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REVIEW PAPER

Sociodemographic Factors Predicting Exclusive Breastfeeding in Ethiopia: Evidence from a Meta-analysis of Studies Conducted in the Past 10 Years

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Abstract

Objectives To investigate the association between EBF and educational status, household income, marital status, media exposure, and parity in Ethiopia.

Methods PubMed, EMBASE, Web of Science, SCOPUS, CINAHL and WHO Global health library databases were searched using key terms for all studies published in English between September 2009 and March 2019. The methodological quality of studies was examined using the Newcastle–Ottawa Scale (NOS) for cross-sectional studies. To obtain the pooled odds ratio (OR), extracted data were fitted in a random-effects meta-analysis model. Statistical heterogeneity was quantified using Cochran's Q test, τ^2, and I^2 statistics. In addition, Jackknife sensitivity analysis, cumulative meta-analysis, and meta-regression analysis were conducted.

Results Out of 553 studies retrieved, 31 studies fulfilled our inclusion criteria. Almost all included studies were conducted among mothers with newborn less than 23 months old. Maternal primary school education (OR 1.39; 95% CI 1.03–1.89; $I^2 = 86.11\%$), medium household income (OR 1.27; 95% CI 1.05–1.55; $I^2 = 60.9\%$) and being married (OR 1.39; 95% CI 1.05–1.83; $I^2 = 76.96\%$) were found to be significantly associated with EBF. We also observed an inverse dose–response relationship of EBF with educational status and income. However, EBF was not significantly associated with parity, media exposure, and paternal educational status.

Conclusions In this meta-analysis, we showed the relevant effect of maternal education, income, and marital status on EBF. Therefore, multifaceted, effective, and evidence-based efforts are needed to increase the national level of exclusive breastfeeding in Ethiopia.

Keywords Breastfeeding · Exclusive breastfeeding · Breast milk · Meta-analysis · Ethiopia

Significance Statement

Exclusive breastfeeding practice (EBF) in Ethiopia is lower than the national Health Sector Transformation Plan 2016–2020, National Nutrition Program 2016–2020, and WHO Global Nutrition Targets 2025. Several factors may predict EBF at different level. For the first time, we depicted that educational status, household income, and marital status significantly predicted EBF practice in Ethiopia. This suggests that the meta-analysis detected small associations that many previous studies in Ethiopia have not been able to show a significant association between TIBF and different predictors. This national evidence can be useful for cross-country and cross-cultural comparisons. The finding also triggers public health interventions targeting identified predictors, such as counseling, peer education and promoting gender equality.

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Background

Optimal breastfeeding is an essential element for satisfactory growth and development of infants and children by reducing and/or preventing morbidity and mortality related to malnutrition and infection (Baker et al. 2006; Edmond et al. 2006; Mullany et al. 2008; Reading 2000). Recent estimates suggest that optimal breastfeeding could prevent around 12% of deaths in under-five children every year, representing around 800,000 lives in low- and middle-income countries (Black et al. 2013). Consequently, the Innocenti Declaration, UNICEF, World Health Organization (WHO), British Paediatric Association, American Dietetic Association, and American Academy of Pediatrics have recommended exclusive breastfeeding (EBF) for the first 6 months (Yngve and Sjöström 2001). EBF is the proportion of children born within 2 years who feed only breastmilk for the first 6 months after delivery (WHO, UNICEF, USAID, AED, UCDAVIS, IFPRI 2008). A recent systematic review and meta-analysis show that Exclusive breastfeeding (EBF) significantly lowers the risk of sepsis, diarrhea and respiratory infections (Khan et al. 2015). Additionally, EBF prevents 20% to 22% of neonatal deaths (Baker et al. 2006; Edmond et al. 2006; Setegn et al. 2011). To achieve the above recommendations and optimize the benefits of EBF, the global initiatives such as the International Code of Marketing of Breast-milk Substitutes, the Baby-Friendly Hospital Initiative (BFHI), the Millennium Development Goals, and the Global Nutrition Targets 2025 and Sustainable Development Goals have been developed (Gomez-Pomar and Blubaugh 2018; Ogbo et al. 2017).

Despite these facts, EBF is suboptimal in both developed and developing countries (Alemayehu et al. 2009a; Patel et al. 2008). Non-exclusive breastfeeding in the first 6 months of life resulted in 1.4 million deaths and 10% of the disease burden in children younger than 5 years of age (Ekambaram et al. 2010). Overall, in low- and middle-income countries, only 37% of children younger than 6 months of age are exclusively breastfeed (Victora et al. 2016). Based on secondary data analysis of 32 Demographic and Health Surveys conducted in sub-Saharan African countries since 2010, the prevalence of EBF is 41.0% (Gebremedhin 2019). In Ethiopia, breastfeeding is a common practice with 96% of children breastfed at some point in time (Macro 2006). A meta-analysis study (Habtewold et al. 2018a) from our research group shows that the prevalence of EBF is 60.1%.

EBF has been associated with parental educational status, marital status, household income, number of children, maternal age, child age, antenatal care, place of delivery, postnatal care, gender, birth order, employment status, mode of delivery, and timely initiation of breastfeeding thought findings are inconsistent (Alemayehu et al. 2009a; Dearden et al. 2002; Dhandapany et al. 2008; Hector et al. 2005; Koosha et al. 2008; Setegn et al. 2011; Uchendu et al. 2009). Likewise, a systematic review of 48 studies from 14 low- and middle-income countries identified 16 similar barriers of EBF (Kavle et al. 2017). In addition, based on a pooled Demographic and Health Survey data sets collected in nine sub-Saharan African countries, maternal educational status, maternal employment, antenatal care, postnatal care, and place of delivery were significantly associated with EBF (Ogbo et al. 2017). Contrary to the above evidence, a prospective study conducted in India shows an absence of significant association between EBF and parental education, living conditions, antenatal care follow-up, birth weight, culture, postnatal breastfeeding advice, previous breastfeeding exposure, and mothers' employment status (Chudasama et al. 2009).

In Ethiopia, a systematic review of 32 studies identified 26 factors significantly associated with EBF that reported by at least one study and categorized into four groups—proximal, proximal-intermediate, distal-intermediate and distal. Proximal factors include maternal educational status, mother's knowledge on EBF, guidance and counseling, access to health facility, poor attitude, and age of newborn. Proximal-intermediate factors include place of delivery, timely initiation of breastfeeding, intention or plan to breastfeeding, mode of delivery, breast complication, breastfeeding self-efficacy and outcome expectancy, and sex of newborn. Distal-intermediate factors include antenatal care, postnatal care, colostrum feeding, and pre-lacteal feeding. Distal factors include paternal educational status, household income, marital status, parity, husband support, maternal age, place of residence and family size (Habtewold et al. 2018a). Among these studies, remarkable inconsistencies in findings, sample size and selection of predictors has also been observed. The follow-up meta-analyses confirmed that maternal occupational status, gender of newborn, age of newborn, guidance and counseling on breastfeeding, colostrum discarding, antenatal care, postnatal care, vaginal delivery, health institution delivery, timely initiation of breastfeeding significantly increased the odds of EBF (Alebel et al. 2018; Alemu et al. 2019; Habtewold et al. 2018a).

The Ethiopian government has also endorsed and implemented national and global nutrition/breastfeeding initiatives to reduce infant and child morbidity and mortality. A national nutrition strategy and program (NNP) has been developed and implemented in a multi-sectoral approach. The Health Sector Development Program (HSDP IV) has also integrated nutrition into the Health Extension Program to improve the nutritional status of mothers and children (Federal Democratic Republic of Ethiopia Ministry of Health 2015). Despite the reduction of under-five mortality,

malnutrition, stunting, and underweight (Assefa et al. 2015), the rate of EBF in Ethiopia has fallen short of the Health Sector Transformation Plan 2016–2020 (Federal Democratic Republic of Ethiopia Ministry of Health 2015), National Nutrition Program 2016–2020 (Federal Democratic Republic of Ethiopia 2016) and WHO Global Nutrition Targets 2025 (World Health Organization 2014). The recent meta-analyses in Ethiopia also shows the pooled effect of only limited number of predicting factors (Alebel et al. 2018; Alemu et al. 2019; Habtewold et al. 2018a, b). These drawbacks call for the need to explore additional factors that affect EBF practice. Thus, the aim of this meta-analysis was to investigate the association between parental educational status, household income, parity, exposure to media and marital status with EBF in Ethiopia. We selected these factors because there was no meta-analysis and we expect they can affect breastfeeding practice.

Methods

Protocol and Registration

This systematic review and meta-analysis was conducted based on the registered (CRD42017056768) and published protocol (Habtewold et al. 2017). Based on the authors' decision, the following changes were made to the published protocol: Joanna Briggs Institute (JBI) tool (Munn et al. 2014) was used to extract the relevant data, and cumulative meta-analysis and mixed-effects meta-regression analysis were done to reveal the trends of evidence and identify possible sources of between-study heterogeneity, respectively. Moreover, studies published from 2009 to 2019 were included even though our inclusion criteria in the published protocol considered studies published starting from 2000.

