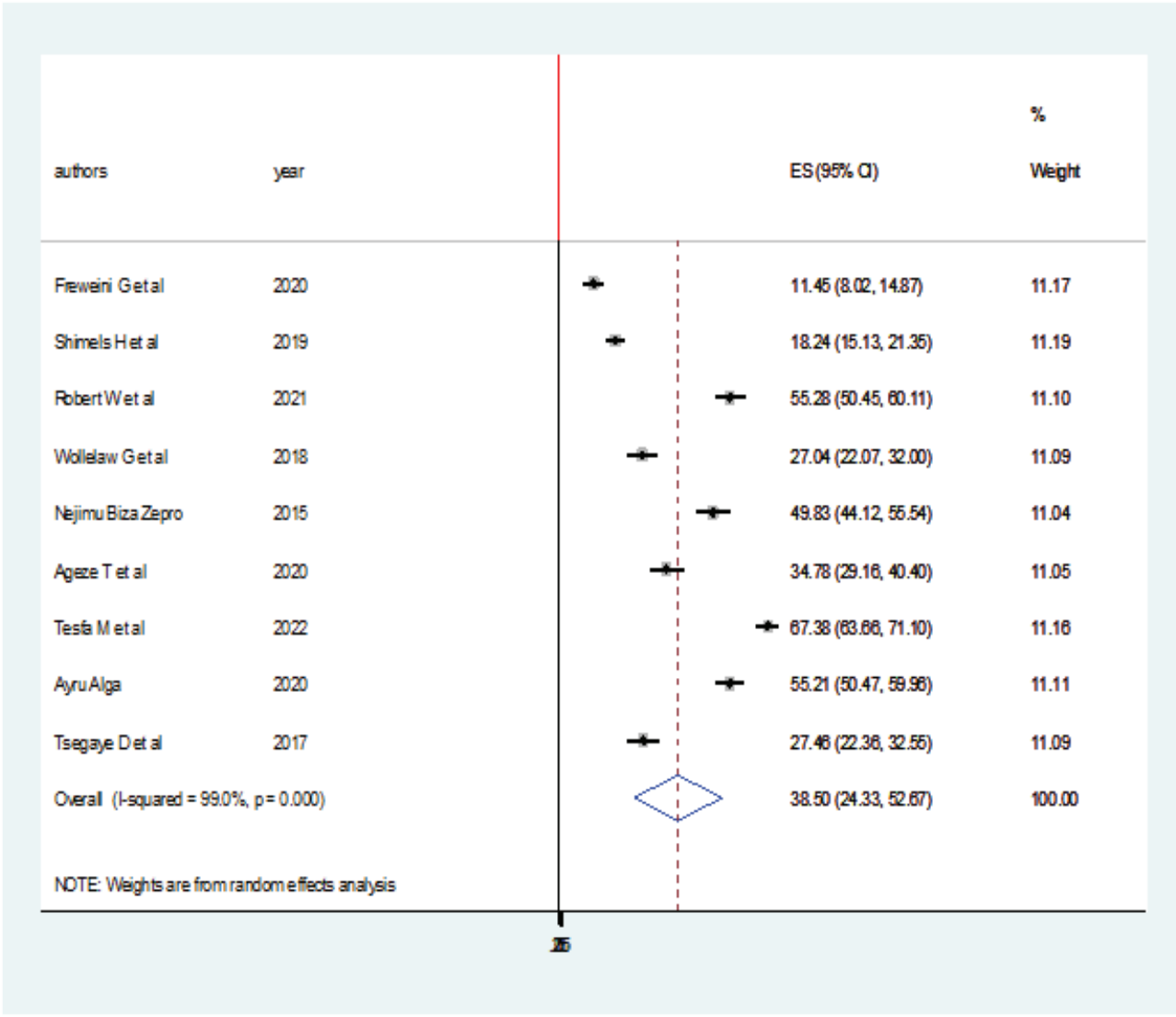

Figure 2: Forest plot of nine studies assessed prevalence of food taboos during pregnancy in Ethiopia, 2022

Subgroup Analysis

From nine studies in the random effects model, the highest prevalence of food taboo found in Somali region 67.38(63.66-71.10) followed by Benishangul -Gumuz 55.21(50.47-59.96), and Oromia region 52.78(95%CI=47.45-58.10). The lowest prevalence was reported from studies done in Tigray 11.45(8.02-14.87), Addis Ababa 18.24(15.13-21.35) and Amhara region 27.04(22.07-32.00) ***(See Figure 3)***. Out of studies in random effect model, the largest pooled prevalence was seen among studies included both urban and rural pregnant women 43.66(29.18-58.13) ***(See Figure 4)***. In terms of prevalence by the year of publication, the highest prevalence was found study published in 2022 67.38(63.66-73.10) that indicated the problem is increasing (***See Figure 5***).

