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Decadal trends in the exclusive breastfeeding practices among working Indian mothers: a multi-level analysis

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Abstract

Background Exclusive breastfeeding (EBF) is defined as feeding infants only breast milk of the mother or a wet nurse for the first six months, without additional food or liquids except the oral rehydration solution or drops/syrups of vitamins, minerals or medicines. The working status of women in developed countries adversely affects the EBF rates, which calls for an assessment in rapidly developing countries like India. Therefore, the primary aim of the present study is to determine the prevalence of EBF using the data from the National Family Health Surveys (NFHS 3, 4, 5) conducted between 2005 and 06, 2015-16 and 2019-21 to estimate the likelihood EBF according to mothers' employment status.

Methods We did a secondary data analysis of the cross-sectional surveys. Exclusive breastfeeding was the primary dependent variable and defined as the percentage of youngest children under six months exclusively breastfed per last 24 h. The employment status of the mother was the primary independent variable and was coded dichotomously (yes/no). Chi-square analysis assessed the association of EBF with the outcome variable of interest. A multi-level modelling approach has been used for portioning variation in the prevalence of exclusive breastfeeding at different geographical levels.

Results From NFHS rounds 3 to 5, the overall prevalence of exclusive breastfeeding was 47.45%, 54.85%, and 64.01% respectively. On segregating the women as per their employment status, the prevalence among employed women was 51.1%, 51.1%, and 60.3%, while in unemployed women the prevalence was 45.9%, 54.8%, and 67.3% respectively. The odds of practising EBF in NFHS-5 doubled since NFHS-3 (Adjusted Odds Ratio: 2; 95% Confidence Interval: 1.08, 3.67). Employed mothers had a significantly lower odds ratio (0.94, 0.91, 0.98) of practising exclusive breastfeeding. The likelihood increased when mothers were exposed to media, had normal BMI, and visited health centres > 4 times during pregnancy. The likelihood decreased in older mothers, birth of infant in a health facility, female gender of the child, and late initiation of breastfeeding.

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Conclusions The lower prevalence of exclusive breastfeeding among working mothers calls for an urgent need to improve policies around maternity benefits at workplaces.

Keywords Maternal and child health, Exclusive breastfeeding, Human rights, Maternity benefits

Background

Previous analyses have attributed approximately 11.6% of under-5 mortality to the lack of exclusive breastfeeding (EBF) [1]. Despite all the potential benefits, about 48% of infants 0–5 months of age worldwide are exclusively breastfed. An analysis of 57 Low Middle-Income Countries depicted the global weighted prevalence of EBF under six months to be around 45.7% during 2010-18 [2]. Socioeconomic inequalities exist in EBF behaviour, and practices differ greatly across WHO regions [3]. Eastern Mediterranean, European regions, and upper-middle-income countries faced the greatest challenges in improving exclusive breastfeeding. This has also been corroborated by the UNICEF data, which shows that South Asia has the highest prevalence of EBF (60%) compared to just 26% in Northern America [4]. If current disparities are maintained, it will be difficult to realize 50% Global Nutrition Targets for exclusive breastfeeding by 2025 [5].

The low prevalence of EBF in higher-income countries (HIC) has been attributed to many factors, occupational profile of the mother being one of the most important. A study from the United States of America concluded that working full-time affects breastfeeding duration. Unemployed mothers were more than twice as likely to breastfeed at six months than mothers who worked full time [6]. The commonest reason to discontinue EBF was the obligation to resume work after childbirth [6]. Further, many workplaces do not provide adequate support like designated lactation spaces, flexible work hours, and breaks for breastfeeding or expressing milk, making it difficult for employed women to continue EBF while being employed. The urgency to resume job-related duties and the challenges faced in balancing work and breastfeeding affects the mother, leading to increased stress, fatigue, and reduced confidence in EBF, ultimately resulting in early weaning and transition to complementary foods.

The problem is just not limited to HICs, as recent evidence from LMIC suggests that women's employment status significantly influences exclusive breastfeeding practices [7–9]. In these countries, working women often face limited maternity leave, restraining them from practising EBF for the recommended six months. As per a sub-national analysis from Karnataka (a southern state in India), although 75% of working mothers had adequate knowledge of exclusive breastfeeding and its importance, only 17.5% reported practising EBF, and only 11% of mothers were allowed breaks between working hours [9]. Another study from Nairobi reported similar findings where the mothers were away from home due to work for about 46.2 h per week, leading to a low prevalence of EBF (13.3%) at three months. Return to work was among the most commonly cited reasons [10]. A similar study from Ghana suggests that workplace factors play an important role in continuing exclusive breastfeeding [10, 11]. An Ethiopian study estimated the mean duration of exclusive breastfeeding to be around 4.8 months, and EBF practices were higher among unemployed women (48.0%) compared to employed (20.9%) [11]. A systematic review and meta-analysis estimated that the overall prevalence of EBF after return to work was 25%, with significant geographical variations [12].

India has depicted very high levels of exclusive breastfeeding in the first six months of an infant's life. The fifth round of the National Family Health Survey (NFHS) estimates a higher prevalence of EBF than the previous rounds [13–15]. However, our initial review suggests that working women around the world are unable to practice EBF for the recommended duration despite adequate knowledge about the benefits of exclusive breastfeeding. India is also undergoing a rapid economic transition, and there has been a surge in the number of working women. As per recent estimates, nearly one-third of the women (32.8%) in the working age group (15 years and above) leave their homes for jobs [16]. Therefore, it would be crucial to assess the impact of women's employment status on exclusive breastfeeding over a period of time. Within this context, NFHS provides us with an opportunity to comprehensively study EBF practices in India over a period of time and deduce meaningful inferences. Therefore, the primary aim of the present study is to determine the prevalence of exclusive breastfeeding over the last three rounds of NFHS as per the mothers' employment status and estimate the likelihood of practising EBF due to working status and other related factors.

Methods

Study design and population

The present study is a secondary data analysis of cross-sectional surveys. The NFHS are a large-scale, multi-round survey conducted in India to collect essential information and emerging issues related to health, nutrition, and family welfare for India and each state/union territory (UT). The NFHS surveys are conducted under the stewardship of the Ministry of Health and Family Welfare, Government of India, and provide data on India's population along with health and nutrition indicators. NFHS surveys are representative at the national and

sub-national levels. The present study employed nationally representative data from the NFHS 3rd, 4th and 5th rounds that were completed in the year 2005-06, 2015-16, and 2019-21 to capture trends over the past 15 years [13–15]. The three rounds of NFHS interviewed 124,385, 699,386, and 724,115 women in reproductive age groups (15–49 years).

Sample size and sampling procedure

The data from the urban and rural areas of all Indian districts were collected using a two-stage sampling. Census Enumeration Blocks (CEB) were selected in the first stage, following which 22 households in each CEB were randomly selection. In rural areas, the villages were considered as the Primary Sampling Units (PSU) in the first stage. In the second stage, 22 households were randomly chosen from each PSU. Of the total sample of women in reproductive age groups (15–49 years), based on children (less than six months) living with their mothers during the survey (KR dataset file), around 4630, 22,473, and 22,600 women were interviewed for EBF practices in the NFHS-3, 4, and 5 and were included in our analysis. Figure 1 depicts the sample selection flowchart.