Measurement Variables

The outcome measurement of this study was EBF, which is the proportion of children born in the last 2 years who feed only breastmilk for the first 6 months after delivery (WHO, UNICEF, USAID, AED, UCDAVIS, IFPRI 2008). Maternal educational status, paternal educational status, household income, marital status, media exposure, and parity were the predicting factors. The selection of these factors was guided by our previous systematic review (Habtewold et al. 2018a) and they were not addressed by the follow-up meta-analysis. Educational status represents the highest schooling grade achieved as per the Ethiopian educational system and categorized as 'uneducated' (including those who were able to read and write without formal schooling), 'primary education' (grades 1 to 8) and 'secondary or above' (starting from grades 9). Household income was categorized as 'high', 'medium' and 'low'. Because of substantial inconsistency in the reported household income, we used a harmonized qualitative way of classification of income for all included studies that reported at least three categories of household income or wealth index based on authors' educational judgment. Marital status was categorized as 'currently married' and 'others' (i.e. single, divorced, widowed or separated). Media exposure represents exposure to or ownership of any print media (newspaper, leaflet, and brochure) and broadcasting (radio and television) and categorized as 'yes' and 'no'. This does not include social medias, such as Facebook, Email, YouTube, or WhatsApp as most mothers do not have access to internet. If studies reported accessibility or exposure to more than one media tool, we extracted data on radio followed by television and print media. Parity refers to the total number of births after 28 weeks and was categorized as 'primipara' if the mothers have only one birth and 'multipara' if the mothers have at least two births.

Search for Literature

PubMed, EMBASE, Web of Science, SCOPUS, CINAHL and WHO Global health library databases were searched for studies published between 2000 and 2019. The interactive searching syntax was developed for all databases in consultation with a librarian, experts on literature searching (Supplementary file 1). We further manually searched the table of contents of Ethiopian Journal of Health Development, Ethiopian Journal of Health Sciences, Ethiopian Journal of Reproductive Health, International Breastfeeding Journal, BMC Pregnancy and Childbirth, BMC Public Health, BMC Paediatrics, Nutrition Journal and Italian Journal of Paediatrics. We also searched cross-references and grey literature on Addis Ababa University institutional research collection repository database. The search was updated in March 2019.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria: (1) observational studies, such as cross-sectional, case–control and cohort studies; (2) conducted in Ethiopia; (3) reported on the association between EBF and maternal and paternal educational status, household income that reported at least three categories, marital status, media exposure that include 'not exposed' or 'no access' to media category and parity; (4) published from September 2009 to March 2019. Program evaluation reports, systematic reviews and meta-analyses, qualitative studies and studies on mothers with medical conditions including HIV/AIDS and pre-term or ill health newborn were excluded.

Screening and Selection of Studies

All identified studies were exported into RefWorks citation manager version 4.6 for Windows and duplicates were deleted. Two reviewers (TD and BS) independently screened the abstracts and titles using Microsoft Excel spreadsheet for relevance, their compliance with our measurements of interest and against our inclusion criteria. Based on Cohen's Kappa inter-rater reliability test, the agreement between the two reviewers was 0.76 indicating substantial agreement. If disagreements on the inclusion of titles or abstracts persisted, full-text was reviewed. After removing irrelevant studies, full text review was conducted by two independent reviewers (TD and SM). Disagreement on inclusion of the studies was resolved through discussion until unanimity was reached. Finally, two independent reviewers (TD and SM) extracted the following information from each included studies using Joanna Briggs Institute (JBI) data extraction tool (Munn et al. 2014): author name, publication year, residence, study design, study population, number of participants, source of funding, and observed event. If funding source was not explicitly mentioned, we reported as 'not mentioned', whereas 'no funding' category was used if the author explicitly mentioned there is no funding or funding not applicable. If funding was not given directly but through other donors, the original donor was mentioned. Newcastle–Ottawa Scale (NOS) was used to examine the quality of studies and the potential risk of bias (Peterson et al. 2011). The scoring system, selection of cut-off value and interpretation used in this meta-analysis were published in our protocol (Habtewold et al. 2017). Preferred Reporting Items for Systematic review and Meta-analysis (PRISMA) guideline was used to illustrate the screening and selection processes of studies and reporting the results (Supplementary file 2) (Moher et al. 2009).

Statistical Analysis

To obtain the pooled odds ratio (OR), extracted data were fitted in a random-effects meta-analysis model. In addition, a cumulative meta-analysis was done to illustrate the trend of evidence regarding the effect of predictors on EBF and interpreted as stable, steadily increased/decreased, slightly increased/decreased or dramatically increased/decreased. Publication bias was assessed by subjective evaluation of the funnel plot, and then, we performed Egger's regression statistical test to objectively confirm the presence of significant publication bias at p-value ≤ 0.01 (Egger et al. 1997). We used Cochran's Q test to test heterogeneity, τ^2 to estimate the amount of total/residual between-study variance, and I^2 statistics to measure the proportion of total variation between studies due to heterogeneity (Higgins and Thompson 2002). Clinical and methodology heterogeneity were also carefully evaluated. Factors attributed to between-study heterogeneity were investigated using mixed-effects meta-regression analysis using region, residence, sample size and publication year as covariates (Viechtbauer 2010). The residual amount of heterogeneity was subtracted from the proportion of heterogeneity and divided by the total amount of heterogeneity to obtain the total amount of heterogeneity (R^2) explained by covariates. Omnibus test of moderators was applied to assess the moderation effect of these covariates. Meta-regression analysis was done only when heterogeneity threshold (I^2) was $\geq 80\%$. Jackknife sensitivity analysis was done to examine the influence of outlier studies on the pooled OR estimate, a significance level of estimate and between-study heterogeneity (Tsumoto and Hirano 2014). The study was excluded when the pooled OR estimate increased or decreased by one and changes the significance level after lifting out that study from the meta-analysis. Because of the small number of studies available for some variables, the change in heterogeneity threshold was not considered as a primary criterion to detect and excluded the outlier study. The data were analyzed using "metafor" packages in R software version 3.2.1 for Windows (Viechtbauer 2010).

Results

Search Results

Of 553 studies retrieved through electronic databases and manual searching, full-texts of 41 studies were reviewed. Ten studies were excluded after the full-text review: three studies reported only the prevalence of EBF, and the other seven studies did not report the selected factors of interest. Detailed characteristics of studies that reported each variable was presented in Table 1. All studies had good methodological quality (NOS score ≥ 7). One study reported more than one influencing factors. The screening and selection process has been illustrated below using the PRISMA flow diagram (Fig. 1).

Predicting Factors

Maternal Educational Status

Seventeen studies (Adugna et al. 2017; Alemayehu et al. 2014, 2009b; Arage and Gedamu 2016; Asfaw et al. 2015; Azeze et al. 2019; Berhe et al. 2013; Getahun et al. 2017; Hailu 2015; Hunegnaw et al. 2017; Seid et al. 2013; Tadesse et al. 2016; Tamir 2010; Tamiru and Tamrat 2015; Tariku et al. 2017; Tsegaye et al. 2019; Worku 2015) involving 14,691 mothers reported the association between maternal educational status and EBF (Table 1a). Seven studies were conducted in Amhara region, five in SNNPR, and

Table 1 Summary of included studies

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
(a) Maternal educational status								
Alemayehu et al. (2014)	Tigray, Axum town	Mothers who had children 6–12 months	418/418	Mekelle University	Uneducated	16	32	48
					Primary	87	127	214
					Secondary and above	74	88	162
					Total	177	247	424
Berhe et al. (2013)	Tigray, Mekelle town	Mothers of children aged 0 to 24 months	361/361	Addis Ababa University	Uneducated	25	24	49
					Primary	27	13	40
					Secondary and above	58	44	102
					Total	110	81	191
Tamiru and Tamrat (2015)	SNNPR, Arba Minch Zuria Woreda	Mothers of infants < 2 years	384/384	Arba Minch University	Uneducated	196	118	314
					Primary	41	9	50
					Secondary and above	18	2	20
					Total	255	129	384
Arage et al. (2016)	Amhara, Debre Tabor Town	Mothers of infants < 6 months	470/453	Debre Tabor University	Uneducated	16	27	43
					Primary	299	81	380
					Secondary and above	19	11	30
					Total	334	119	453
Adugna et al. (2017)	SNNPR, Hawassa city	Mothers with infants 0–6 months	541/529	USAID and Save the Children	Uneducated	31	20	51
					Primary	124	63	187
					Secondary and above	167	124	291
					Total	322	207	529
Getahun et al. (2017)	SNNPR, Kemba Woreda	Mothers with children 6 months to 2 years	567/562	Not mentioned	Uneducated	47	126	173
					Primary	81	121	202
					Secondary and above	100	87	187
					Total	228	334	562
Alemayehu et al. (2009b)	Tigray, Axum town	Mothers with children 6–12 months	1,142/1,142	Not mentioned	Uneducated	449	442	891
					Primary	98	107	205
					Secondary and above	11	35	46
					Total	558	584	1142
Asfaw et al.(2015)	Amhara, Debre Berhan District	Mothers with infant < 12 months	634/ 634	Debre Berhan University	Uneducated	270	73	343
					Primary	68	37	105
					Secondary and above	97	89	186
					Total	435	199	634

