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Original Article

Trends and Prevalence of Low Birth Weight in India: What Does Data Suggest?

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ABSTRACT

Introduction: "Low birth weight" (LBW) is defined as birth weight < 2.5 kg (2500 grams). LBW infants remain at a relatively higher risk of mortality than those with normal birth weight. This is still a major public health problem in developing countries like India. This study examines the trend and prevalence of LBW in India and its data characteristics.
Methods: National Family Health Survey (N.F.H.S.) data rounds were collected from 1992-2021. The study sample included women aged 15-49 years. The logistic regression model was fitted to assess the maternal determinants affecting the birth weight among newborns. Also, the heaping pattern of the data for each round of N.F.H.S. data was analyzed.
Results: The trend and prevalence of low birth weight were reported 1884 (25.2%) in the first round of the National Family Health Survey, 1859 (22.7 %) in the second, 4146 (21.5%) in the third, 35476 (18.2%) in fourth, and 38167 (18.2%) in fifth, which remains constant in comparison to the previous round.
Conclusion: The prevalence of LBW in India has declined over the past decades as reported in data like NFHS-I, II & III, but NFHS-IV and V are constant. Sociodemographic factors are shown as a risk factor for LBW. Data heaping is a key challenge to give the correct estimate of LBW and it is found in each round of the data set. Maternal health services are required during the gestation period to reduce LBW.

Introduction

Low birth weight (LBW) is a major problem in developing countries, especially in India. It is a key indicator for child health, especially a concern in low-middle-income countries. LBW is also a public health concern globally due to its association with increased neonatal morbidity and mortality, as well as long-term health implications for affected individuals. At the time of birth, if the baby's body weight is less than 2.5kg or 2500 grams is defined as a low birth weight (LBW) otherwise normal birth weight.[1]

Poor maternal nutrition and health services during the gestational period of the mother was

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a measure cause of LBW. A study has revealed that mothers' daily consumption of nutritional foods, adequate utilization of antenatal care (ANC) and delivery care, and improved socio-economic status were protective against LBW.[2] In India, regional and geographical variations of the prevalence of low birth weight were reported with causal factors of socio-economic and maternal characteristics.[3,4] Appropriate maternal age at conception and multiparty contributed substantially to LBW and extremely low birth weight was also evaluated for mortality and morbidities.[5,6] LBW in Indian newborns was influenced by maternal and sociodemographic factors.[7] Mothers are suffering from poor health and young mothers are at more risk of LBW.[8] Lack of awareness about, dietary requirements, and prenatal services among the mothers of tribal districts of India was a major cause of LBW.[9] Mothers who had not received any antenatal care and those who suffered from any pregnancy complications had a higher chance of giving birth to LBW babies.[10]

The proportion of missing data on birthweight was reported higher among newborns belonging to several mother characteristics. There was a high birth weight reported at multiples of '500 grams' and heaping at '2,500 grams' during the time of birthweights reporting either from the health cards or from the mother's recall. 'LBW' was probable to be miscalculated when missing data as well as heaping at '2,500 grams' are highly dominant.[11,12]

Keeping in the view of literature, it was found that sufficiently plentiful published research articles available in multiple directions to fulfill the desire of individual objectives of the study like distribution and determination, predictions, comparisons, developed various types of statistical models, and applied various statistical techniques to estimate the accurate prevalence of LBW in India and its blocks, districts, state, regional and geographical level with help of primary and secondary data. It was also observed that various government organizations were also involved in conducting the survey and collecting data about maternal and child health and their reports were also available on public platforms. In this study, we focused on highlighting the trends of Low Birth Weight in India with its determinants and reporting of the data.

Methods

The present study has used the national family health survey data to fulfill the aim of the study. From 1992 to till date total fifth times N.F.H.S. data was collected through survey methodology and the report has been disseminated. Currently six rounds of N.F.H.S. data collection is going on. Therefore, the first round of the N.F.H.S. data was collected in the year 1992-93, the second round in 1998-99, the third round in 2005-06, the fourth round in 2015-16, and the fifth round in 2019-2021.[13 -17] In this study, all fifth rounds of the data were analyzed to find the prevalence of trends of low birth weight in India and its states. Risk factors of low birth weight were also identified with the help of the latest round of data. The pattern of birth weight reporting during the survey was also demonstrated graphically to understand the heaping pattern of the data for each round of the NFHS data and. a brief N.F.H.S data is explained below.