Data collection

The NFHS uses four types of tools to collect information that are translated into different regional languages, including household questionnaires, women's questionnaires, men's questionnaires, and biomarker assessments. Specifically, the women's questionnaire collected information from all eligible women aged 15–49, who were asked questions on a large variety of topics related to background characteristics, reproduction, prevalence of hysterectomy, menstrual hygiene (for women aged 15–24 years), family planning, contacts with community health workers; maternal and child health, breastfeeding, and nutrition (antenatal care; delivery care; postnatal care, postpartum amenorrhoea, breastfeeding and child feeding practices, vaccination coverage, prevalence and treatment of diarrhoea, symptoms of acute respiratory infection, and fever, use of oral rehydration therapy (ORT), utilization of ICDS services), Marriage and sexual activity, fertility preferences, husband's background and woman's work (husband's age, schooling, and occupation, and the woman's employment and type of earnings), women's empowerment (household decision making, mobility, use of a bank account and a mobile phone, ownership of a house or land, barriers to medical treatment), HIV/AIDS; other health issues and domestic violence.

Study variables

In the present study, the principal dependent variable was exclusive breastfeeding (EBF) among infants aged<6 months. This was defined based on the WHO key infant feeding indicators and the guide to DHS statistics [17]. Percentage of children exclusively breastfed (Percentage of youngest children less than six months, who are living with their mother and was exclusively breastfed until

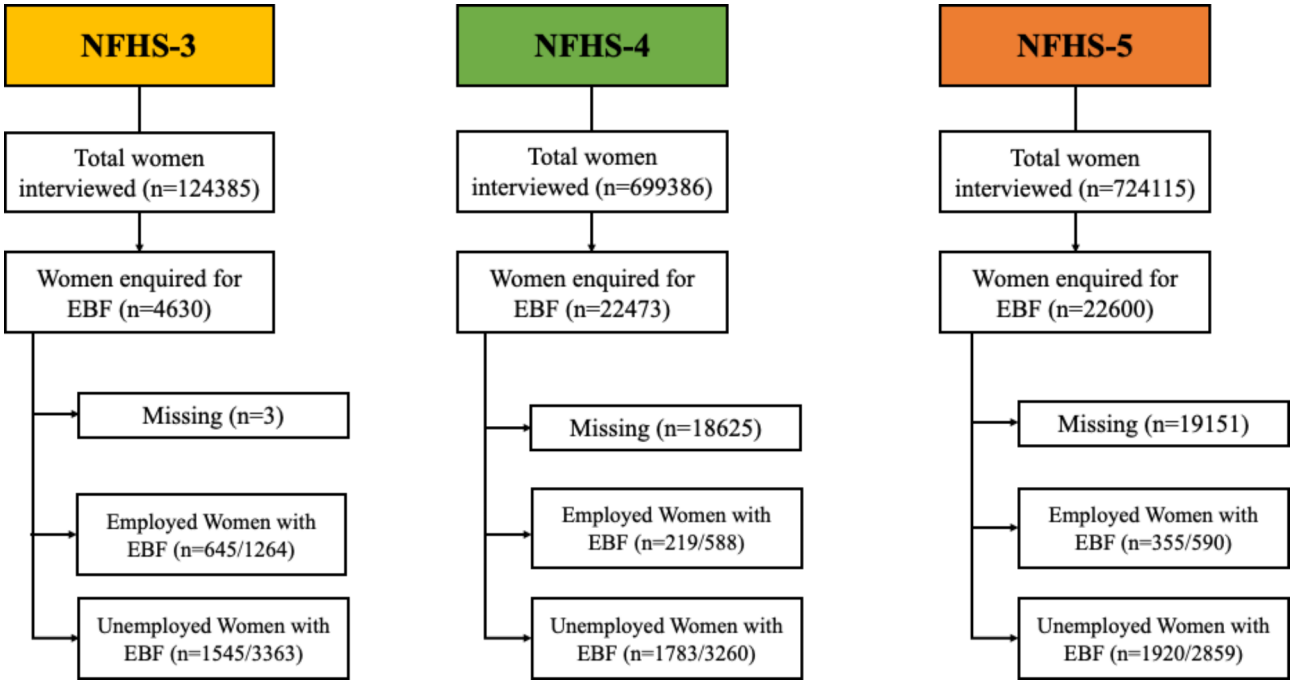

Fig. 1 - Sample selection flowchart to depict the association between maternal employment status and exclusive breastfeeding practices in 3 waves of NFHS

six months of age) as per the variables defined in the KR dataset file. Specifically, the numerator included the youngest children less than six months old who are living with their mother who were breastfed (m 4=95) but given nothing else in the 24 h preceding the interview. At the same time, the denominator included the total number of youngest children born in the six months preceding the survey who are living with their mother (b 19<6). Exclusive breastfeeding was calculated by dividing the Numerator with the denominator and multiplying by 100 [17].

We included relevant exposure variables suggested by existing literature. The variables were categorized into demographic and socioeconomic characteristics, pregnancy and birth-related characteristics, and maternal health service utilization factors. The various independent variables included were Mother's age (*categorized as < 18, 18–34, and > 34 years)*, mother's body mass index *(underweight/normal and overweight/obese)*, mother's education *(illiterate, primary, secondary, and higher educated)*, mother's employment status *(employed or unemployed)*, mother's mass media exposure *(yes or no)*, father's employment status *(employed or unemployed)*, number of household members (*< 5, > 5*), socioeconomic status as per wealth quintile (*rich, middle, and poor)*, place of residence (rural, urban), the geographical region of the country *(categorized as north, south, east, west, central, and north-eastern regions)*, preceding birth interval *(< 3 years and≧3 years)*, birth order of the infant (*first, second, and third or higher)*, number of antenatal check-ups received by mother *(< 4 and≧4)*, birth of the infant in a health facility *(yes/no)*, birth mode of the infant *(normal vaginal/caesarean section)*, gender of the infant *(male/female)*, postnatal care received by the mother (yes /no) defined as 'postnatal health check within the first 24 hours after delivery' [14], early initiation of breastfeeding *(yes "those being breastfed within 1 hour" and no "those being breastfed later")*, and prelacteal feed given to the infant *(yes/no).* Prelacteal feed defined as the practice of giving a newborn anything other than breast milk within the first three days of life [15].

Data analysis

Descriptive statistics were obtained, and chi-square analysis was used to assess the association of selected background characteristics with the outcome variable of interest. Bivariate analyses and multivariate analyses were carried out to understand the variation in the prevalence of exclusive breastfeeding. A multi-level modelling approach has been used for portioning variation in the prevalence of EBF at different geographical levels. By using multi-level models, we can apportion the variance in the response variable according to the different levels of the data. The analysis is based on the following three-level hierarchical structure with administrative division (regions) at level 1, place of residence at level 2, and individuals at level 3. To decompose the variation in EBF, we specified a series of three-level random intercept logistic models for the probability of an individual '*i*' in place of residence '*j,*' administrative division '*k,*' having exclusive breastfeeding (*yijk*=1) as (*Logit (πijk) = β0 + B X'ijk + (v0k + u0jk).* The multi-level modelling approach is an efficient method to combine data from different geographical levels and deal with small area rate instability. The estimates and the variations apportioned to each level are precision-weighted for both small cluster sizes and imbalances in the nesting structure. **Intra-class correlation (ICC) is a measure of the degree of clustering within groups (or classes)**, **but it also represents a complementary concept**, **the degree of variability between groups.** All the statistical analysis was done in Stata v16.0, and a significance level of $p<0.05$ was used in the analysis.