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Hunegnaw et al. (2017)	Amhara, Gozamin district	Mothers wiht infants 6 to 12 months	506/478	No funding	Uneducated	62	29	91
					Primary	70	19	89
					Secondary and above	226	72	298
					Total	358	120	478
Seid et al.(2013)	Amhara, Bahir Dar city	Mothers who delivered in the last 12 months	819/819	University of Gondar	Uneducated	120	141	261
					Primary	97	64	161
					Secondary and above	195	202	397
					Total	412	407	819
Tadesse et al. (2016)	SNNPR, Sorro District	Mothers with infants aged of 0–5 months	602/ 579	NORAD	Uneducated	184	190	374
					Primary	69	45	114
					Secondary and above	17	9	26
					Total	270	244	514
Tariku et al. (2017)[a]	Amhara, Dabat District	Mothers with children < 59 months	5,227/ 5,227	University of Gondar	Uneducated	1609	1704	3313
					Primary	407	316	723
					Secondary and above	835	356	1191
					Total	2851	2376	5227
Tsegaye et al. (2019)	Afar, Aysaita woreda	Mothers with infants < 6 months	631/618	Addis Ababa University	Uneducated	183	192	375
					Primary	106	64	170
					Secondary and above	51	22	73
					Total	340	278	618
Azeze et al.(2019)	SNNPR, Boditi Town	Mothers with children 6 to 12 months	412/ 403	Wolaita Sodo University	Uneducated	63	47	110
					Primary	89	39	128
					Secondary and above	109	56	165
					Total	261	142	403
Tamir (2010)	Amhara, Bahir Dar city	Mothers having children 0–23 months of age	825/794	Addis Ababa University	Uneducated	92	22	114
					Primary	126	55	181
					Secondary and above	220	310	530
					Total	438	387	825
Hailu (2015)	Addis Ababa city	Mothers with infants < 6 months	383/383	Not mentioned	Uneducated	38	9	47
					Primary	53	29	82
					Secondary and above	193	60	253
					Total	284	98	382

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Worku (2015)	Amhara, Woldiya	Mothers who have infants aged 0–6 month	876/ 852	Addis Ababa University	Uneducated	88	26	114
					Primary	114	72	186
					Secondary and above	275	277	552
					Total	477	375	852
(b) Paternal educational status								
Tamiru and Tamrat (2015)	SNNPR, Arba Minch Zuria Woreda	Mothers of infants < 2 years	384/384	Arba Minch University	Uneducated	160	98	258
					Primary	79	26	105
					Secondary and above	16	5	21
					Total	255	129	384
Asfaw et al.(2015)	Amhara, Debre Berhan District	Mothers with infant < 12 months	634/ 634	Debre Berhan University	Uneducated	198	65	263
					Primary	76	30	106
					Secondary and above	191	104	295
					Total	465	199	664
Hunegnaw et al. (2017)	Amhara, Gozamin district	Mothers with Infants 6 to 12 months	506/478	No funding	Uneducated	59	29	88
					Primary	56	14	70
					Secondary and above	243	77	320
					Total	358	120	478
Seid et al.(2013)	Amhara, Bahir Dar city	Mothers who delivered in the last 12 months	819/819	University of Gondar	Uneducated	99	78	177
					Primary	76	73	149
					Secondary and above	258	235	493
					Total	433	386	819
Hailu (2015)	Addis Ababa city	Mothers with infants < 6 months	383/383	Not mentioned	Uneducated	8	4	12
					Primary	32	10	42
					Secondary and above	219	69	288
					Total	259	83	342
(c) Socioeconomic status								
Shiferaw et al. (2015)	Addis Ababa	Mothers with newborn ≤ 9 months	660/648	Addis Continental Institute of Public Health	Low	130	319	449
					Medium	29	58	87
					High	12	58	70
					Total	171	435	606
Regassa (2014)	SNNPR, Sidama zone	Mother with infants 0–6 months	1100/	Norwegian Government (HU-NORAD)	Low	149	29	178
					Medium	44	6	50
					High	5	1	6
					Total	198	36	234

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Chekol et al. (2017)	Amhara, Gondar town	Mothers with children 7–12 months	333/333	No funding	Low	13	71	84
					Medium	24	85	109
					High	29	94	123
					Total	66	250	316
Berhe et al. (2013)	Tigray, Mekelle town	Mothers of children 0 to 24 months	361/361	Addis Ababa University	Low	16	9	25
					Medium	39	22	61
					High	51	36	87
					Total	106	67	173
Abera (2012)	Harari, Harar town	Mothers of children < 2 years	604/583	Not mentioned	Low	128	96	224
					Medium	42	31	73
					High	48	85	133
					Total	218	212	430
Arage and Gedamu (2016)	Amhara, Debre Tabor Town	Mothers of infants < 6 months	470/453	Debre Tabor University	Low	27	20	47
					Medium	178	40	218
					High	117	71	188
					Total	322	131	453
Alemayehu et al. (2009b)	Tigray, Axum town	Mothers who had children aged 6–12 months	418/418	Not mentioned	Low	202	254	456
					Medium	154	102	256
					High	204	227	431
					Total	560	583	1143
Asfaw et al.(2015)	Amhara, Debre Berhan District	Mothers with infant < 12 months	634/ 634	Debre Berhan University	Low	160	57	217
					Medium	123	52	175
					High	152	90	242
					Total	435	199	634
Hunegnaw et al. (2017)	Amhara, Gozamin district	Mothers with infants 6 to 12 months	506/478	No funding	Low	113	50	163
					Medium	83	20	103
					High	162	50	212
					Total	358	120	478
2013 Seid et al. ()	Amhara, Bahir Dar city	Mothers with infant < 12 months	819/819	University of Gondar	Low	210	211	421
					Medium	109	91	200
					High	93	105	198
					Total	412	407	819

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Tariku et al. (2017)	Amhara, Dabat District	Mothers with children < 59 months	5,227/ 5,227	University of Gondar	Low	793	796	1589
					Medium	1285	1022	2307
					High	678	498	1176
					Total	2756	2316	5072
Tewabe et al. (2016)	Amhara, Motta town, East Gojjam zone	Mothers with an infant < 6 months old	423/405	No funding	Low	114	84	198
					Medium	55	52	107
					High	34	66	100
					Total	203	202	405
Teka et al. (2015)	Tigray, Enderta Woreda	Mothers having children < 24 months	541/530	Mekelle University	Low	262	115	377
					Medium	85	38	123
					High	25	5	30
					Total	372	158	530
(d) Marital status								
Abera (2012)	Harari, Harar town	Mothers of children < 2 years	604/583	Not mentioned	Married	196	179	375
					Other	11	13	24
					Total	207	192	399
Adugna et al. (2017)	SNNPR, Hawassa city	Mothers with infants 0–6 months	541/529	USAID and Save the Children	Married	298	177	475
					Other	24	30	54
					Total	322	207	529
Egeta et al. (2013)	Oromia, Kersa district	Mothers of children < 2 years of age	881/ 860	Haramaya University	Married	603	230	833
					Other	14	13	27
					Total	617	243	860
Alemayehu et al. (2009b)	Tigray, Axum town	Mothers who had children aged 6–12 months	418/418	Not mentioned	Married	258	835	1093
					Other	31	17	48
					Total	289	852	1141
Hunegnaw et al. (2017)	Amhara, Gozamin district	Mothers who had infants aged between 6 to 12 months	506/478	No funding	Married	317	104	421
					Other	41	16	57
					Total	358	120	478
Sonko et al. (2015)	SNNPR, Halaby special woreda	Mothers of children aged < 6 months	422/420	Not mentioned	Married	294	120	414
					Other	2	4	6
					Total	296	124	420