N.F.H.S.-I

The 'first' round of the "National Family Health Survey" (NFHS-I)–1992–1993 data was collected between '1992' and '1993' from twenty-four states and union territories of Delhi. The survey provides self-reported information on birth weight either mother memory recall or health cards. Data collection was carried out in three phases from 'April 1992' to 'September 1993'. This survey adopted a 'two-stage' "stratified random sampling method" for data collection. The technique of sample size calculation, survey design, and weightage of the sample in detail has been published in the reports and it can be found on the International Institute for Population Sciences websites.[13] N.F.H.S.-II: The 'second' round of the "National Family Health Survey" (NFHS-II)–1998–1999 data was collected between '1998' and '1999' for all states and union territories.[14] N.F.H.S.-III: The 'third' round of the "National Family Health Survey" (NFHS-III) –2005–2006 data was collected between '2005' and '2006' for all states and union territories. The survey provides self-reported information.[15]

N.F.H.S.-IV

The 'fourth' round of the "National Family Health Survey" (NFHS-IV)– 2015–2016 data was collected between '2015' and '2016' from '29 states', '7 union territories', and '640 districts. The survey provides self-reported information.[16] N.F.H.S.-V: The 'fifth' round of the "National Family Health Survey" (NFHS-V) -2019-2021 data was collected on a nationwide survey to "scientifically investigate" 'health and its social determinants' and related 'economics' in India. It gives information for '707 districts', '28 states', and '8 union territories. It was collected in two phases. Phase-I from '17 June 2019' to '30 January 2020' covering '17 states' and '5 UTs'. Phase II from '2 January 2020' to 'April 2021' covering '11 states' and '3 UTs'.[17] The second, third, fourth, and fifth rounds of this data have adopted a "multistage stratified random sampling" method for data collection.

Dependent Variable

The outcome variable was low birth weight; it was measured by their birth weight (BW), if BW < 2500 grams was considered as LBW, and if BW ≥ 2500 g was considered normal.

Independent Variable

The mother's characteristics were used as independent variables; age, education, religion, place, caste, region, wealth index, tobacco users, and alcohol consumption.

Statistical analysis

We used "logistic regression" analysis to evaluate the 'statistically' relevant factors. The unadjusted "odds ratio" with a "95% confidence interval" (CI) was used to express the 'association' between the dependent and independent variables.

Logistic Regression Model

A univariate logistic regression model has been developed wherein the "birth weight" category ('LBW = 1' & 'NBW = 0') was used as the 'outcome variable' and maternal factors considered as 'predictor variable'. Here, x_1=age, x_2=education, x_3=religion, x_4=caste,

x_5=residence, x_6=region, x_7=wealth index, x_8=tobacco, x_9=alcohol

The equation of this epidemiological model is:

$$\log\left[\frac{p}{1-p}\right]=a_0+a_1x_1 \ldots\ldots\ldots [1] \qquad \log\left[\frac{p}{1-p}\right]=a_0+a_2x_2 \ldots\ldots\ldots [2]$$

$$\log\left[\frac{p}{1-p}\right]=a_0+a_3x_3 \ldots\ldots\ldots [3] \qquad \log\left[\frac{p}{1-p}\right]=a_0+a_4x_4 \ldots\ldots\ldots [4]$$

$$\log\left[\frac{p}{1-p}\right]=a_0+a_5x_5 \ldots\ldots\ldots [5] \qquad \log\left[\frac{p}{1-p}\right]=a_0+a_6x_6 \ldots\ldots\ldots [6]$$

$$\log\left[\frac{p}{1-p}\right]=a_0+a_7x_7 \ldots\ldots\ldots [7] \qquad \log\left[\frac{p}{1-p}\right]=a_0+a_8x_8 \ldots\ldots\ldots [8]$$

$$\log\left[\frac{p}{1-p}\right]=a_0+a_9x_9 \ldots\ldots\ldots [9]$$

keeping given above nine equations the notations a_1 , a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9 are the "regression coefficients" and $\log\left[\frac{p}{1-p}\right]$ is called 'log odds' or 'logit' of the event.[18]