Data access permission and ethical considerations

This study analyses a nationally representative survey database that is available freely in the public domain and can be accessed using standard protocols from the Demographic Health Surveillance (DHS) website. Being a secondary data analysis of datasets available in the public domain, ethical approvals were not necessary. All methods were carried out in accordance with relevant guidelines and regulations.

Results

Initially, we present a comparison of the demographic, socioeconomic, and health-related characteristics of respondents in three rounds of the NFHS. Each characteristic is presented as a percentage distribution for the respective survey years. There was a gradual decrease in the proportion of young, underweight, illiterate mothers, those from the poorest wealth quintiles and women with a higher birth order from the survey rounds 3 to 5 (Table 1). However, there was increase in exposure to media from wave 3 to 4, which dipped again in wave 5, there was also increase in the proportion of husbands who were unemployed. Obstetric history depicted gradual improvements in birth intervals, more antenatal care check-ups, better postnatal care, earlier initiation of breastfeeding, less preference for any prelacteal feeding after the baby's birth, but a higher proportion of caesarean deliveries over the three rounds.

From NFHS rounds 3 to 5, the overall prevalence of exclusive breastfeeding was 47.45%, 54.85%, and 64.01% among the women included in the analysis. The available data was further filtered to include mothers with complete information on EBF and employment status. The prevalence among employed women was lower in

Table 1 Sociodemographic and health-related characteristics of the mothers of infants less than 6 months who participated in the three rounds of the National Family Health Survey, India

Characteristics	Unweighted counts (weighted %)		
Survey round	**NFHS-3**	**NFHS-4**	**NFHS-5**
Mothers of children aged less than 6 months	**4630 (3.72)**	**22,473 (3.21)**	**22,600 (3.12)**
Mother's current age (in completed years)			
< 18	190 (4.11)	306 (1.36)	283 (1.25)
18–34	4210 (90.92)	21,176 (94.23)	21,310 (94.29)
> 34	230 (4.97)	991 (4.41)	1008 (4.46)
Mother's Body Mass Index			
Normal	2767 (59.76)	14,675 (65.3)	14,335 (63.43)
Underweight	1586 (34.25)	4740 (21.09)	4337 (19.19)
Overweight/Obese	277 (5.99)	3059 (13.61)	3928 (17.38)
Mother's education			
Illiterate	2195 (47.41)	5823 (25.91)	4145 (18.34)
Primary	663 (14.33)	2930 (13.04)	2529 (11.19)
Secondary	1532 (33.08)	10,821 (48.15)	11,840 (52.39)
Higher	240 (5.18)	2899 (12.9)	4086 (18.08)
Maternal employment			
Employed	1334 (28.82)	2661 (11.84)	3076 (13.61)
Unemployed	3296 (71.18)	19,812 (88.16)	19,524 (86.39)
Media exposure			
Yes	3141 (67.83)	16,587 (73.81)	16,173 (71.56)
No	1489 (32.17)	5886 (26.19)	6427 (28.44)
Husband's employment status			
Employed	4572 (98.74)	21,170 (94.2)	21,402 (94.7)
Unemployed	58 (1.26)	1303 (5.8)	1198 (5.3)
Number of household members			
≤ 5	1435 (30.99)	8268 (36.79)	8694 (38.47)
> 5	3195 (69.01)	14,205 (63.21)	13,906 (61.53)
Socioeconomic status as per wealth quintiles			
Rich	1454 (31.41)	7378 (32.83)	7716 (34.14)
Middle	932 (20.13)	4425 (19.69)	4448 (19.68)
Poor	2244 (48.46)	10,670 (47.48)	10,437 (46.18)
Place of residence			
Rural	3505 (75.71)	16,576 (73.76)	17,065 (75.51)
Urban	1125 (24.29)	5897 (26.24)	5535 (24.49)
Region of country			
North	871 (18.81)	4245 (18.89)	4152 (18.37)
South	564 (12.18)	2189 (9.74)	5691 (25.18)
East	734 (15.86)	4524 (20.13)	3756 (16.62)
West	493 (10.65)	1528 (6.8)	1313 (5.81)
Central	1065 (23)	6926 (30.82)	5322 (23.55)
Northeastern	903 (19.5)	3061 (13.62)	2366 (10.47)
Preceding birth interval			
< 3 years	2634 (56.89)	12,630 (56.2)	11,994 (53.07)
>=3 years	1996 (43.11)	9843 (43.8)	10,606 (46.93)
Birth order of the infant			
First	1414 (30.53)	8627 (38.39)	8891 (39.34)
Second	1314 (28.4)	7466 (33.22)	7598 (33.62)
Third or Higher	1902 (41.07)	6380 (28.39)	6111 (27.04)
Number of antenatal check-ups received by mother			
< 4	2982 (64.4)	10,854 (48.3)	9241 (40.89)
≥ 4	1648 (35.6)	11,619 (51.7)	13,359 (59.11)
Birth of the infant in a health facility			

Table 1 (continued)

Characteristics	Unweighted counts (weighted %)		
Survey round	**NFHS-3**	**NFHS-4**	**NFHS-5**
Mothers of children aged less than 6 months	**4630 (3.72)**	**22,473 (3.21)**	**22,600 (3.12)**
Yes	1942 (41.94)	18,592 (82.73)	20,500 (90.71)
No	2688 (58.06)	3881 (17.27)	2100 (9.29)
Birth mode of the infant			
Normal vaginal	4192 (90.53)	18,142 (80.73)	17,262 (76.38)
Caesarean section	438 (9.47)	4331 (19.27)	5338 (23.62)
Gender of the infant			
Male	2308 (49.84)	11,641 (51.8)	11,594 (51.3)
Female	2322 (50.16)	10,832 (48.2)	11,006 (48.7)
Postnatal care received by the mother			
Yes	195 (4.21)	8328 (37.06)	10,118 (44.77)
No	4435 (95.79)	14,145 (62.94)	12,482 (55.23)
Early initiation of breastfeeding			
Yes	3074 (66.39)	15,118 (67.27)	17,002 (75.23)
No	1556 (33.61)	7355 (32.73)	5598 (24.77)
Prelacteal feed given to the infant			
Yes	2433 (52.55)	10,147 (45.15)	8134 (35.99)
No	2197 (47.45)	12,326 (54.85)	14,466 (64.01)
Practiced exclusive breastfeeding	2197 (47.45)	12,326 (54.85)	14,466 (64.01)