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Tadesse et al. (2016)	SNNPR, Sorro District	Mothers with infants 0–5 months	602/ 579	NORAD	Married	262	223	485
					Other	8	21	29
					Total	270	244	514
Tariku et al. (2017)	Amhara, Dabat District	Mothers with children < 59 months	5,227/ 5,227	University of Gondar	Married	2428	2053	4481
					Other	423	323	746
					Total	2851	2376	5227
Tewabe et al. (2016)	Amhara, Motta town, East Gojjam zone	Mothers with an infant < 6 months	423/405	No funding	Married	182	165	347
					Other	21	37	58
					Total	203	202	405
Biks et al. (2015)[b]	Amhara, Dabat district	Pregnant women in the second/ third trimester	1,769/1,769	WHO and University of Gondar	Married	501	1146	1647
					Other	42	80	122
					Total	543	1226	1769
Tsegaye et al. (2019)	Afar, Aysaita woreda	Mothers with infants < 6 months	631 /618	Addis Ababa University	Married	318	270	588
					Other	22	8	30
					Total	340	278	618
Chekol et al. (2017)	Amhara, Gondar town	Mothers with children 7–12 months	333/333	No funding	Married	215	366	581
					Other	11	57	68
					Total	226	423	649
Teka et al. (2015)	Tigray, Enderta Woreda	Mothers having children < 24 months	541/530	Mekelle University	Married	333	132	465
					Other	39	26	65
					Total	372	158	530
Tamir (2010)	Amhara, Bahir Dar city	Mothers having children 0–23 months	825/794	Addis Ababa University	Married	364	336	700
					Other	74	51	125
					Total	438	387	825
Hailu (2015)	Addis Ababa city	Mothers with infants < 6 months	383/383	Not mentioned	Married	255	82	337
					Other	29	16	45
					Total	284	98	382
Worku (2015)	Amhara, Woldiya	Mothers with infants 0–6 month	876/ 852	Addis Ababa University	Married	417	324	741
					Other	60	53	113
					Total	477	377	854
(e) Media exposure								
Getahun et al. (2017)	SNNPR, Kemba Woreda	Mothers with children 6 months to 2 years	567/562	Not mentioned	Yes	144	158	302
					No	84	176	260
					Total	228	334	562

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Alemayehu et al. (2009b)	Tigray, Axum town	Mothers who had children 6–12 months	418/418	Not mentioned	Yes	192	243	435
					No	365	338	703
					Total	557	581	1138
Taddele et al. (2014)	Amhara, Injibara Town	Mothers of children ≤ 1 year	524/473	Not mentioned	Yes	109	45	154
					No	58	44	102
					Total	167	89	256
Tamiru et al. (2012)	Oromia, Jimma Arjo Woreda	Mothers of children < 6 months	384/ 382	Not mentioned	Yes	77	104	181
					No	106	95	201
					Total	183	199	382
Tamiru and Tamrat (2015)	SNNPR, Arba Minch Zuria Woreda	Mothers of infants < 2 years	384/384	Arba Minch University	Yes	147	38	185
					No	108	91	199
					Total	255	129	384
Berhe et al. (2013)	Tigray, Mekelle town	Mothers of children aged 0 to 24 months	361/361	Addis Ababa University	Yes	64	42	106
					No	46	29	75
					Total	110	71	181
Worku (2015)	Amhara, Woldiya	Mothers who have infants < 6 months	876/ 852	Addis Ababa University	Yes	350	278	628
					No	127	97	224
					Total	477	375	852
(f) Parity								
Dachew et al. (2014)	Amhara, North Gondar Zone	Nurses and midwives	196 /178	University of Gondar	Primiparous	19	55	74
					Multiparous	55	59	114
					Total	74	114	188
Gultie et al. (2016)	Amhara, Debre Berhan town	Mothers having children < 23 months old	548/548	Not mentioned	Primiparous	89	103	192
					Multiparous	184	172	356
					Total	273	275	548
Tsegaye et al. (2019)	Afar, Aysaita woreda	Mothers with infants < 6 months	631/618	Addis Ababa University	Primiparous	81	52	133
					Multiparous	259	226	485
					Total	340	278	618
Sefene et al. (2013)	Amhara, Bahir Dar city	Mothers with a child < 6 months	170/159	Not mentioned	Primiparous	34	42	76
					Multiparous	44	39	83
					Total	78	81	159
Azeze et al. (2019)	SNNPR, Boditi Town	Mothers with children age between 6 and 12 months	412/ 403	Wolaita Sodo University	Primiparous	163	73	236
					Multiparous	98	69	167
					Total	261	142	403

Table 1 (continued)

Studies	Study area	Study population	Sample size/ Participated	Funding	Factors	Exclusive breastfeeding		
						Yes	**No**	**Total**
Hailu (2015)	Addis Ababa city	Mothers with infants < 6 months	383/383	Not mentioned	Primiparous	147	59	206
					Multiparous	137	39	176
					Total	284	98	382
Worku (2015)	Amhara, Woldiya	Mothers with infants 0–6 month	876/ 852	Addis Ababa University	Primiparous	208	130	338
					Multiparous	269	245	514
					Total	477	375	852

[a]Used nationally representative Ethiopian Demographic Health Survey (EDHS) data

[b]Nested case–control study

four studies in Addis Ababa, Afar, and Tigray. One study used nationally representative data. The odds of EBF in mothers who attained primary education was 39% significantly higher than uneducated mothers (OR 1.39; p = 0.03; 95% CI 1.03–1.89; $I^2 = 86.11\%$) (Fig. 1). This estimate was obtained after removing one outlier study (Worku 2015). The meta-regression analysis result showed that region, sample size and publication year explained 24.54% of the between-study heterogeneity. These factors had also a moderation effect. The odds of EBF among mothers with secondary education and above was 9% higher than uneducated mothers (OR 1.09; p = 0.71; 95% CI 0.69–1.72; $I^2 = 93.96\%$) (Supplementary Figure S3). The meta-regression analysis result showed that region, sample size and publication year explain 10.82% of the between-study heterogeneity, however, moderation effect was not observed (QM = 9.03, df = 7, p = 0.25). The odds of EBF in mothers with secondary education and above was 15% lower than mothers who attained primary education (OR 0.85; p = 0.25; 95% CI 0.64–1.12, $I^2 = 83.71\%$ %) (Supplementary Figure S6). Based on the meta-regression analysis result, 67.13% of the between-study heterogeneity accounted for the difference in region, study area, sample size and publication year. Region had moderation effect (QM = 26.47, df = 9, p = 0.002). In all three comparisons, there was no significant publication bias (Supplementary Figure S1, Supplementary Figure S4, Supplementary Figure S7) and the evidence on the effect of maternal educational status on EBF was mixed with steady (Supplementary Figure S2) and dramatic increment (Supplementary Figure S5 and Supplementary Figure S8) over time. Even though the association was not statistically significant at all levels, there was a clear pattern of a dose–response relationship between maternal educational status and EBF whereby the practice of EBF decreased when the educational status is increased.

Paternal Educational Status

Five studies (Asfaw et al. 2015; Hailu 2015; Hunegnaw et al. 2017; Seid et al. 2013; Tamiru and Tamrat 2015) with 2698 mothers reported the association between paternal educational status and EBF (Table 1b). Three studies were conducted in Amhara region, and the other two studies conducted in Addis Ababa and SNNPR. Mothers who had spouse with primary education had 23% higher chance of EBF than mothers who had uneducated spouse (OR 1.23; p = 0.35; 95% CI 0.80–1.90, $I^2 = 59.35\%$) (Fig. 2). Likewise, mothers who had spouse with secondary education and above had 5% higher chance of EBF than mothers who had had uneducated spouse, but not statistically significant (OR 1.05; p = 0.83; 95% CI 0.67–1.66; $I^2 = 69.28\%$) (Supplementary Figure S11). Moreover, mothers who had spouse with secondary education and above had 9% higher chance