Results

In this study, results are mainly focused on trends of low birth weight in three subsequent decades from 1992 to 2021. The decades have witnessed five times national survey data. N.F.H.S. has collected with the help of the "International Institute of Population Sciences" as a nodal agency and funded by the "Ministry of Health and Family Welfare", Govt. of India. Here, a total of four tables were used to show the findings of the data. Table-1 & 2, represent the prevalence of LBW for each round of the N.F.H.S. data for each state and selected sociodemographic characteristics. Table-3 & 4, represent the findings of logistic regression analysis only for the fifth round of the N.F.H.S. data. Table 1; Prevalence of low birth weight reported in the first round of the data is 25.2%, second 22.7%, third 21.5%, and fourth and fifth was 18.2% at the national level. The fifth round of the data reveals the prevalence of LBW is higher than the fourth round of the N.F.H.S. data in the following states; Punjab, Chhattisgarh, Bihar, Jharkhand, West Bengal, Assam, Sikkim, Tripura, Kerala and Tamil Nadu. Table 2; the prevalence of low birth weight was highest among the younger age group of mothers across the rounds of the N.F.H.S. data and the latest one was reported at 23.5%. Mother's schooling, place of residence, religion, caste, and birth order were key risk factors of LBW in India throughout all the subsequent NFHS data. Prevalence of LBW among age of mothers <20 years decreased from 32.1% in NFHS-I to 23.5% in NFHS-V, 20-34 Years: decreased from 24.8% in NFHS-I to 18.2% in NFHS-V, 35-49 Years: Relatively stable, around 17% in recent rounds. LBW in 1st Birth order: decreased from 28.0% in NFHS-I to 18.9% in NFHS-V, 2nd & 3rd Births: Decreased from 23.8% in NFHS-I to 17.6% in NFHS-V, 4th & 5th Births: Decreased from 25.0% in NFHS-I to 18.5% in NFHS-V, 6+ Births: Remained relatively stable, around 19% in recent rounds. LBW among the urban place of residence: Decreased from 26.5% in NFHS-I to 17.4% in NFHS-V, Rural: Decreased from 24.8% in NFHS-I to 18.6% in NFHS-V. LBW among the no Education: Decreased from 28.6% in NFHS-I to 20.1% in NFHS-V, Primary Education: Decreased from 28.3% in NFHS-I to 20.6% in NFHS-V, Secondary Education: Decreased from 25.6% in NFHS-II to 18.2% in NFHS-V, Higher Education: Slightly improved from 19.6% in NFHS-I to 14.5% in NFHS-V. LBW among the religion Hindu: Decreased from 26.3% in NFHS-I to 18.5% in NFHS-V, Muslim: Decreased from 23.1% in NFHS-I to 16.8% in NFHS-V, Christian: Decreased from 17.4% in NFHS-I to 15.9% in NFHS-V, Sikh: Data varies, but a general decrease in later rounds, Buddhist/Neo-Buddhist: Decreased

from 33.8% in NFHS-I to 19% in NFHS-V, Jain: Decreased from 26.7% in NFHS-II to 13.9% in NFHS-V, Other: Variable data but generally shows fluctuations. The prevalence of LBW among the Scheduled Caste: Decreased from 25.8% in NFHS-I to 19.5% in NFHS-V, Scheduled Tribe: Decreased from 23.9% in NFHS-I to 18.8% in NFHS-V, Other Backward

Table 1. Represents the state-wise trends of low birth weight in India evidence from N.F.H.S.-I, N.F.H.S.-II, N.F.H.S.-III, N.F.H.S.-IV and N.F.H.S.-V data.