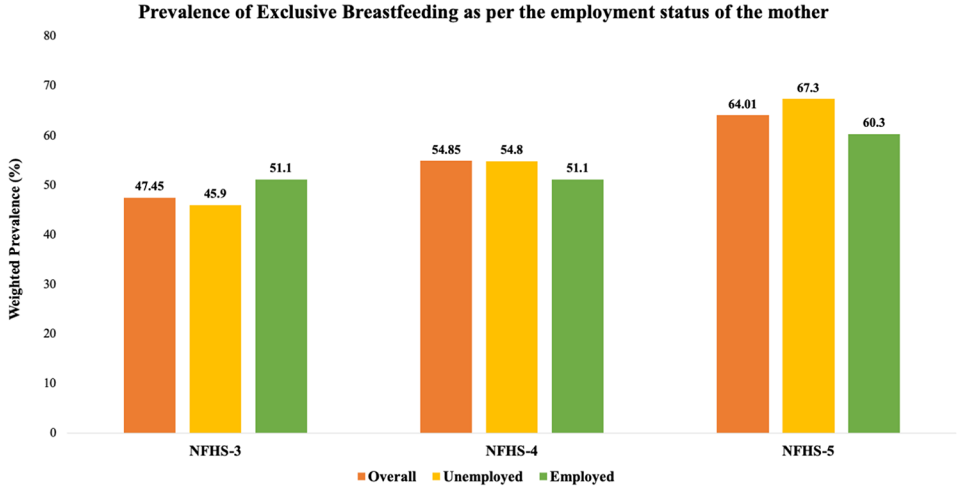

Fig. 2 - Prevalence of exclusive breastfeeding practices among infants less than 6 months old as per their mothers' employment status who participated in the NFHS 3–5

waves 4 and 5 (51.1% and 60.3%) compared to the unemployed women (54.8% and 67.3%) (Fig. 2). Table 2 further depicts the prevalence of EBF in employed and unemployed women as per different independent variables. In NFHS 5, the prevalence of EBF among employed women was highest in women > 34 years, having BMI in the normal range, who studied up to secondary school, having media exposure, employed husbands, a smaller family, middle class as per socioeconomic status, from urban areas in Southern region of India, a higher birth interval, a smaller birth order, with more antenatal care checkups, birth of the infant in a health facility through a caesarean section, male gender of the newborn, and those who did initiate breastfeeding early after birth of the infant. Among the unemployed women group, the prevalence corroborated with employed women but varied as per age (18–34 years), education (up to primary school), and residence in rural areas in the Western region of India. Over the three rounds, the EBF prevalence among employed women constantly increased in older mothers (> 34 years), women with BMI in the normal category, having media exposure, residents in urban areas, in North and South region of India, with more antenatal care (ANC) checkups, and deliveries in health facilities.

The results of a multi-level logistic random intercept model conducted to examine the factors affecting

Table 2 Prevalence of exclusive breastfeeding stratified by maternal employment status among infants less than 6 months from the National Family Health Survey (round 3–5), India

	NFHS-3		NHFS-4		NFHS-5	
	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed
	N (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)
Eligible mothers with known employment status	1264	3363	588	3260	590	2859
Overall Exclusive breastfeeding Prevalence	645 (51.1)	1545 (45.9)	299 (51.1)	1783 (54.8)	355 (60.3)	1920 (67.3)
Mother's current age						
< 18	25 (56.4)	75 (51.7)	1 (21.6)	21 (62.2)	1 (100)	21 (62.1)
18–34	573 (51.4)	1404 (45.4)	284 (51.4)	1681 (54.5)	327 (60.1)	1831 (67.4)
> 34	47 (45.8)	66 (53.5)	14 (48)	81 (59.8)	27 (62.8)	68 (61.9)
Mothers BMI						
Underweight	239 (53.8)	517 (45.4)	69 (48.6)	346 (56)	69 (56.1)	357 (65)
Normal	391 (49.8)	919 (46.6)	207 (52.4)	1122 (53.9)	228 (64.8)	1248 (68.6)
Overweight/obese	15 (45.7)	109 (44.1)	23 (46.2)	315 (56.6)	58 (51.3)	315 (64.2)
Mother's education						
Illiterate	410 (50.6)	663 (48.5)	96 (48)	436 (56.4)	78 (55.2)	321 (64.4)
Primary	93 (54.9)	244 (49.3)	54 (51.5)	198 (52.3)	43 (57.9)	199 (69.1)
Secondary	127 (52.7)	553 (42.6)	113 (52.1)	907 (54.7)	164 (64.5)	1065 (67.9)
Higher	15 (35.6)	85 (42.8)	36 (55.2)	242 (54.5)	70 (59.1)	335 (66.2)
Media exposure						
No	287 (51.2)	445 (48.8)	76 (40.5)	423 (56.7)	105 (58)	516 (62.1)
Yes	358 (51)	1100 (44.9)	223 (55.8)	1360 (54.2)	250 (61.4)	1404 (69.2)
Husband's employment status						
Unemployed	5 (52)	25 (50.5)	20 (76.9)	106 (57.1)	9 (38.5)	99 (62.9)
Employed	640 (51.1)	1520 (45.9)	279 (49.8)	1677 (54.7)	346 (61.3)	1821 (67.5)
No. of household members						
≤ 5	189 (48.8)	458 (43.8)	118 (50.2)	650 (52.7)	153 (66.3)	735 (67.7)
> 5	456 (52.1)	1087 (47)	181 (51.4)	1133 (56.1)	202 (56.6)	1185 (66.8)
Socioeconomic status						
Poor	473 (54.4)	715 (52.8)	171 (49.5)	764 (55.7)	197 (59.1)	847 (66.3)
Middle	101 (47.5)	309 (43.1)	47 (42.8)	355 (54.2)	56 (62.6)	395 (70.6)
Rich	71 (39.4)	521 (40.4)	81 (61.7)	664 (54.1)	102 (61.8)	678 (66.3)
Place of residence						
Urban	53 (40.3)	413 (41.3)	39 (51)	528 (51.7)	46 (60.5)	490 (64.7)
Rural	592 (52.4)	1132 (48)	260 (50.9)	1255 (56.2)	309 (60.3)	1430 (68)
Region						
North	102 (40.86)	114 (30.53)	38 (47.56)	234 (58.28)	64 (69.23)	427 (68.41)
South	80 (58.12)	234 (51.93)	54 (62.42)	383 (61.19)	95 (71.54)	278 (67.94)
East	154 (47.22)	378 (43.58)	57 (43.9)	454 (61.69)	53 (64.18)	409 (65.33)
West	117 (56.55)	201 (48.23)	48 (60.58)	232 (44.07)	57 (48.31)	197 (77.37)
Central	267 (53.41)	521 (48.21)	78 (46.56)	414 (48.55)	32 (42.22)	531 (69.4)
Northeastern	28 (57.16)	97 (54.96)	24 (51.43)	66 (62.27)	54 (53.75)	178 (59.42)
Preceding birth interval						
< 3 years	270 (51.8)	714 (44.7)	113 (52)	548 (46.5)	105 (49.5)	543 (64.3)
≥ 3 years	375 (51.5)	831 (48.7)	186 (42.2)	1235 (57.1)	250 (59.5)	1477 (64.7)
Birth order						
First	141 (49.6)	517 (45.5)	93 (60.6)	767 (61.2)	153 (71.9)	818 (71.1)
Second	173 (55.2)	449 (44.9)	102 (46.4)	560 (48.5)	98 (49.9)	640 (64.7)
Third or Higher	331 (49.7)	579 (47.3)	104 (48.6)	456 (53.9)	104 (58)	462 (64.2)
Number of antenatal check-ups received						
< 4	495 (51.3)	937 (46.8)	149 (49)	715 (52.7)	148 (58.1)	721 (65.4)
≥ 4	150 (50.5)	608 (44.7)	150 (53)	1068 (56.3)	207 (62.1)	1199 (68.2)
Birth of the infant in a health facility						

Table 2 (continued)