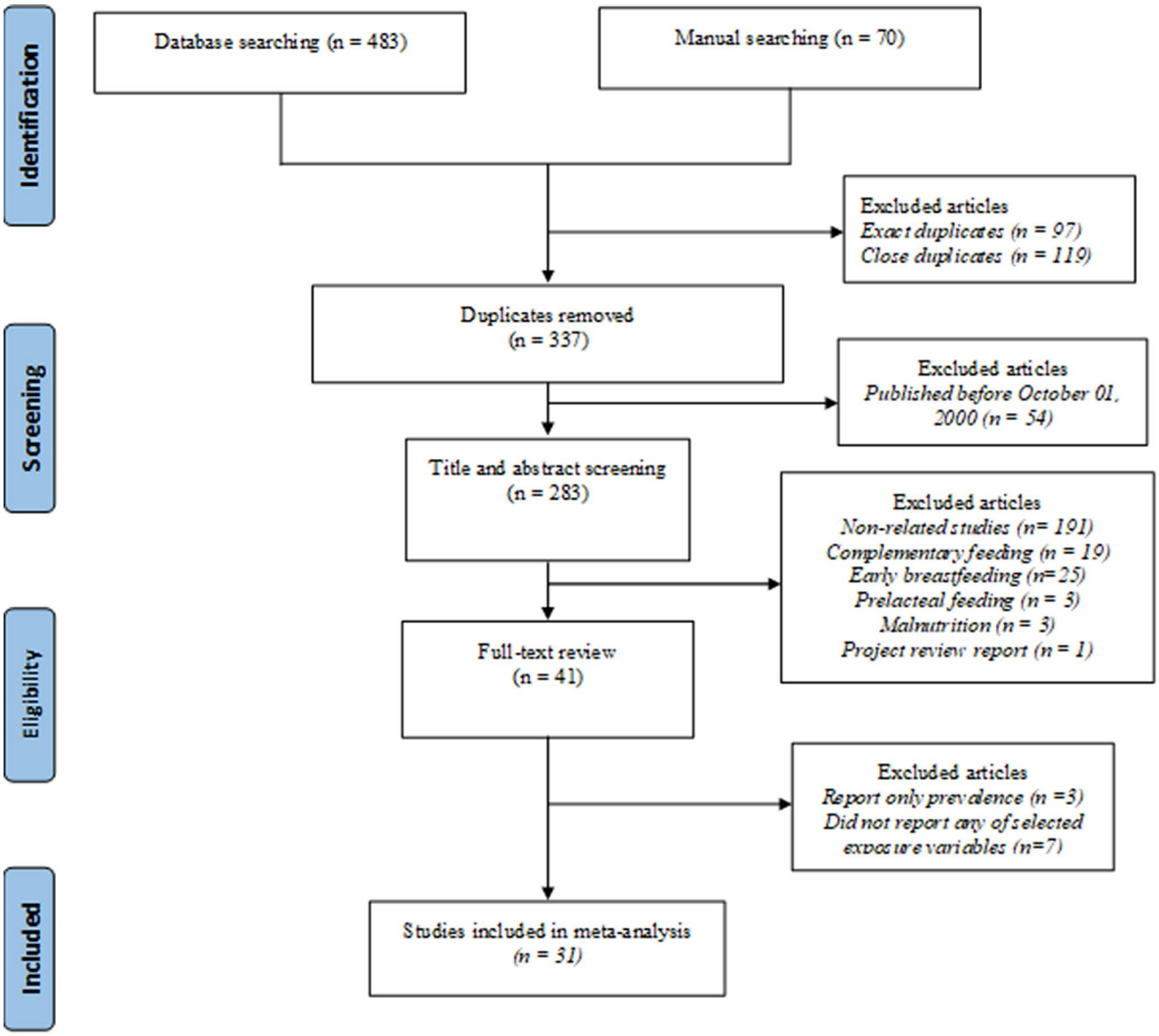

Fig. 1 PRISMA flow diagram showing the schematics of literature screening and selection

of EBF than mothers who had spouse with primary education (OR 0.91; p = 0.46; 95% CI 0.71–1.17, $I^2 = 0.00\%$) (Supplementary Figure S14). In all comparisons, there was no significant publication bias (Supplementary Figure S9, Supplementary Figure S12, Supplementary Figure S15). The evidence on the effect of paternal educational status on EBF was mixed with slight increment (Supplementary Figure S10 and Supplementary Figure S13) and decrement (Supplementary Figure S16) over time. Similar to maternal educational status, an inverse dose–response relationship was detected between paternal educational status and EBF although the association was not statistically significant at all levels.

Household Income

Thirteen studies (Abera 2012; Alemayehu et al. 2009b; Arage and Gedamu 2016; Asfaw et al. 2015; Berhe et al. 2013; Chekol et al. 2017; Hunegnaw et al. 2017; Regassa 2014; Seid et al. 2013; Shifraw et al. 2015; Tariku et al. 2017; Teka et al. 2015; Tewabe 2016) with 11,966 mothers reported the association between socioeconomic status and EBF (Table 1c). Seven studies were conducted in Amhara region, two studies in Tigray region, and the other three studies conducted in Addis Ababa, Harari, and SNNPR. One study used nationally representative data. The odds of EBF among mothers who had medium socioeconomic status was 27% significantly higher than mothers who had low

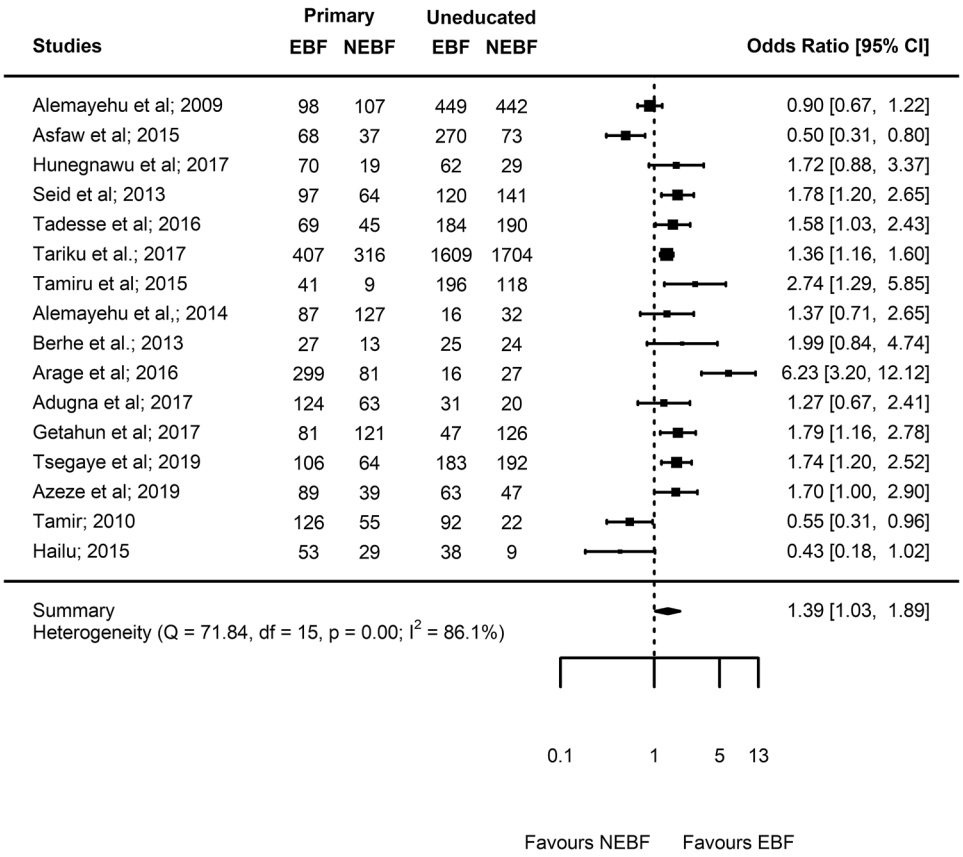

Fig. 2 Forest plot showing the results of 17 studies examining the association between maternal educational status (primary education versus uneducated) and exclusive breastfeeding

socioeconomic status (OR 1.27; p = 0.02; 95% CI 1.05–1.55; $I^2 = 60.9\%$) (Fig. 3). The odds of EBF among mothers who had high socioeconomic status was 11% lower than mothers who had low socioeconomic status although not statistically significant (OR 0.89; p = 0.47; 95% CI 0.66–1.21; $I^2 = 83.11\%$) (Supplementary Figure S19). Based on the meta-regression analysis, 29.41% of the heterogeneity accounted for the variation in region, study area and publication year, however, none of these factors had moderation effect (QM = 11.55, df = 9, p = 0.24). Moreover, the odds of EBF among mothers who had high socioeconomic status was 31% significantly lower than mothers who had medium socioeconomic status (OR 0.69; p = 0.002; 95% CI 0.54–0.87; $I^2 = 68.82\%$) (Supplementary Figure S22). There was no significant publication bias in all comparisons (Supplementary Figure S17, Supplementary Figure S20, Supplementary Figure S23). The evidence on the effect of socioeconomic status on EBF was not substantially changed over time (Supplementary Figure S18, Supplementary Figure S21, Supplementary Figure S24).

Marital Status

Sixteen studies (Abera 2012; Adugna et al. 2017; Alemayehu et al. 2009b; Biks et al. 2015; Chekol et al. 2017; Egata et al. 2013; Hailu 2015; Hunegnaw et al. 2017; Sonko and Worku 2015; Tadesse et al. 2016; Tamir 2010; Tariku et al. 2017; Teka et al. 2015; Tewabe 2016; Tsegaye et al. 2019; Worku 2015) including 15,689 mothers reported the association between marital status and EBF (Table 1d). Seven studies conducted in Amhara region, three studies in SNNPR and five studies conducted in Addis Ababa, Afar, Harari, Oromia, and Tigray. One study used nationally representative data. One outlier study (Alemayehu et al. 2009b) was excluded after sensitivity analysis. The odds of EBF among married mothers was 39% significantly higher than unmarried mothers (OR 1.39; p = 0.02; 95% CI 1.05–1.83; $I^2 = 76.96\%$) (Fig. 4). There was no publication bias (Supplementary Figure S25). The evidence on the effect of marital status on EBF was slightly increased over time (Supplementary Figure S26).