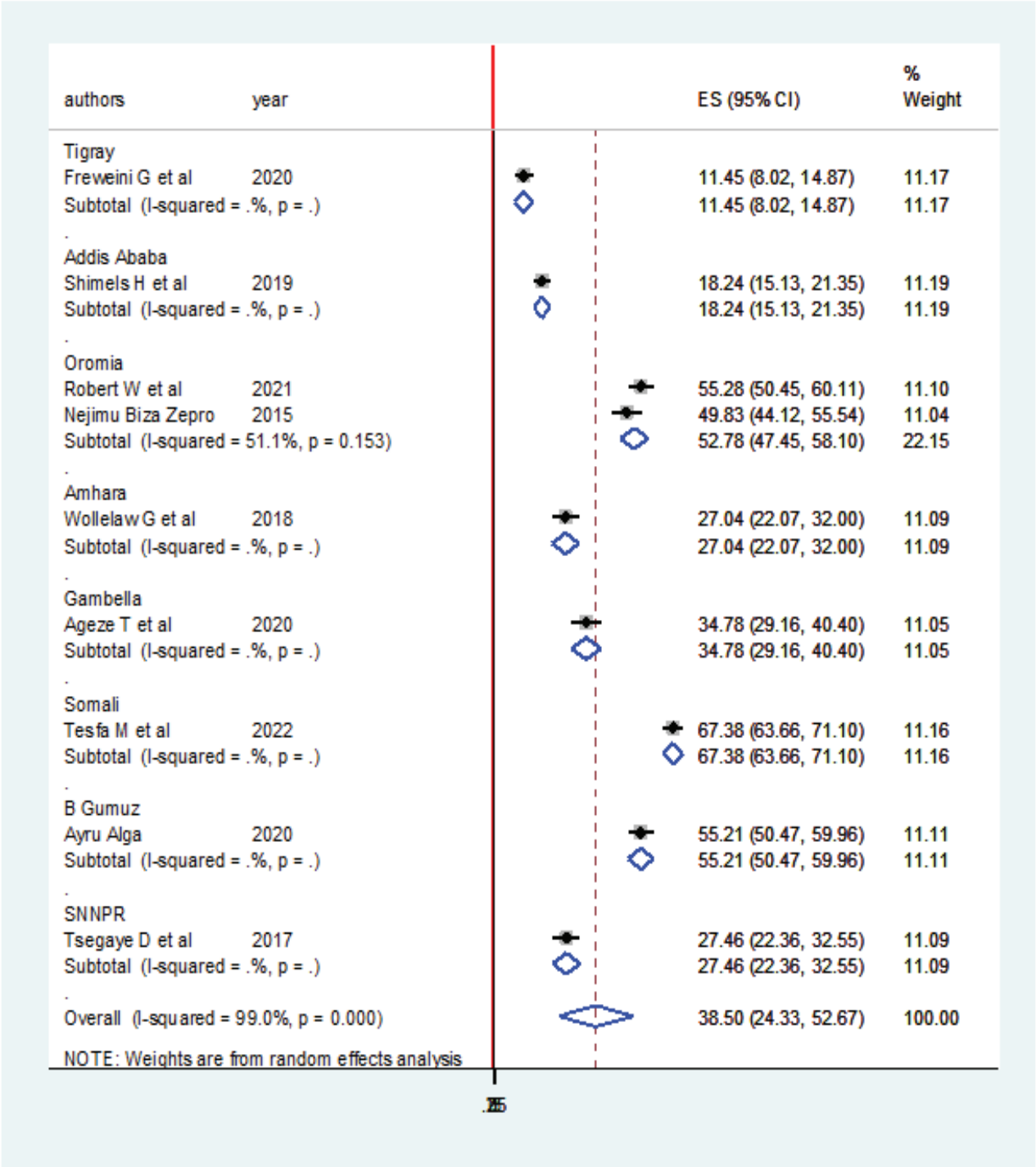

Figure 3: Forest plot of nine studies assessed prevalence of food taboos during pregnancy by regions of Ethiopia, 2022

Figure 4: Forest plot of nine studies assessed prevalence of food taboos during pregnancy by residence of the study participants, 2022