India	N.F.H.S.-I	N.F.H.S.-II	N.F.H.S.-III	N.F.H.S.-IV	N.F.H.S.-V
States	25.2 (1884)	22.7 (1859)	21.5 (4146)	18.2 (35478)	18.2 (38166)
Chandigarh	NA	NA	NA	31 (22.3)	23 (16.5)
Delhi	46 (27.2)	39 (26.4)	71 (26.6)	671 (26.6)	612 (22.1)
Haryana	24 (25.8)	30 (24.4)	101 (32.8)	1001 (20.4)	857 (20.5)
Himachal Pradesh	8 (26.7)	14 (35)	27 (24.5)	178 (19.6)	144 (15.7)
Jammu & Kashmir	5 (31.2)	6 (27.3)	13 (19.1)	217 (13.9)	159 (10.7)
Punjab	30 (28.8)	35 (23.6)	125 (27.8)	664 (17.2)	853 (22.4)
Rajasthan	46 (47.4)	55 (30.4)	202 (27.4)	2464 (21.4)	2485 (17.7)
Uttarakhand	NA	NA	24 (24.2)	318 (24.7)	279 (17.7)
Ladakh	NA	NA	NA	NA	3 (12.0)
Chhattisgarh	NA	NA	47 (17.4)	659 (12.6)	770 (15.9)
Madhya Pradesh	114 (36.2)	123 (32.3)	200 (23.4)	3012 (21.9)	2652 (20.5)
Uttar Pradesh	107 (27.2)	122 (37.1)	245 (25.2)	4891 (20.7)	7759 (20.2)
Bihar	60 (21.8)	57 (22.2)	200 (27.5)	2656 (14.4)	3884 (16.8)
Jharkhand	NA	NA	61 (19.2)	749 (14.5)	927 (15.6)
Odisha	25 (23.4)	53 (24.9)	147 (20.5)	1566 (20.8)	1344 (19.2)
West Bengal	204 (24.7)	195 (25.5)	409 (22.9)	2396 (16.7)	2872 (19.0)
Arunachal Pradesh	2 (20.0)	3 (27.3)	3 (15.8)	12 (10.9)	15 (10.6)
Assam	27 (21.8)	34 (33.7)	56 (19.4)	738 (15.8)	869 (16.1)
Manipur	6 (27.3)	2 (8.7)	7 (13.2)	32 (9.2)	27 (7.1)
Meghalaya	6 (18.2)	3 (15.8)	11 (18.0)	58 (12.2)	85 (11.7)
Mizoram	1 (5.0)	2 (9.1)	3 (7.1)	11 (5.9)	7 (4.2)
Nagaland	NA	1 (11.1)	1 (10.0)	10 (7.9)	5 (4.3)
Sikkim	NA	1 (25.0)	1 (7.7)	5 (8.5)	6 (10.2)
Tripura	8 (28.6)	7 (25.0)	19 (26.8)	84 (17.5)	107 (19.7)
Dadra & Nagar Haveli	NA	NA	NA	15 (23.1)	17 (20.7)
Daman & Diu	NA	NA	NA	4 (17.4)	
Goa	6 (24.0)	5 (25.0)	10 (21.7)	46 (22.3)	28 (14.0)
Gujarat	134 (21.3)	123 (19.8)	305 (22.0)	1859 (19.0)	1745 (18.5)
Maharashtra	497 (32.3)	354 (25.9)	685 (22.1)	3873 (19.5)	3606 (20.0)
Andaman & Nicobar Islands	NA	NA	NA	8 (16.3)	7 (17.9)
Andhra Pradesh	110 (25.6)	162 (18.6)	381 (19.3)	1512 (17.6)	1167 (16.2)
Karnataka	113 (21.3)	95 (17.3)	317 (18.7)	1683 (17.2)	1580 (15.9)
Kerala	129 (18.2)	117 (17.6)	160 (16.2)	661 (15.5)	731 (16.3)
Lakshadweep	NA	NA	NA	2 (16.7)	1 (10.0)
Puducherry	NA	NA	NA	33 (15.9)	20 (13.8)
Tamil Nadu	176 (22.6)	221 (17.2)	315 (17.2)	2284 (16.4)	1823 (17.0)
Telangana	NA	NA	NA	1075 (15.9)	697 (13.9)

*"NA" represents the non-availability of data. N.F.H.S.-V, Dadra &Nager Haveli, and Daman &Diu were combined reported. That is why these two rows are merged.