	NFHS-3		NHFS-4		NFHS-5	
	Employed	Unemployed	Employed	Unemployed	Employed	Unemployed
	N (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)	*N* (weighted %)
Home	478 (52.3)	850 (48.4)	59 (48)	255 (53.6)	44 (59.6)	189 (68.7)
Yes (Facility)	167 (47.9)	695 (43.3)	240 (51.7)	1528 (55)	311 (60.5)	1731 (67)
Birth mode of the infant						
Normal vaginal	615 (51.5)	1387 (46.4)	253 (50)	1331 (52.9)	273 (60.3)	1458 (67.8)
Caesarean section	30 (43.1)	158 (42.2)	46 (57)	452 (61.3)	82 (60.5)	462 (65.1)
Gender of the infant						
Male	322 (52.6)	783 (46.2)	157 (55.1)	971 (57.2)	177 (60.9)	970 (67.4)
Female	323 (49.7)	762 (45.7)	142 (47)	812 (52.2)	178 (59.8)	950 (66.9)
Prelacteal feed given to the new-born						
No	614 (51.2)	1477 (45.7)	183 (53.9)	1141 (55.1)	174 (62.9)	1057 (67.7)
Yes	31 (49.4)	68 (52)	116 (46.8)	642 (54.2)	181 (58.1)	863 (66.5)
Initiation of breastfeeding						
Early	229 (58.1)	560 (48.7)	212 (54.3)	1205 (57.4)	288 (63.4)	1447 (70.2)
Late	416 (48.1)	985 (45.2)	87 (46.5)	578 (52.9)	67 (59.6)	473 (64.5)

the likelihood of EBF practices in India are present in Table 3. The model considers "place of residence" as the level-two factor and "administrative division" as the level-three factor. The table provides adjusted odds ratios and 95% confidence intervals for different predictors related to exclusive breastfeeding. The likelihood of practicing EBF significantly increased nearly twice from NFHS-3 to 5. Employed mothers depicted a significantly lower odds ratio (0.94; 95% CI 0.91,0.98) of practicing exclusive breastfeeding. The likelihood increased among mothers who were exposed to media (1.11; 1.09,1.14), with BMI in the normal range (1.02; 95% CI 1.02, 1.02), and those who visited health centres > 4 times for ANC visits (1.16; 95% CI 1.16, 1.17). The likelihood decreased in older mothers compared to mothers < 18 years (0.82; 95% CI 0.79, 0.86), Birth of the infant in a health facility (0.79; 95% CI 0.64, 0.96), female gender of the child (0.83; 95% CI 0.8, 0.86), late initiation of the breastfeeding (0.83; 95% CI 0.75, 0.92), and those who reported receiving postnatal care by the health workers (0.91; 95% CI 0.86, 0.97). The ICC for place of residence is 0.0, indicating no variability in EBF practices attributable to where the mother resides, and was statistically significant ($p < 0.001$). In contrast, the ICC for regions was observed to be 0.01, ~ i.e. only 1% of the variability in EBF practices is explained by differences across regions, though this small effect is also statistically significant ($p = 0.001$).

Overall, while regional differences slightly influence exclusive breastfeeding practices, most of the variation can be attributed to individual-level factors.

Discussion

Previous studies reiterate the benefits of breastfeeding to mothers and children, both in poor and rich countries, and implementing exclusive breastfeeding practices is a cost-effective way of improving maternal and child health indicators [18, 19]. However, nursing care is a very demanding job and is affected by many factors, including female employment. The latest Report of Periodic Labour Force Survey (2021-22) by the Government of India depicts an increased Female Labour Force Participation Rate (LFPR) in India over the last few years. Around 32.8% of females of working age (15 years and above) were in the labor force in 2021-22, compared to 23.3% in 2017-18, registering a surge of 9.5% points. Rural sector contributions have surged more considerably than urban ones. In rural areas, female LFPR has increased to 36.6% during 2021-22 compared to 24.6% in 2017-18, showing an increase of 12.0% points. Conversely, female LFPR was 23.8% in 2021-22 compared to 20.4% in 2017-18 in urban areas, exhibiting a nominal increase of just 3.4% points [16]. Therefore, looking at the global trends, we tested our hypothesis and report certain intriguing findings. First, there was an overall increase in exclusive breastfeeding prevalence rates in subsequent rounds. Second, the prevalence of EBF among working women was lower than for non-working women per the latest round of NFHS. Third, there were significant sociodemographic disparities in EBF rates among employed and unemployed women. Lastly, the employment status of the women significantly decreased the odds of exclusive breastfeeding in the presence of other independent variables.

Our exclusive breastfeeding rates are comparable to estimates from countries with similar socioeconomic

Table 3 Factors associated with exclusive breastfeeding (EBF) practice in India using a multi-level model

Exclusive Breastfeeding	AOR (95% CI)	*P*-value
Employment status of the mother		
Unemployed	**Reference value**	
Employed	0.94 (0.91, 0.98)	< 0.001
NFHS rounds		
NFHS 3	**Reference value**	
NFHS 4	1.22 (1.05, 1.4)	0.01
NFHS 5	2 (1.08, 3.67)	0.03
Age of mother		
< 18	**Reference value**	
18–34	0.82 (0.79, 0.86)	< 0.001
> 34	0.8 (0.64, 0.99)	0.05
Body Mass Index of mother		
Underweight	**Reference value**	
Normal	1.02 (1.02, 1.02)	< 0.001
Overweight	1.08 (0.79, 1.49)	0.62
Mother's education		
Illiterate	**Reference value**	
Primary	0.93 (0.77, 1.12)	0.42
Secondary	0.95 (0.88, 1.02)	0.17
Higher	0.85 (0.72, 1.01)	0.07
Media exposure		
No	**Reference value**	
Yes	1.11 (1.09, 1.14)	< 0.001
Husband's employment status		
No	**Reference value**	
Yes	0.83 (0.56, 1.24)	0.37
Number of household members		
<=5	**Reference value**	
> 5	1.04 (0.85, 1.26)	0.71
Socio-economic status		
Poor	**Reference value**	
Middle	0.79 (0.59, 1.06)	0.12
Rich	0.78 (0.59, 1.05)	0.1
Preceding birth interval		
< 3 years	**Reference value**	
≥ 3 years	1.19 (0.95, 1.5)	0.13
Number of antenatal check-ups received		
< 4 ANC Visits	**Reference value**	
≥ 4 ANC Visits	1.16 (1.16, 1.17)	< 0.001
Birth of the infant in a health facility		
No	**Reference value**	
yes	0.79 (0.64, 0.96)	0.02
Birth mode of the infant		
Normal Vaginal	**Reference value**	
Caesarean section	1.17 (0.75, 1.81)	0.49
Gender of the infant		
Male	**Reference value**	
Female	0.83 (0.8, 0.86)	< 0.001
Postnatal care received		
No	**Reference value**	
Yes	0.91 (0.86, 0.97)	< 0.001
Early initiation of the breastfeeding		
Yes	**Reference Value**	

Table 3 (continued)

Exclusive Breastfeeding	AOR (95% CI)	*P*-value
No	0.83 (0.75, 0.92)	< 0.001
Constant	1.66 (0.92, 2.99)	0.09
Place of Residence Var (Constant)	-	
Regions of India Var (Constant)	0.06 (0.05, 0.07)	
ICC[a] Place of Residence	0.0 (0.0, 0.0)	0.00*
ICC[a] Regions of India	0.01 (0.004, 0.01)	0.001*

[a]ICC: Intra-class correlation, *standard error, 3-level hierarchical structure with administrative division (regions) at level 1, (place of residence) at level 2, and (individuals) at level 3

conditions, which have reported the prevalence of EBF in the range of 65% (Bangladesh) to 50% (Ghana) [20, 21]. According to the United Nations Children's Fund (UNICEF), less than half of all newborns worldwide (44%) are exclusively breastfed during the first five months of their lives. In LMICS, the prevalence of EBF has been reported to be as high as 86.9% in Rwanda and lowest at 8.9% in Suriname [4]. Compared to HIC, where the maximum prevalence is less than many LMICs, and some countries even depicted negative trends in annual growth rates, these estimates are motivating. In these HICs, despite the prevalence of breastfeeding early initiation being over 80%, a drastic drop in breastfeeding rates is observed within the first six months of life, especially exclusive breastfeeding [22]. The prevalence is still lower than the recommended target of 70% by 2030 per the World Health Assembly, but it has achieved the global nutrition target 2025 of achieving exclusive breastfeeding at least up to 50% [5, 23].