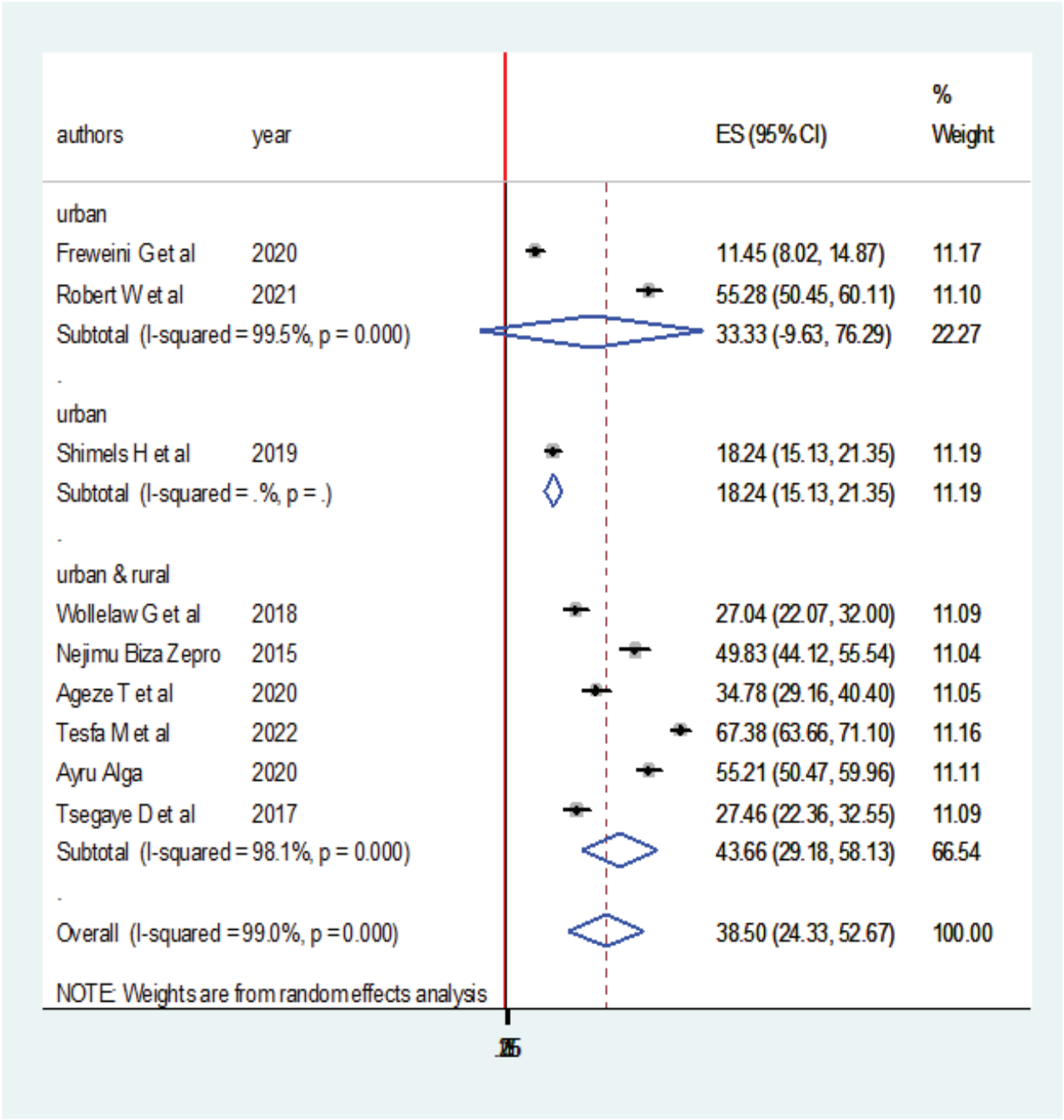

Figure 5: Forest plot of nine studies assessed prevalence of food taboos during pregnancy by year of publication, 2022.

Discussion

Food taboo is a harmful traditional practice that occurred in the world wide and it is a neglected phenomenon which attribute to a huge account of under nutrition during pregnancy in the developing countries (34, 35). In Sab Saharan Africa, where maternal under nutrition was highly prevalent, pregnancy related food taboo is one of the main contributing factor (6, 7). Ethiopia is the country with pervasive practice of food taboos among pregnant women in which foods, the best source of

carbohydrates (potato, gruel, linseed, porridge, banana, sugarcanes) protein (meat, milk products, chicken, egg fatty meat, vegetables) were tabooed due to traditional knowledge emanated from cultural views of nutrition (36).These cultural restrictions of vital nutrients required for optimal maternal health and fetal development results poor pregnancy outcome and poor future health of the babies (15).