Media Exposure

Seven studies (Alemayehu et al. 2009b; Berhe et al. 2013; Getahun et al. 2017; Taddele et al. 2014; Tamiru et al. 2012; Tamiru and Tamrat 2015; Worku 2015) in 4231 mother reported the association between media exposure and EBF (Table 1e). Two studies conducted in Amhara region, two studies in SNNPR, and two other studies conducted in Oromia and Tigray region. One study used nationally representative data. The odds of EBF among mothers who had

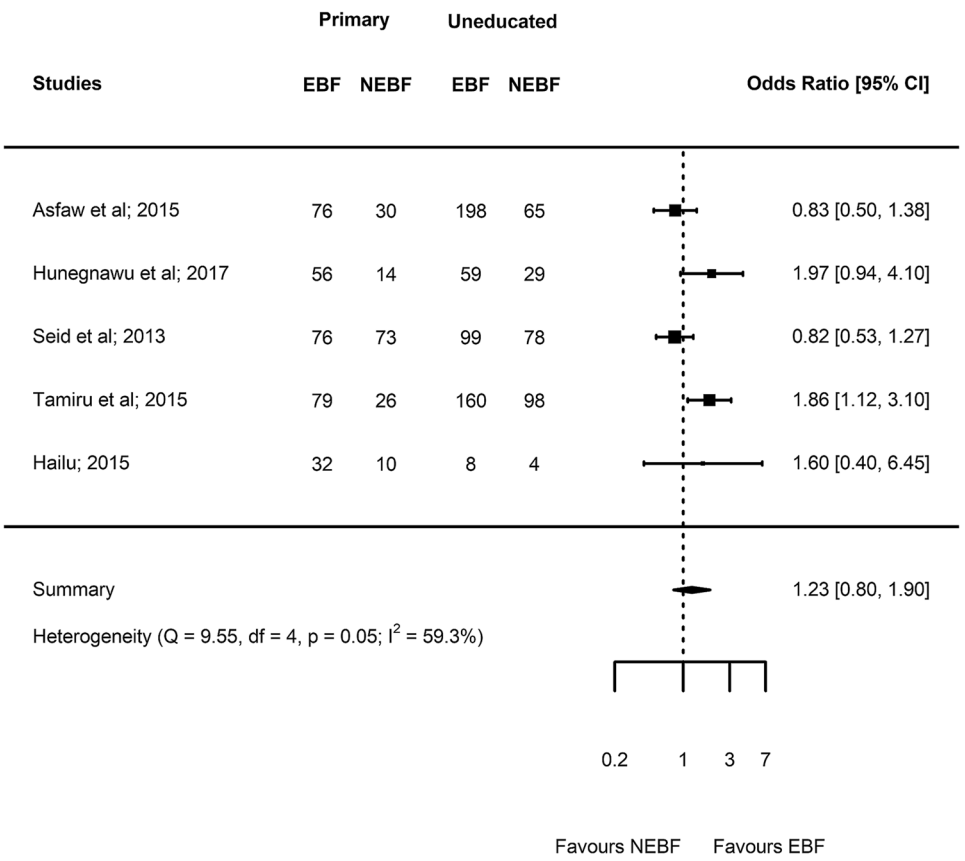

Fig. 3 Forest plot showing the results of five studies examining the association between paternal educational status (primary versus uneducated) and exclusive breastfeeding

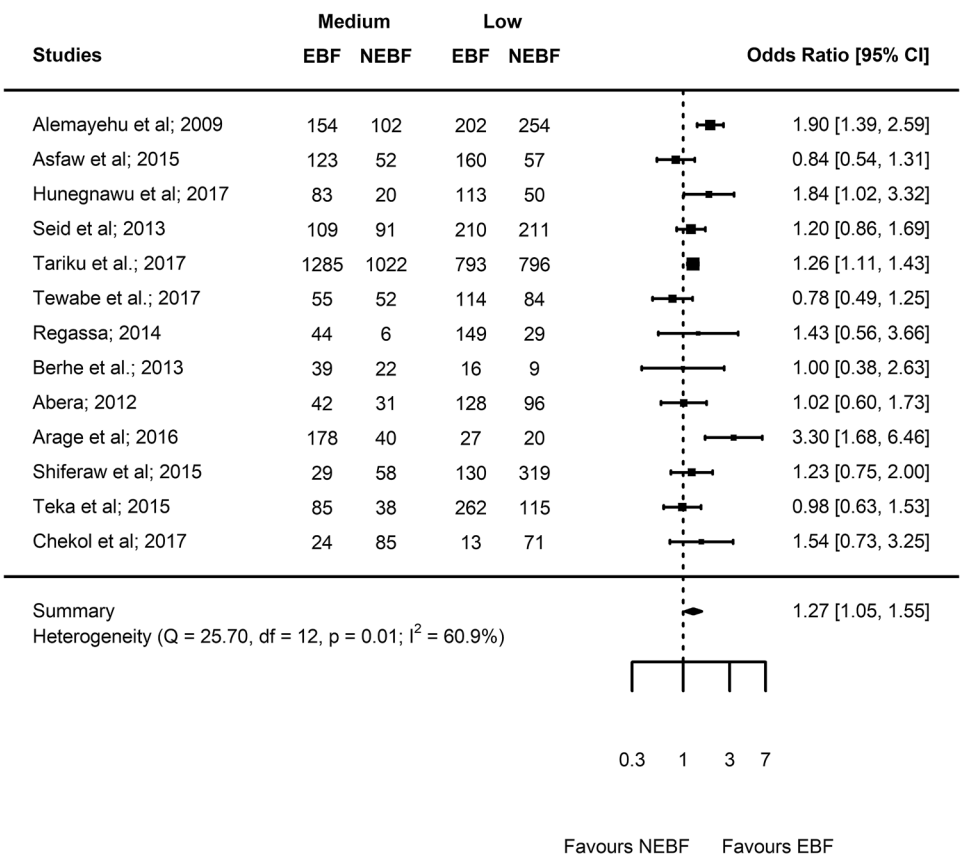

Fig. 4 Forest plot showing the results of 13 studies examining the association between household income (medium versus low) and exclusive breastfeeding

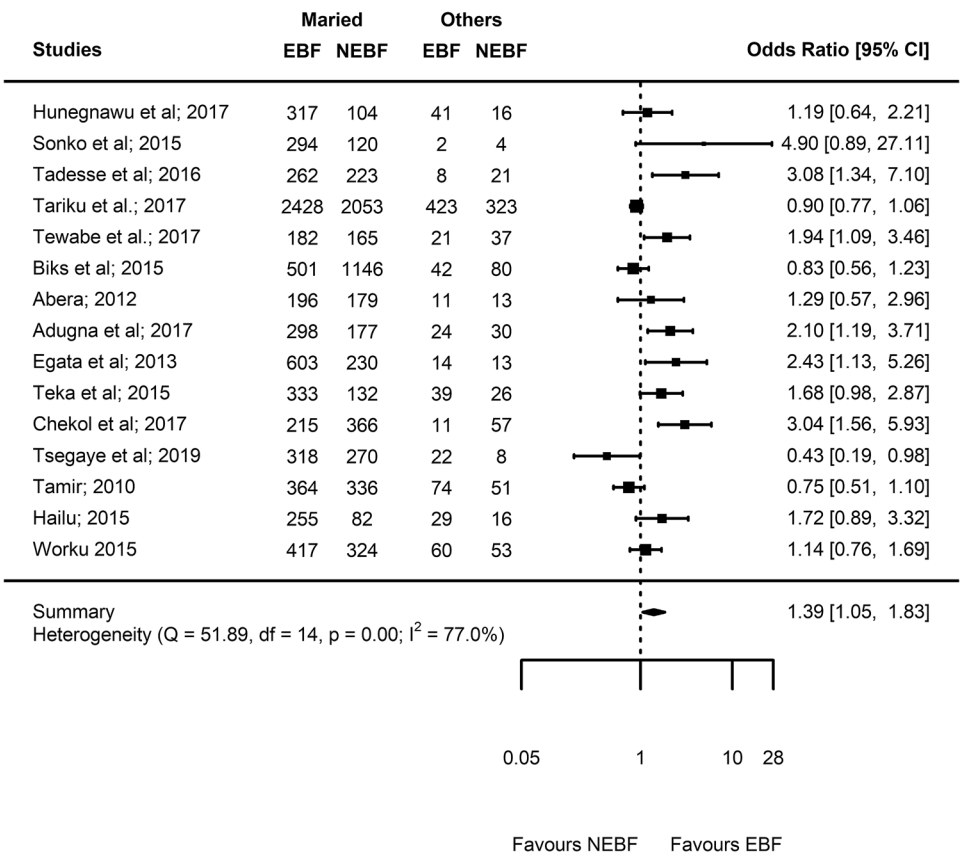

Fig. 5 Forest plot showing the results of 16 studies examining the association between marital status (married versus others) and exclusive breastfeeding

no media exposure was 25% higher than mothers who had no media exposure although the association was not statistically significant (OR 1.25; p = 0.32; 95% CI 0.81–1.94; $I^2 = 89.32\%$) (Fig. 5). There was no significant publication bias (Supplementary Figure S27). The evidence on the effect of media exposure on EBF was steadily increased over time (Supplementary Figure S28). The meta-regression analysis result showed that 100% of the between-study heterogeneity accounted for the variation in region and publication year, and these factors had significant moderation effect (QM = 53.58, df = 5, p ≤ 0.01).