Improvement in EBF rates can be attributed to proactive steps taken by the government to promote breastfeeding through several key policies and initiatives. These policies aim to create an enabling environment for exclusive breastfeeding by addressing cultural and workplace barriers that often deter mothers from breastfeeding. The National Code for Protection and Promotion of Breastfeeding was adopted in 1983, followed by the Infant Milk Substitutes, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act (1993) by the Department of Women and Child Development, which prohibits the promotion of infant milk substitutes, feeding bottles, and infant foods. It also prevents the distribution of samples of these products, as well as gifts of utensils and other items, to pregnant women or mothers of infants. India is compliant with the World Health Organisation and UNICEF Baby Friendly Hospital Initiative (BFHI), which is based on "Ten Steps to Successful Breastfeeding" with the objective of improving breastfeeding practices in hospitals with maternity services [24]. Within the government setup, the flagship maternal and child health program -RMNCAH+N, is built upon the continuum of care concept through a strategic lifecycle approach that encompasses all interventions aimed at reproductive, maternal, newborn, child, and adolescent health and nutrition under a broad umbrella, strongly promotes exclusive breastfeeding [24]. Other national programs like Mothers' Absolute Affection (MAA), Infant and Young Child Feeding (IYCF) guidelines under the Ministry of health and Family Welfare, and Integrated Child Development Services (ICDS) scheme under the Ministry of Women and Child Development are being implemented to improve breastfeeding, including early initiation and EBF for the first six months, followed by age-appropriate complementary feeding practices through capacity building of frontline health workers and comprehensive IEC campaigns [25–27]. Within MAA, Accredited Social Health Activists (ASHA) are also incentivised to reach pregnant and lactating mothers of all children under two years old and advocate ideal IYCF practices in the community [27]. Outside the scope of the health system, there are several legislations that intend to protect the EBF rights of newborns by targeting working mothers. Maternity Benefit Act 1961 is included in the official gazette of the Government of India and applies to any other establishment or class of establishments, industrial, commercial, agricultural or otherwise. This act regulates the employment of women in certain establishments for six weeks before and after childbirth and provides for maternity benefits up to 12 weeks, while the All India Service (leave) rules 1955 has a provision of leaves up to 180 days, if women has less than 2 surviving children with full pay protection [28, 29]. The Amendment of the Maternity Benefit Act 2017, provides breaks for breastfeeding and creche facilities at workplaces, ensuring support for working mothers to continue breastfeeding post-maternity leave (Ministry of Women and Child Development, 2017). The Maternity Benefits Act of 2017 increased the period to 26 weeks. This is a "fully paid leave' available to a working woman who is pregnant or nursing in order to care for herself and her child. This 2017 amendment significantly modifies India's previous Maternity Act 1961 and applies to enterprises and factories with ten or more employees, whether organised or unorganised.

In our study, we observed a lower prevalence of exclusive breastfeeding in employed mothers compared to

unemployed mothers, and maternal employment significantly affected the odds of EBF per recommendations. These findings are coherent with results from similar analyses done in different countries [21]. Maintaining breastfeeding after returning to work is challenging for working mothers, and most of them need support to continue breastfeeding practice. Various factors can be attributed to this variation, such as limited maternity leave, difficult working conditions, increased workload, lack of flexible work hours, lack of designated lactation spaces, absence of creches, etc [11, 30]. Also, some women may have an unmet need for medical consultation for certain physical challenges such as low milk production, inverted nipples, or other breastfeeding difficulties, making it harder to breastfeed even if they desire to do so exclusively. Employers play a role in providing a support system and facilities in the workplace for mothers to express and store breast milk. The Maternity Benefit (Amendment) Act, 2017 applies to women employees working in any establishment (factories, plantations, shops, mines, or commercial establishments) with 10 or more employees and entitles breastfeeding moms to a crèche at their workplace of any kind, including an IT firm, government office, factory, plantation, or mine [31]. Similar legislations like the Sect. 14 of The Beedi and Cigar Workers (Conditions of Employment) Act, 1966 states that establishments related to the manufacturing of beedi and cigars should provide crèches [32]. There are a few more pieces of legislation similar to this Act. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; the Factories Act, 1948; and the Plantations Labour Act, 1951 require establishments to provide their women employees with childcare facilities. Apart from these national-level legislations, many state-specific laws mandate to ensure adequate maternity benefits, including exclusive breastfeeding [33]. However, many places have laws that are not adequately enforced, which calls for concerted efforts [34].

Both internal and external support are essential for mothers to overcome challenges in order to achieve success in breastfeeding. Apart from maternal employment, some other factors have been investigated. Our study concluded that the mother's age had a significant relation with exclusive breastfeeding. Younger mothers, as well as mothers of more than 34 years, had a low prevalence of EBF, a similar finding in other studies [35, 36]. This age-related pattern can be explained by the false perceptions about perceived breast milk insufficiency in young females and reduction in the production of breastmilk in mothers of higher ages and are mostly contributed by factors like delayed breastfeeding initiation, lack of awareness about the importance of exclusive breastfeeding, and proper technique and infant formula feeding [37]. Insufficient milk supply is one of the most commonly cited reasons for early cessation or decreased exclusivity in women who have initiated breastfeeding [38]. A study conducted by Avery M showed that younger age mothers have higher chances of early cessation of breastfeeding [39]. Mothers with normal BMI showed a higher prevalence of exclusive breastfeeding, as also seen in a study conducted by Marshall [40]. According to a study, a higher BMI can lead to delayed lactogenesis and reduced milk supply [41]. A study conducted by Peng Zhu observed that mothers who were underweight had a higher chance of breastfeeding cessation within the first two months [42]. Women with more years of education depicted higher EBF rates. Besides better awareness regarding the benefits of exclusive breastfeeding to both children and mothers, a better education levels help women through Legal Protection. Educated women know their rights and the laws in their country regarding breastfeeding in the workplace. Similarly, women who visited health facilities more frequently for antenatal care visits depicted better odds of practising EBF, as shown in other studies [20, 36]. The higher compliance is attributed to nutritional counselling provided during ANC visits. More antenatal care visits encourage the mother to practice EBF by providing adequate and timely information about its benefits [43]. Mothers who were more exposed to media showed a higher prevalence of practising exclusive breastfeeding. Mass media is a good source of information about benefits, how to effectively breastfeed, and the policies formed by the government. According to a study conducted by Uwalaka and Nwala, social media can be the most efficient messenger for providing information about exclusive breastfeeding [44]. According to our analysis, the gender of a child had a significant impact on the odds of exclusive breastfeeding. Female infants depicted lesser odds of being exclusively breastfed than males, which points towards disparities, societal beliefs, and gender inequality, as reported in other studies [45]. A study from Bangladesh showed that the gender of a newborn was related to the duration and frequency of breastfeeding. Male infants showed a higher demand for breast milk than female infants [46]. Mothers who had initiated breastfeeding earlier depicted a higher prevalence of EBF a similar finding in other studies [47]. This can be explained by support from health professionals and guidance towards early breastfeeding initiation. However, we also observed lower EBF prevalence in mothers who delivered in a health institution or those who had received postnatal care. This is a finding of concern and is in contrast to results from other studies conducted in different parts of the world, reflecting a need for a more detailed exploration of the scope of counselling services provided during the hospital stay

and home-based postnatal care services for mothers after birth in India [45, 48].