There was no pooled prevalence of food taboo in Ethiopia that aid health care planners in planning regarding food taboos during pregnancy. As a result, this systematic review and meta-analysis was carried out to fill this gap. Hence, the prevalence of food taboos during pregnancy was identified in this systematic review. Furthermore, this meta-analysis distinguished the regions with a larger magnitude of food taboos at the time of pregnancy. The present systematic review and meta-analysis revealed that the pooled prevalence of food taboo among pregnant women in Ethiopia was 38.50 (95% CI = 24.33-52.67); which is in line with studies conducted in Enugu, the south eastern part of Nigeria 36.5% (37), Eastern Cape Province of south Africa 37% (9) and Sudan Khartoum 43.8% (11). This might be due to the similarity in the study population, and methodology.

On the other hand, the current finding is lower than studies carried out in the Surendranagar district of Gujarat state of India 77% (38) , northern KwaZulu of South Africa 64% (35) , Malay 70.2% (39) , Varanasi districts of northern India 70.47% (40) and higher than a study conducted in Lio people`s democratic republic 1.6% (41) and Oyo state of Nigeria 13% (42). The observed discrepancy is due to difference in knowledge of nutrition of the participants, socio-cultural, study setting, sample size, and quality of the studies.

In subgroup analysis, the higher prevalence of food taboo identified in study carried out in Somali region 67.38% (33). This finding is supported by a qualitative study conducted in the Abala districts of the Afar region that numerous food groups were restricted during pregnancy (43) . This may be due to low coverage of health care facilities that provide nutrition education and low utilization of available health care services during pregnancy. Furthermore, the pastoralist way of in populations of Somali and Afar regions should be considered which challenges the delivery of the services.

Another huge magnitude is among studies done in the Oromia region Sedafa bake town 55.28% (16) and Sheshemenne districts 49.8% of west Arsi zone (12). The resulted in line with the qualitative evidence that there are misbelieves and misconceptions concerning prohibited foods during pregnancy in the region (44). Considerable prevalence of food taboos found in studies done in Benishangul -Gumuz 55.21% (31), Gambella34.7% (32), Amhara 27.04% (30), and SNNPR 27.46% (18) regions. Pregnancy food belief of Ethiopia women, social and sociocultural factors that enhance food taboos during pregnancy were the factors behind practice of food taboos (15). The reason for adherence to food taboos were poor knowledge of food sources, limited awareness about the contents of specific food groups, and lower awareness concerning the consequences of poor diet on mothers and fetal health among Ethiopian women (15, 44) .

The lower prevalence seen from studies conducted among urban populations of the Tigray region, Makele city11.45% (17) and central Ethiopia ,Addis Ababa 18,24% (29). This finding contradicts comparative cross sectional study employed in Ogun state of Nigeria that prevalence food taboo higher among Urban pregnant women 19.4% than rural 16.1% (45). The discrepancy may be due to the study population, study setting, and sample size that the previous study included both urban and rural pregnant women and the sample size of the former study was larger.

Even though variability in the magnitude of food taboo during pregnancy, remarkable cultural

food restrictions was practiced in all setting urban, rural, and all regions of Ethiopia. Therefore, all pregnant women in Ethiopia need nutrition education that focused on elimination of the views linked with cultural food taboos and enhancing the habit of food diversification.

Strengths and limitations

Detailed literature search from multiple data bases was carried out by both manually and electronic search. The articles were included in the analysis based on predetermined inclusion criteria and data abstraction done by two independent reviewers to minimize errors. Potential limitation was no study included this meta-analysis from the Afar region and Dire Dawa city that may challenge the generalization of the results.

Conclusion and Recommendations

Pregnancy related food taboo is pervasive and increasing phenomenon that causes the detrimental effect on the mothers and their fetus. The relevant literatures analyzed in this systematic review and meta-analysis shown considerable prevalence of food taboo during pregnancy in Ethiopia. Next, the review came up with variability of the prevalence in subgroup analysis by the regions. In addition, the review discovered a neglected issue which is pregnant women concern in Ethiopia. Therefore, based on the results of the meta-analysis we recommended that all concerned bodies; health care workers those works in antenatal clinics, governmental and non-governmental organizations focused on awareness creation on the consequences of food taboo during pregnancy to the pregnant women, their house bands, and to the community at large. Indeed, incorporation of the nutrition education into the basic antenatal care programs to eradicate harmful cultural beliefs in all regions was recommended. Furthermore, educating women as a long term solution was forwarded because educated people less adhered to unscientific believe.

Authors Contributions

Shiferaw Gelchu was the principal investigator conceptualizes and designs the study, abstraction, entered, analyzed, interpreted the data, and prepared the manuscript.

Desalegn Wirtu contributed to writing review, editing, and preparing final manuscript.

Biftu Geda contributed to editing, and preparing final manuscript.

Dawit Galgalo supported in review, the data abstraction, and drafted the manuscript.

All authors read and approved the final manuscript.

Ethical Issues

Not applicable

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