Table 2. Represents the sociodemographic characteristics wise propensities of low birth weight in India evidence from N.F.H.S.-I, N.F.H.S.-II, N.F.H.S.-III, N.F.H.S.-IV, and N.F.H.S.-V data.

Maternal Factors	N.F.H.S.-I	N.F.H.S.-II	N.F.H.S.-III	N.F.H.S.-IV	N.F.H.S.-V
Age					
<20	347 (32.1)	237 (28)	326 (28.2)	3022 (21.0)	1312 (23.5)
20-34	1465 (24.8)	1564 (22.1)	3655 (21.4)	30061 (18)	33959 (18.2)
35-49	73 (23.5)	59 (19.9)	165 (16.8)	2393 (17.9)	2896 (17.5)
Birth order					
1	896 (28.0)	845 (22.6)	1912 (22.3)	15888 (19.0)	16090 (18.9)
2 & 3	772 (23.8)	816 (22.3)	1774 (20.2)	15923 (17.3)	18001 (17.6)
4 & 5	168 (25.0)	160 (24.7)	372 (24.7)	2449 (19)	3310 (18.5)
6+	48 (26.1)	39 (22.3)	89 (22.3)	715 (19)	766 (19.8)
Residence					
Urban	1146 (26.5)	782 (21.1)	1668 (19.3)	10941 (17.6)	10047 (17.4)
Rural	738 (24.8)	1078 (23.9)	2478 (23.3)	24534 (18.5)	28120 (18.6)
Education					
No education	383 (28.6)	456 (30.2)	1034 (26.2)	8755 (20.1)	7824 (20.1)
Primary	379 (28.3)	346 (24.6)	639 (24.6)	5261 (20.2)	5125 (20.6)
Secondary	926 (25.6)	742 (21.6)	2096 (20.5)	17938 (17.9)	20112 (18.2)
Higher	196 (19.6)	316 (17)	377 (15.3)	3521 (14.2)	5104 (14.5)
Religion					
Hindu	1443 (26.3)	1485 (23.5)	3351 (21.8)	28832 (18.5)	30987 (18.5)
Muslim	246 (23.1)	241 (20.2)	529 (20.2)	4935 (17.3)	5534 (16.8)
Christian	62 (17.4)	51 (13.4)	94 (16.2)	732 (17.1)	691 (15.9)
Sikh	34 (30.6)		89 (26)	513 (17.7)	571 (20.8)
Buddhist/Neo-Buddhist			54 (23.6)	293 (15.9)	202 (19)
Jain	99 (33.8)	83 (26.4)	20 (26.7)	53 (20.9)	44 (13.9)
Other			5 (10.63)	117 (12.2)	137 (17.2)
Caste/tribe					
Scheduled caste	119 (25.8)	337 (26.6)	784 (23.5)	7859(19.1)	9328 (19.5)
Scheduled tribe	67 (23.9)	98 (25.3)	266 (23.3)	3990 (20.5)	3893 (18.8)
Other backward class		609 (20.7)	1578 (21.3)	14978 (17.7)	16171 (17.8)
Other	1698 (25.9)	813 (22.6)	1402 (20.6)	6956 (17.0)	6627 (17.3)
Don›t know	NA	NA	NA	413 (25)	461 (25.1)

*"NA" represents the non-availability of data. Table 2 religion variable has 8 categories for N.F.H.S.-III, IV & V but N.F.H.S.-I; has only five categories and the fifth one is others therefore, the fifth categories are merged and the fifth category includes (Buddhist/Neo-Buddhist, Jain and others). NFHS-II; has only four categories and the fourth one is others that is why the fourth categories are merged and the fourth category includes (Sikh, Buddhist/Neo-Buddhist, Jain, and others). In N.F.H.S.-I, caste categories only have three categories therefore OBC and others merged.