Parity

Seven studies (Azeze et al. 2019; Dachew and Bifftu 2014; Gultie and Sebsibie 2016; Hailu 2015; Sefene et al. 2013; Tsegaye et al. 2019; Worku 2015) in 3165 mothers reported the association between parity and EBF (Table 1f). Four studies conducted in Amhara region, and the other three studies conducted in Addis Ababa, Afar, and SNNPR region. The odds of EBF in multiparous mothers 6% higher than primiparous mothers although not statistically significant (OR 1.06; p = 0.74; 95% CI 0.74–1.53; $I^2 = 80.68\%$) (Fig. 6). There was a significant publication bias (Supplementary Figure S29). The evidence on the effect of media exposure on EBF was decreased over time (Supplementary Figure S30). The meta-regression analysis showed that 56.11% of the between-study heterogeneity accounted for the variation in the study area and publication year. Publication year had also moderation effect (QM = 6.94, df = 2, p = 0.03) (Fig. 7).

Discussion

This meta-analysis investigated several factors that predict EBF practice in Ethiopia. EBF was significantly associated with maternal primary school education, being married and medium household income, but not with multiparity, media exposure and paternal school education. We further unraveled the dose–response relationship of educational status and household income and EBF although the association was not persistently significant at all levels.

Congruent with previous meta-analyses (Pereira-Santos et al. 2017; Senarath et al. 2010), our meta-analysis showed that maternal primary education was beneficial for maintaining EBF until 6 months. This might be because mothers are more likely to be aware of the health benefits of breastfeeding if they attained primary education. Female literacy is essential to access health-related information, resist harmful traditional beliefs and practices, increase confidence, and maintain duration of EBF. On the other hand, in this meta-analysis, the odds of EBF

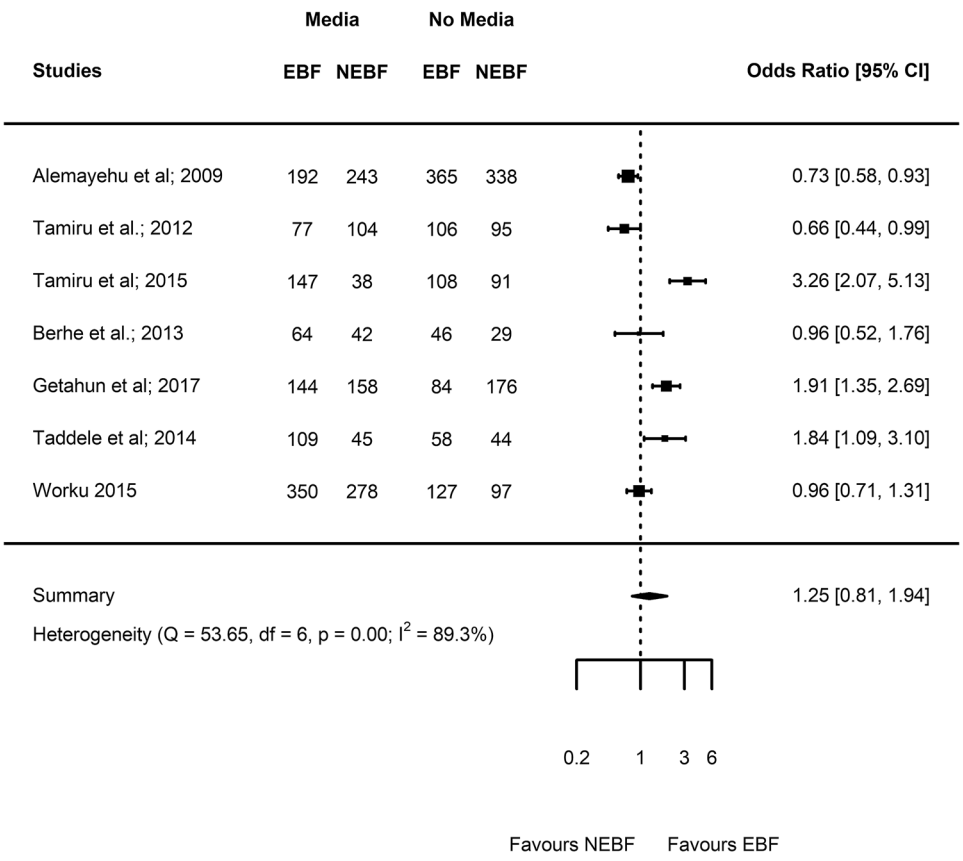

Fig. 6 Forest plot showing the results of seven studies examining the association between media exposure (yes versus no) and exclusive breastfeeding

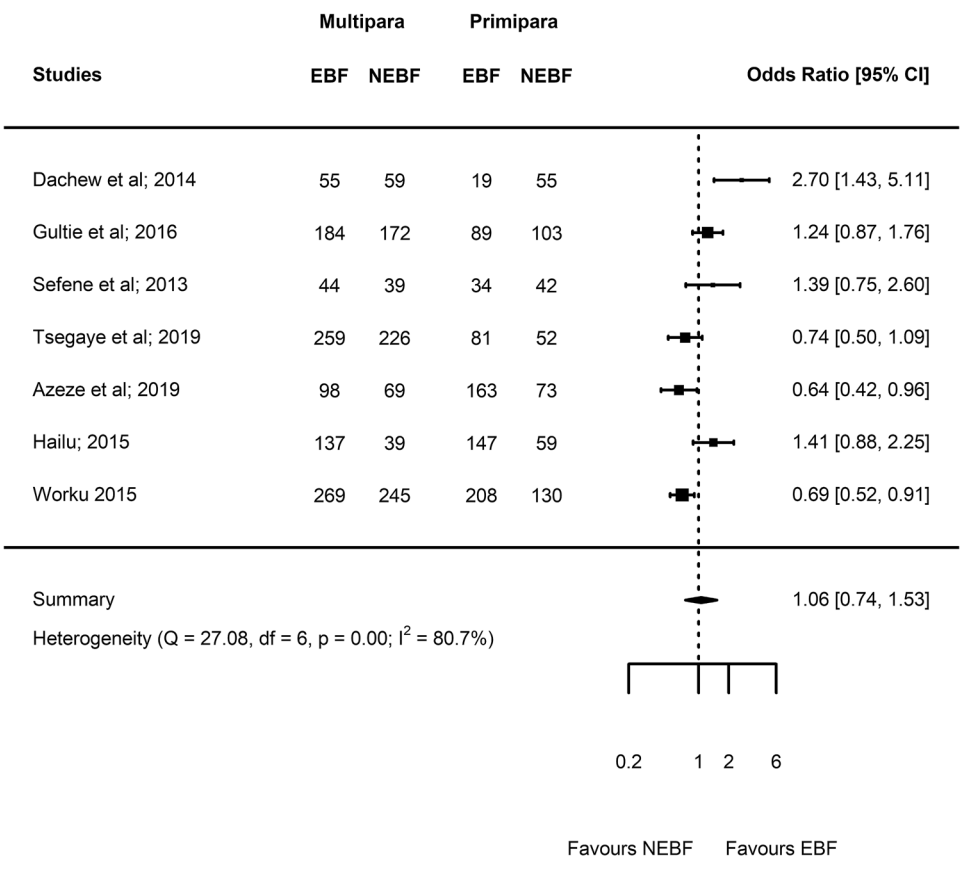

Fig. 7 Forest plot showing the results of seven studies examining the association between parity (multiparous versus primiparous) and exclusive breastfeeding

among mothers having secondary education and above was lower than mothers with primary education and uneducated mothers. This might be because secondary and above education leading to better employment of the mother, engagement in intensive and time-consuming works which may buffer the relation between education and EBF. This hypothesis was supported by previous studies that found a negative correlation between maternal employment and EBF (Alzaheb 2017; Kavle et al. 2017; Ogbo et al. 2017). In Ethiopia, only few organizations have workplace breastfeeding centers.