There are certain policy implications and recommendations emerging form our study. It is pertinent to implement supportive workplace policies, such as longer maternity leave, flexible work hours, and designated lactation spaces, which can positively influence EBF outcomes [5]. Providing education and awareness programs for employers and colleagues can foster a supportive environment for breastfeeding mothers. The study also calls for improvement in the scope of counselling services offered to women delivering in hospitals. The study has a few strengths and limitations that should be acknowledged. Using data from three rounds of nationally representative datasets for weighted analysis makes our results crucial for policy recommendations. Robust methodology and survey implementation help collect detailed data on confounders and standardised instruments, which is another strength of our study. The use of multi-level modelling helps to account for addressing geographical and urban-rural disparities better. However, the original definition of exclusive breastfeeding only enquires about the last 24 h before the interview to address recall bias, and the picture may not be the same throughout the recommended first six months after birth. Many women who were asked about EBF were not having employment data and vice-versa, this generated a lot of missing data, and that affects generalisability of our results. Further, exclusive breastfeeding may be prone to self-reported, recall, and social desirability biases. Based on available data, we cannot explain the contrasting results seen regarding the effect of postnatal care on EBF odds, which may be affected by many factors like who provided the information, what topics were covered and at what time and how frequently was the care provided by the health workers. Thus, we can say that this study is prone to misclassification and residual confounding, due to a limited number of variables used in the survey enquiring about exclusive breastfeeding included in our study for the purpose of our analysis and may not give us a complete picture of the effect of workplace on EBF practices.

Conclusions

This study tests the hypothesis based on the trends observed in the developed countries with more engagement of females in the jobs. We observed a lower prevalence of exclusive breastfeeding among working mothers, and is a cause of concern. Despite multiple legislations at national and sub-national levels already in place, poor enforcement put our newborns at risk, and are a source of psychological agony to the mother for not being available to her newborn at the time of need. Working women substantially contribute to the development of the nation's GDP. It is imperative that we support breastfeeding women so that they can effectively contribute to the nation's progress, rather than to see them dropping out of the workforce.

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Author contributions
RA, PG, and MV were involved in the conceptualization of the research question and preparation of the manuscript; PB wrote the first draft of the manuscript, and AA was involved in data analysis. IK, MR, and RK were involved in visualizing the manuscript from a policy point of view and contributed to the development of the manuscript through their critical inputs. All the authors approved the final version of the manuscript.

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Data availability
This study analyses a nationally representative survey database that is available freely in the public domain and can be accessed using standard protocols from the Demographic Health Surveillance (DHS) website at https://dhsprogram.com/data/available-datasets.cfm.

Declarations

Ethics approval and consent to participate
Being a secondary data analysis of datasets available in the public domain, ethical approvals were not deemed necessary. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Wake GE, Mittiku YM. Prevalence of exclusive breastfeeding practice and its association with maternal employment in Ethiopia: a systematic review and meta-analysis. Int Breastfeed J. 2021;16:86.
2. Zong X, Wu H, Zhao M, Magnussen CG, Xi B. Global prevalence of WHO infant feeding practices in 57 LMICs in 2010–2018 and time trends since 2000 for 44 LMICs. EClinicalMedicine. 2021;37:100971.
3. Abegunde D, Hutchinson P, Anaba U, Oyedokun-Adebagbo F, Johansson EW, Feyisetan B, et al. Socioeconomic inequality in exclusive breastfeeding behavior and ideation factors for social behavioral change in three north-western Nigerian states: a cross-sectional study. Int J Equity Health. 2021;20:172.
4. UNICEF, Breastfeeding. UNICEF Data: Monitoring the situation of children and women. 2022 [cited 2024 Oct 24]. Available from: https://data.unicef.org/to