Class: Decreased from 25.9% in NFHS-I to 17.8% in NFHS-V, Other: Decreased from 22.6% in NFHS-II to 17.3% in NFHS-V, Don't Know: Introduced in NFHS-IV, showing a steady value around 25%.

Table 3. Logistic regression analysis showing associations of LBW with mother characteristics, N.F.H.S.-V

Characteristic	Unadjusted odds ratio	95% Confidence Interval	
Individual Age		LL	UL
<20	Ref		
20-34	0.75	0.70	0.81
35-49	0.68	0.63	0.74
Highest educational level			
No education	Ref		
Primary	1.04	0.97	1.11
Secondary	0.86	0.82	0.90
Higher	0.63	0.58	0.66
Household Religion			
Hindu	Ref		
Muslim	0.91	0.86	0.97
Others	0.92	0.85	1.00
Caste			
Scheduled Caste	Ref		
Scheduled Tribe	0.94	0.88	1.00
Other Backward Castes	0.87	0.83	0.91
Others	0.83	0.78	0.89
Type of residence			
Urban	Ref		
Rural	1.11	1.06	1.17
Region			
North	Ref		
Central	1.09	1.04	1.15
East	0.94	0.89	1.00
Northeast	0.76	0.70	0.82
West	1.03	0.95	1.10
South	0.77	0.72	0.83
Wealth index			
Poorest	Ref		
Poor	0.91	0.86	0.95
Middle	0.78	0.74	0.82
Richer	0.74	0.69	0.78
Richest	0.63	0.59	0.67

Table 3; Here, low birth weight was considered as the outcome variable and it was explained by numerous mother characteristics as predictor variables like age, education, religion, caste, residence, and wealth index. An unadjusted odds ratio with a 95% confidence interval was reported through a logistic regression model. Among the higher age group of the mothers there is less chance of the occurrence of LBW in comparison to the younger age group. Those with higher levels of education were less likely to have a chance of low birth weight in comparison to the lower and uneducated group. Muslims and other religions are less likely to have LBW than Hindus. Schedule tribes, Other Backward Classes, and others have less chance of occurring in the LBW than the Schedule Caste category. Rural was having an 11% higher chance of occurring LBW than urban (OR=1.11; CI: 1.06-1.17). Central and northeast regions had to have a higher chance of occurring the LBW in comparison to the northern region of India. Among the higher wealth index was less chance of LBW than lower.

Table 4. Association between "low birth weight" with 'tobacco' and 'alcohol consumption' in India (NFHS-5)

	Un-adj. OR	95% Confidence Interval	
Tobacco usage			
Yes	1.23	1.13	1.34
No	Ref	Ref	
Alcohol consumption			
No	Ref	Ref	
Yes	1.08	0.87	1.35

Table 4; Statistical model examining the relationship between tobacco and alcohol consumption with low birth weight. Individuals who use tobacco have 1.23 times the odds of the LBW occurring compared to those who do not use tobacco. This represents a 23% increase in odds associated with

tobacco usage. Confidence interval indicates that 95% confident the true odds ratio lies between 1.13 and 1.34. Since the interval does not include 1, the association between tobacco use and the outcome is statistically significant, suggesting a positive relationship. Individuals who consume alcohol have 1.08 times the odds of the LBW occurring compared to those who do not consume alcohol. This represents an 8% increase in odds associated with alcohol consumption. Confidence interval indicates that 95% confident the true odds ratio lies between 0.87 and 1.35. Because this interval includes 1, the association between alcohol consumption and the LBW is not statistically significant, suggesting that alcohol consumption might not have a substantial effect on the LBW.