The lower exclusive breastfeeding among women with secondary education can be due to the short maternity leave in the country. A woman's ability to breastfeed is markedly reduced when she returns to work if breastfeeding breaks are not available, if quality infant care near her workplace is inaccessible or unaffordable, and if no facilities are available for pumping or storing milk (Gatrell 2007). Studies found that increasing the length of paid maternity leave can improve the duration of exclusive breastfeeding (Mirkovic et al. 2016; Navarro-Rosenblatt and Garmendia 2018). Until 2019, employed women in Ethiopia were entitled for only 90 days of maternity leave. This includes one month of pre-natal leave and 2 months of post-natal leave. Recently, the revised Labour Proclamation 1156/2019 grants female employees a minimum of 120 days of paid maternity leave (Teshome 2020). There might be a need to extend the maternity leave further to meet the WHO minimum standard of exclusively breastfeeding for 6 months. A study that explored the national policies of 182 Member States of the United Nations showed that the guarantee of paid breastfeeding breaks for at least 6 months was associated with an increase of 8.86 percentage points in the rate of EBF (Heymann et al. 2013).

Other studies on the association between maternal education and EBF found mixed results. For example, in a review of studies conducted in Middle East countries, two studies found a significant positive association, other three studies revealed a significant negative association, and 10 studies could not confirm an association in either direction (Alzaheb 2017). A study based on the pooled Demographic and Health Survey data collected in nine sub-Saharan Africa countries found that mothers with a secondary level of education or above were more likely to exclusively breastfeed compared with uneducated mothers (Ogbo et al. 2017). Despite the inconsistencies in previous findings, health professionals should give special emphasis on uneducated or highly educated mothers with alternative supportive and educational interventions, such as prenatal education, counseling, and peer education (Acharya and Khanal 2015). Maternal education plays an important role in infant feeding behavioral change and to maintain the mother and newborn health. A systematic review of interventions designed to promote EBF in high-income countries found that the interventions using educational approaches were significantly associated with the increased duration of EBF (Khresheh et al. 2011; Skouteris et al. 2014). Another systematic review and meta-analysis showed that greatest improvements in EBF rates were seen when counseling or education was provided concurrently in home and community, health systems and community, health systems and home settings, respectively (Sinha et al. 2015).

Another relevant finding was that mothers who are married had a high chance of EBF compared with currently unmarried mothers. This might be due to the following reasons. First, married mothers could have better incomes and educational levels (Li et al. 2005b), as we showed a certain level of education and household income advantage increased the likelihood of EBF. Second, married mothers are more satisfied, committed to spousal relationships, get shared spousal support and reported less conflict. As a result, married mothers can have high emotional responsibility to keep the health of the newborn, more likely to engage in positive parenting behaviours and continue to breastfeed until 6 months (Raj and Plichta 1998; Rempel and Rempel 2011; Seltzer 2000). This implies that health professionals should give attention to unmarried mothers before, during and after birth. However, a systematic review of studies conducted in Brazil revealed only one out of six studies found a significant association between living with a partner and EBF (Boccolini et al. 2015).

This meta-analysis also showed that mothers with medium household income had a higher chance of EBF than mothers with low household income. However, mothers with a high level of household income had a lower chance of EBF than mothers with medium income and are not significantly different from mothers with low household income. Our result was in line with a study in five East and Southeast Asian Countries that showed a significant association between high household wealth index and low EBF practice (Senarath et al. 2010). Even though a certain level of income is beneficial for EBF, it may decrease when the socioeconomic status is increased. This may be due to that mothers with high household income afford to and engage in formula milk, which leads to early initiation of complementary feeding. On the contrary, another meta-analysis revealed that low family income significantly contributes to discontinuation of EBF before 6 months (Pereira-Santos et al. 2017) and a large-scale study in nine sub-Saharan Africa countries found no association between household wealth index and EBF (Ogbo et al. 2017). In general, improving the economic power of women can increase EBF practice to certain level.

In this meta-analysis, parity, paternal education, and media exposure were not found to be associated with EBF. This might be due to small number of studies included in the

meta-analysis. For example, only five studies were found for paternal educational status and seven studies were found for parity and media exposure each, which was less than half of the number of studies found for the other studied significant variables. Previous studies found mixed results on the association between parity and EBF. A meta-analysis of 22 epidemiological studies (Pereira-Santos et al. 2017) conducted in Brazil, and East and Southeast Asian Countries (Senarath et al. 2010) found that primiparity was associated with non-EBF. On the other hand, another systematic review showed that only 6 out of 19 studies found a significant association EBF and multiparity (Alzaheb 2017).

This meta-analysis showed, for the first time, the pooled effect of several relevant sociodemographic predicting factors based on studies conducted in the past 10 years. We tried to minimize residual heterogeneity by conducting meta-regression analysis and removing outlier studies using the Jackknife method. In addition, clinical heterogeneity was minimized by including only studies conducted on healthy mothers and newborns. Methodological heterogeneity was also minimized by including studies that reported EBF based on WHO definition, selected study subjects using a random sampling method, and similar study design and data collection methods. To minimize the possibility of missing relevant studies, we have used a combination of electronic databases search and manual search of cross-references, grey literature, and table of contents of relevant journals. Furthermore, this meta-analysis was conducted based on a published protocol to minimize methodological biases.

Some of the limitations of this meta-analysisshould also be taken in to account during the translation of our results. All the studies included in this meta-analysis were cross-sectional study, which hinders inference on a cause-effect relationship. The risk of measurement error and recall bias should also be acknowledged. Measuring breast feeding is challenging, and the use of standardized questions may be interpreted differently according to socio-cultural contexts and differing probing techniques by interviewers. (Salasibew et al. 2014). Interestingly, almost all included studies were conducted in mothers with a newborn less than 23 months. In relation to this, the maternal recall is found to be a valid and reliable estimate of breast feeding initiation and duration when the data is collected within 3 years of breast feeding history (Li et al. 2005a, b). Social desirability bias could also be evident given that self-reported breast feeding experience, educational status, and income were used. In addition, the household income classifications are not standardized and did not account for indices such as inflation, which changes over time. Another limiation was the confounding effect that can not be excluded given that the reported effect size in this meta-analysis was not adjusted to covariates, such as breast feeding counseling, cultural beliefs, partner support or maternal health status following childbirth. Studies for some variables were lacking in some regions, which may limit the generalizability of our findings. Despite this fact, at least one study used nationally representative data per each variable. Similarly, only four studies investigated the association between paternal educational status and EBF, which may limit the statistical power of our meta-analysis. This meta-analysis covers studies conducted only in Ethiopia; therefore, the results may not be extrapolated to other LMCs and developed countries. Moreover, statistical heterogeneity was observed in some of the analysis. The dose–response relationship of multiparity and EBF was not investigated due to the huge difference between included studies in the categorization of multiparity. Furthermore, maternal and paternal education was defined based on formal education gained through schooling and it may not reflect the health literacy of the mothers and fathers. Finally, the results cannot be generalized to breastfeeding mothers with HIV/AIDS or other medical illness.

Conclusions

In this meta-analysis, we depicted the relevant effect of maternal education, income, and marital status on EBF. This suggests that the meta-analysis detected small associations that many previous studies in Ethiopia have not been able to show a significant association between TIBF and different predictors. This national evidence can be useful for cross-country and cross-cultural comparisons. Generally, workplace support for breastfeeding, strengthening health-worker knowledge and skills at health facilities and Baby-Friendly Hospital Initiative, and strengthening the family- and community-level interventions are may be relevant interventions to address barriers of EBF (Kavle et al. 2017). Besides, access to breastfeeding support professionals, such as trained pediatricians, midwives, International Board-Certified Lactation Consultants, and peer counselors is considered important (Theurich et al. 2019).

Future Perspectives

In developing countries, breastfeeding coverage is relatively good but we noted studies focused only on factors affecting breastfeeding. To bridge this gap, future studies investigating the effect of breast feeding on maternal and newborn health outcomes, such as cardiometabolic diseases, neuropsychological diseases, and psychiatric disorders are required in Ethiopia. All included studies in the current review performed the traditional bivariate and multiple logistic regression. Therefore, studies on associated factors should deeply consider the interconnection between predictors and apply detailed statistical analysis

methods, such as mediation and moderation analysis. Moreover, future research should examine the possible causations between predicting factors and EBF practices in Ethiopia by implementing longitudinal research designs and large cohort-based studies to produce more accurate and insightful results. For example, one longitudinal study (Chudasama et al. 2009) indicated the absence of significant association of predicting factors of EBF that consistently reported in cross-sectional studies. Overall, we observed a substantial inconsistency regarding predicting factors across the nation; therefore, context-specific meta-analysis is further required to strengthen inferences. Given the scarcity of national, regional, or international meta-analysis that reports the pooled effect of various relevant factors affecting EBF, future researchers in low- and middle-income countries should focus on meta-analysis instead of a narrative review.

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Data Availability All data generated or analyzed in this study are included in the article and its supplementary files.

Compliance with Ethical Standards

Competing interests The authors declare that they have no competing interest.

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