pic/nutrition/breastfeeding/#:~:text=Yet despite all the potential,of infants being exclusively breastfed.
5. World Health Organization. Global Nutrition targets 2025 to improve maternal, infant and young child. World Health Organ. 2018;2(6):375–88.
6. Chhetri S, Rao AP, Guddattu V. Factors affecting exclusive breastfeeding (EBF) among working mothers in Udupi taluk, Karnataka. Clin Epidemiol Global Health. 2018;6(4):216–9.
7. Thu HN, Eriksson B, Khanh TT, Petzold M, Bondjers G, Kim CNT, et al. Breastfeeding practices in urban and rural Vietnam. BMC Public Health. 2012;12:964.
8. Walingo MK, Mutuli LA. Influence of maternal beliefs, attitude, perceived behavior on breast-feeding among post partum mothers in Western Kenya. Pakistan J Nutr. 2014;13(5):250–4.
9. Zhang K, Tang L, Wang H, Qiu L-Q, Binns C, Lee A. Why do mothers of young infants choose to formula feed in China? Perceptions of mothers and hospital staff. Int J Environ Res Public Health. 2015;12(5):4520–32.
10. Lakati A, Binns C, Stevenson M. The effect of work status on exclusive breastfeeding in Nairobi. Asia Pac J Public Health. 2002;14(2):85–90.
11. Abekah-Nkrumah G, Antwi MY, Nkrumah J, Gbagbo FY. Examining working mothers' experience of exclusive breastfeeding in Ghana. Int Breastfeed J. 2020;15:56.
12. Dutheil F, Méchin G, Vorilhon P, Benson AC, Bottet A, Clinchamps M, et al. Breastfeeding after returning to work: a systematic review and meta-analysis. Int J Environ Res Public Health. 2021;18(16):8631.
13. International Institute for Population Sciences. National Family Health Survey (NFHS-4). 2015–16. *India Report*. 2017;791-846 [cited 2023 Aug 30]. https://dhsprogram.com/pubs/pdf/fr339/fr339.pdf
14. International Institute of Population Sciences. National Family Health Survey-3. Full report. [cited 2023 Sep 23]. https://www.nfhsiips.in/nfhsuser/index.php
15. International Institute for Population Sciences. National family health survey(NFHS-5) India 2019-21. Demographic and Health surveys. 2021 [cited 2023 Aug 30]. pp. 1–714. https://dhsprogram.com/methodology/survey/survey-display-541.cfm
16. Ministry of Labour and Employment, Directorate General of Employment. Female labour utilization in India employment statistics in focus-April 2023. 2023. pp. 1–40. https://dge.gov.in/dge/sites/default/files/2023-05/Female_Labour_Utilization_in_India_April_2023_final__1_-pages-1-2-merged__1_.pdf#page=8.08
17. Rutstein SO, Rojas G. Guide to DHS statistics: Demographic and Health Surveys methodology.DHS Publication. 2006;1–168. [cited 2024 Oct 24]. https://www.dhsprogram.com/pubs/pdf/DHSG1/Guide_to_DHS_Statistics_29Oct2012_DHSG1.pdf
18. Victora CG, Horta BL, De Mola CL, Quevedo L, Pinheiro RT, Gigante DP, et al. Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. Lancet Glob Health. 2015;3(4):e199–205.
19. Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet. 2016;387(10017):475–90.
20. Mohammed S, Yakubu I, Fuseini A-G, Abdulai A-M, Yakubu YH. Systematic review and meta-analysis of the prevalence and determinants of exclusive breastfeeding in the first six months of life in Ghana. BMC Public Health. 2023;23:920.
21. Ahmmed F, Hossain MJ, Sutopa TS, Al-Mamun M, Alam M, Islam MR, et al. The trend in exclusive breastfeeding practice and its association with maternal employment in Bangladesh: a multilevel analysis. Front Public Health. 2022;10:988016.
22. Vaz JS, Maia MFS, Neves PAR, Santos TM, Vidaletti LP, Victora C. Monitoring breastfeeding indicators in high-income countries: levels, trends and challenges. Matern Child Nutr. 2021;17(3):e13137.
23. World Health Organization, United Nations International Children's Emergency Fund (UNICEF). WHO/UNICEF discussion paper: The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030. Guidance. 2019 [cited 2024 Oct 24]. p. 12. https://data.unicef.org/resources/who-unicef-discussion-paper-nutrition-targets/
24. World Heath Organization, Baby-Friendly UNICEF. Hospital Initiative. Revised, updated and expanded for Integrated Care. 2009 [cited 2024 Jul 30]. https://www.ncbi.nlm.nih.gov/books/NBK153471/#:~:text=The Baby-friendly Hospital Initiative,and expanded for integrated care.
25. Ministry of Health and Family Welfare Directorate General of Health Services. Infant and young child feeding. One Day Sensitization Module. 2016. https://www.nhm.gov.in/MAA/One_Day_Sensitization_Module/One_Day_Sensitization_Module_English_lowres.pdf
26. Ministry of Women and Child Development. Integrated Child Development Services (ICDS) Scheme. 2015 [cited 2024 Jul 30]. https://wcd.nic.in/integrated-child-development-services-icds-scheme
27. Ministry of Health and Family Welfare Directorate General of Health Services. MAA: Programme for Promotion of Breastfeeding. Operational guidelines. 2016;36. https://nhm.gov.in/MAA/Operational_Guidelines.pdf
28. Government of India. Maternity Benefit Act, 1961 (No. 53 of 1961) 1. Gazette Notifications. 1961 [cited 2024 Jul 30]. pp. 1–11. https://labour.gov.in/sites/default/files/the_maternity_benefit_act_1961_0.pdf
29. Department of Personnel and Training G of I. The All India Services (Leave) Rules, 1955. 1955. [cited 2024 Jul 30]. pp. 1–9. https://dopt.gov.in/sites/default/files/Revised_AIS_Rule_Vol_I_Rule_03.pdf
30. Thet MM, Khaing EE, Diamond-Smith N, Sudhinaraset M, Oo S, Aung T. Barriers to exclusive breastfeeding in the Ayeyarwaddy Region in Myanmar: qualitative findings from mothers, grandmothers, and husbands. Appetite. 2016;96:62–9.
31. Ministry of Law and Justice; Government of India. The maternity Benefits (Amendment) act, 2017. The Gazette of India Extraordinary. 2017. pp. 3–6. https://labour.gov.in/sites/default/files/maternity_benefit_amendment_act2017_.pdf
32. Government of India. The Beedi and Cigar Workers (Conditions of Employment) Act, 1966. Central Advisory. 1966;1–15. [cited 2023 Oct 12]. https://www.indiacode.nic.in/handle/123456789/1675?sam_handle=123456789/1362
33. India.com. World Breastfeeding Week: Breastfeeding Laws For Working Mothers In India That You Must Know. 2021 [cited 2023 Oct 12]. https://www.india.com/video-gallery/world-breastfeeding-week-breastfeeding-laws-for-working-mothers-in-india-that-you-must-know-watch-now-4860299/
34. Majhi N, Maroof KA, Sharma AK, Shah D. Maternity leave access and breastfeeding practices among working mothers in an urban residential area of East Delhi. Indian J Community Med. 2021;46(3):537–40.
35. Manyeh AK, Amu A, Akpakli DE, Williams JE, Gyapong M. Estimating the rate and determinants of exclusive breastfeeding practices among rural mothers in Southern Ghana. Int Breastfeed J. 2020;15:7.
36. Sankar TJ, Suryanarayana R, Kamath BTP, Sunil BN, Reddy MM. To determine the survival, prevalence and associated factors of exclusive breastfeeding practices in South India. J Fam Med Prim Care. 2023;12(1):36–41.
37. Huang Y, Liu Y, Yu X, Zeng T. The rates and factors of perceived insufficient milk supply: a systematic review. Matern Child Nutr. 2022;18(1):e13255.
38. Namyalo H, Nankumbi J, Ngabirano TD. Perceived breast milk insufficiency: prevalence and associated factors among women attending a young child clinic in Uganda. Int J Afr Nurs Sci. 2023;19:100637.
39. Avery M, Duckett L, Dodgson J, Savik K, Henly SJ. Factors associated with very early weaning among primiparas intending to breastfeed. Matern Child Health J. 1998;2(3):167–79.
40. Marshall NE, Lau B, Purnell JQ, Thornburg KL. Impact of maternal obesity and breastfeeding intention on lactation intensity and duration. Matern Child Nutr. 2019;15(2):e12732.
41. Nommsen-Rivers LA, Chantry CJ, Peerson JM, Cohen RJ, Dewey KG. Delayed onset of lactogenesis among first-time mothers is related to maternal obesity and factors associated with ineffective breastfeeding. Am J Clin Nutr. 2010;92(3):574–84.
42. Zhu P, Hao J, Jiang X, Huang K, Tao F. New insight into onset of lactation: mediating the negative effect of multiple perinatal biopsychosocial stress on breastfeeding duration. Breastfeed Med. 2013;8(2):151–8.
43. Biks GA, Tariku A, Tessema GA. Effects of antenatal care and institutional delivery on exclusive breastfeeding practice in northwest Ethiopia: a nested case–control study. Int Breastfeed J. 2015;10:30.
44. Uwalaka T, Nwala B. Social media influence on exclusive breastfeeding among expecting mothers in Port Harcourt. Niger J Commun. 2020;17(2):191–210.
45. Sefene A. Determinants of exclusive breastfeeding practice among mothers of children age less than 6 month in Bahir Dar City Administration, Northwest Ethiopia; a community based cross-sectional survey. Sci J Clin Med. 2013;2(6):153.

46. Ghosh R, Mascie-Taylor CGN, Rosetta L. Longitudinal study of the frequency and duration of breastfeeding in rural Bangladeshi women. Am J Hum Biol. 2006;18(5):630–8.
47. Acharya P, Khanal V. The effect of mother's educational status on early initiation of breastfeeding: further analysis of three consecutive Nepal demographic and health surveys. BMC Public Health. 2015;15:1069.
48. Seid AM, Yesuf ME, Koye DN. Prevalence of exclusive breastfeeding practices and associated factors among mothers in Bahir Dar City, Northwest Ethiopia: a community based cross-sectional study. Int Breastfeed J. 2013;8:14.

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