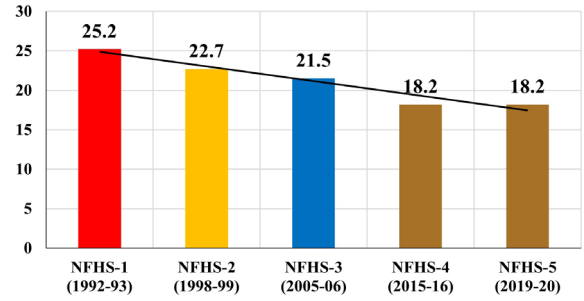

Figure 1. Trends of LBW in India

Figure 1; shows the pattern of low birth weight in India from 1992 to 2020, it has been almost three decades. Here, key facts were that NFHS-4 and 5 data showed an equal prevalence of LBW, 18.2%.

Figure 2; Data Heaping: - The quantitative data of birth weight was used to create line diagrams. The horizontal axis considers the actual birth weight which was reported by

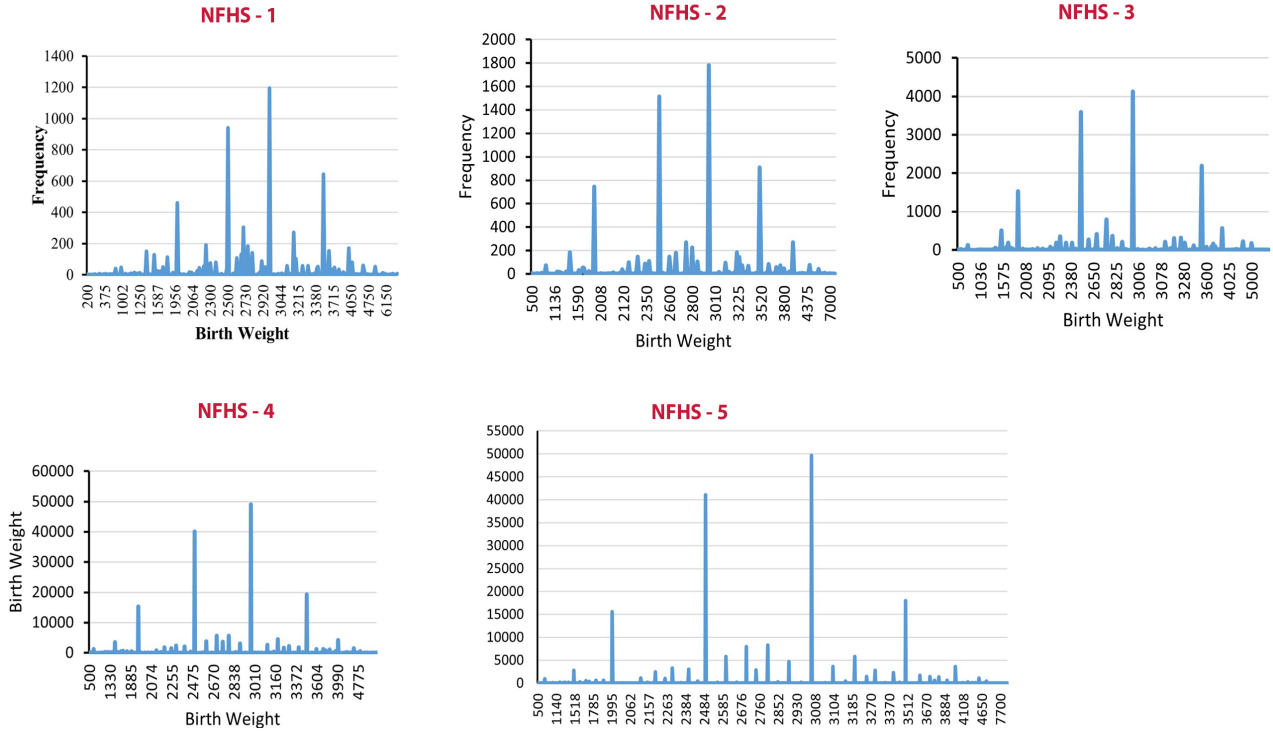

Figure 2. Shows the heaping pattern of birth weight of data in multiple of 500 grams in each rounds of national family health surveyed data.

the respondents and the vertical axis includes the frequency of each unit of the birth weight. There were five-line diagrams were created and each diagram shows the individual round of N.F.H.S. data pattern. Which was the almost same heaping pattern of birth weight of data in multiple of 500 grams in all fifth rounds of national family health survey data. Heaping was identified in data reporting problems and because of its prevalence of low birth weight may be under-estimated.[12] We focused on the data collected in the last three decades and the pattern of data shows almost similar types. Data missing may be one of the causes showing the reporting pattern of birth weight in multiple of 500 grams and serious problems at 2500 grams because it decides the estimates of 'low birth weight'.

Discussion

In this study, we analyzed trends and patterns of low birth weight (LBW) across states and sociodemographic groups using data from each round of the National Family Health Survey (N.F.H.S.). The prevalence of LBW has decreased over time, from 25.2% in N.F.H.S.-I to 18.2% in N.F.H.S.-V. Specifically, the rates were 22.7% in N.F.H.S-II, 21.5% in N.F.H.S.-III, and 18.2% in N.F.H.S.-IV and V.[16,17, 18] Despite this overall decline, the prevalence remains high, and the rates for the fourth and fifth rounds are comparable.[16, 17, 19] LBW babies are a global public health concern. Several socio-demographic and maternal factors are responsible for LBW babies in India to understand the trends of LBW.[18, 20] Maternal characteristics were key determinates (age, education, place, caste, religion, region, tobacco and alcohol consumed) to influence the prevalence of LBW.[21, 23] Reporting of birth weight and prevalence of low birth weight was underestimated especially in small areas like districts of India.[22]

In continuation, it was observed that still the prevalence of low birth weight is high in India including the risk factors and the data quality (missing & heaping). We need to emphasize that government policy and national health programs to understand the pattern of LBW. Here, we discussed the data from 1992 to 2020, in between the government of India launched various health programs to reduce the mortality and morbidity of newborn baby and their mothers.

A national program like Janani Suraksha Yojana (JSY) was launched on 12 April 2005. The objective of the JSY program was to encourage low-socioeconomic status women to give birth at health facilities and safe motherhood preventive measures to cash transfer.[24] "Janani Shishu Suraksha Karyakram (JSSK)" was launched in 2011 and the aim of JSSK was for the woman and her newborn to get critical treatment and 'zero out-of-pocket expenditure' within 48 hours.[25] "Navjaat Shishu Suraksha Karyakram (NSSK)" was launched in 2009 and the objective of the NSSK is to address crucial interventions of care at birth and basic neonate care & training programs.[26] "Home-Based Newborn Care (HBNC)" was launched in 2011 to make the provision of essential 'neonate care' to 'all neonates, special care of 'premature or LBW babies', initial detection of diagnosis followed by referral, and 'promotion to the family for good healthy practices' by 'ASHA' workers.[27] "Indian Newborn Action Plan (INAP)" was launched in 2014 and the objective was to link 'important interventions' across the continued care, from the 'antenatal

to postnatal' periods, focusing on natural connections between (reproductive, prenatal, neonate), and child health care.[28] In addition, many more government programs are running to improve maternal and child health to reduce mortality and morbidity. As we know numerous health programs are governed by national and state governments in India to reduce the risk of "low birth weight" in India. However recent data shows the prevalence of LBW is 18.2% which is still high and N.F.H.S.-I to N.F.H.S.-V trends of LBW is 25.2%, 22.7%, 21.5%, 18.2% and 18.2% respectively. The government needs to focus on special tasks to identify the reasons at the ground level.

Conclusion

Trends and the prevalence of LBW in India have declined over the past decades as evidenced by N.F.H.S.-I (25.2%), N.F.H.S.-II (22.7%) & N.F.H.S.-III (21.5%), in prevalence no changes have reported in N.F.H.S.-IV & V (18.2%) which is constant. The sociodemographic factors, alcohol, and tobacco consumption are shown as risk factors for LBW. Data heaping is a key challenge to give the correct estimate of LBW and it is found in each round of the data set.

Conflicts of interest

Authors declare 'no conflict of interest'.

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