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Original Research Article

Prevalence and associated risk factors of reproductive morbidity in Gujarat: evidences from National family health survey-IV

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ABSTRACT

Background: Every year 50 million women are affected by maternal morbidity and for at least 18 million of them these morbidities become long-term and are often debilitating. To reduce the maternal mortality ratio, as per the target 3.1 of Sustainable Development Goals (SDGs), India needs to continue strengthening its efforts for improving maternal health. The study aims to find out the prevalence and associated risk factors of reproductive morbidity in Gujarat.
Methods: The present study has utilised National family health survey-4 (2015-16) data. The survey provides information related to reproductive morbidity including maternal morbidity. Bivariate analysis with Chi-square test and logistic regression has been utilised to show the prevalence and risk factors of reproductive morbidity in Gujarat.
Results: Prevalence of reproductive morbidity during pregnancy is 58.1 percent. The morbidity was the highest during delivery (39.44%) and lowest in post-delivery period (12.97%). Looking to the risk factors, education, women's autonomy and experience of IPV were found to be significant predictors of such a morbidity.
Conclusions: Targeted measures directed to check violence against women can help in reducing reproductive morbidities among women in Gujarat. This can ultimately lead to reduction in maternal mortality level as targeted under SDG.

Keywords: Reproductive morbidity, Maternal mortality, Sustainable development goals, Prevalence, Risk factors

INTRODUCTION

Reproductive morbidity has been defined as any condition or dysfunction of the reproductive tract, or any morbidity which is a consequence of reproductive behaviour including pregnancy, abortion, childbirth, or sexual behaviour.[1] Every year 50 million women are affected by maternal morbidity and for at least 18 million of them these morbidities become long-term and are often debilitating.[2] According to WHO estimates, reproductive ill health accounts for 33% of the total burden of disease in women as compared to 12.3% for men.[3] In developing countries, although the men as well as women face a heavy burden of morbidity and mortality due to certain diseases, it is the women who are more seriously affected.[4] A cross-sectional study in India, Pakistan, Kenya and Malavi found that a significant burden of ill-health is suffered by women during and after pregnancy period that has largely been 'hidden' and/or underestimated.[5] In the past few decades important strides have been made relating to several health indicators in India. There are multi-dimensional changes in the sexual and reproductive health (SRH) situation in the country. The maternal, neonatal, and perinatal mortality are noted to havedeclined.[6] The maternal mortality ratio has declined over the past years, from 130 per 100,000 births in 2014-16 to 122 in 2015-17 to 113 in 2016-18 (SRS Bulletin, 2016- 2018). Similarly, the neonatal mortality rate declined from 49 per 1,000 births for the five years preceding NFHS-1 in 1992–1993 to 30 per 1,000 births

for the five years preceding NFHS-4 in 2015-2016.[7] Perinatal mortality has reduced to 36 per 1,000 pregnancies of seven or more months duration in 2015-2016, from 49 per 1,000 such pregnancies in 2005-2006.[7] The Government of India, through the various policies, laws, and programmes, has shown it's commitment to improving the sexual and reproductive health of it's population. Despite these efforts, however the pace of improvement in SRH outcomes has remained compromised.[6] According to a hospital-based study in USA severe maternal morbidity (SMM) was found in approximately 2.9 per 1000 births and half of it occurred due to postpartum hemorrhage.[8] Moreover, worldwide, SMM not only puts the woman's life at risk but her foetus/neonate may also suffer consequences of morbidity and mortality.[9] A study based on data from rural Bangladesh showed a high burden of obstetric morbidity.[10]

A community-based study in south India found that reproductive ill-health account for about fifty percent of the overall burden of perceived illness among the young women.[11] A community-based study in Gujarat reported that 11% of women had pregnancy-related problems.[12] In a study conducted in an Indian urban slum, symptoms of gynaecological morbidity were reported by as high as 88% of the women and the majority (72%) of women were found to be infected based on laboratory tests.[13] As per a study in Karnataka, during pregnancy period, 18 % of all women respondents reported at least one morbid symptom; 10% had symptoms like pre- eclampsia, and infection. During delivery, nearly 8% of respondents reported conditions like prolonged labour and haemorrhage. Altogether 23% reported one or more postnatal complications; symptoms of possible infection reported by about 17% and problems such as excessive bleeding and loss of consciousness reported by 11%.[14] Further it was showed that problems related to the reproductive system account for about half of the overall burden of perceived illness in the study population of young women.[11] Furthermore, in a hospital based study in Delhi, the incidence of severe maternal morbidity was shown to be 3.3/100 deliveries. Morbidities of eclampsia/pre-eclampsia, haemorrhage, sepsis, obstructed labour and other medical conditions were found.[15] It has been noted that national level surveys provide limited information on reproductive morbidity based on self-reported symptoms therefore the magnitude is very high.[16] A study based on data from understanding the lives of adolescents and young adults (UDAYA), found that about one-fourth of adolescent girls (10-19 years) were suffering from gynaecological morbidities. Looking to the findings from a study based on NFHS (1992-93) data noted that the proportion of deliveries with complications related to deliveries was higher in urban as compared to rural areas; the difference was statistically significant in the state of Gujarat as also in Andhra Pradesh, Assam, Delhi, Gujarat, Karnataka and Rajasthan.[17] Another study based on NFHS-3 data, almost one-third of the women reported symptoms suggestive of pre-eclampsia (difficulty with vision during daylight, and swelling of the legs, body, or face). These symptoms were higher among severely anaemic women, those who smoked tobacco, had diabetes or asthma, among obese women, Muslim women, Christian women with reference to their counterparts.[18]

The findings of a study based on DLHS-II data showed that nearly one-third of the women were suffering from some post-delivery complication and around half of them had sought treatment.[19] A study by Gogoi et al based on DLHS-III data showed that more than fifty percent of women experienced any complication during pregnancy and delivery. Moreover, mothers who received full antenatal care during pregnancy was found to be having less complications during the delivery and post-partum period. Looking to certain other studies on factors, it has been reported that obesity was associated with many pre, peri and postnatal complications in both mother as well as child.[20] A study by Kumar et.al has noted significant association between higher education levels and maternal complication.[21] Intimate Partner Violence was found to be linked with pregnancy complications specifically excessive bleeding, swelling of the legs, and convulsions.[22] According to a study by Sikder and others maternal age, nulliparity, a history of miscarriage or stillbirth, and lack of pregnancy wantedness were found to be associated with increased risk of obstetric complications.[10] Another study showed that conditions, such as haemorrhage, high blood pressure and convulsions during the third trimester period were of a serious nature; morbidities of fever and discharge or inflammation were reported by one-third of (out of 188) the women after delivery, and the latter condition rose significantly with age of the women.[23] It has been reported that maternal deaths have been described as the tip of the iceberg and maternal morbidity as the base; the actual burden of maternal morbidity is poorly known. For every woman who dies due to pregnancy-related causes, 20 or 30 other women experience acute or chronic morbidity.[6,24] The target 3.1 of sustainable development goals which is set by United Nations has aimed to reduce the global maternal mortality ratio to less than 70 per 100,000 live births (SRS Bulletin 2016-18). To be able to achieve this goal, India needs to continue strengthening of its efforts for improving maternal health. The study attempts to find out the prevalence of reproductive morbidity during reproductive periods along with the risk factor associated with the same.

METHODS

The present study has been carried out with the help of secondary data available from NFHS-IV. It should be noted that the present study has focused on morbidities experienced during pregnancy, during delivery and during post-partum period as covered under NFHS-IV. The following table gives description of the study variables (Table 1).

Table 1: Description and characteristics of outcome variables.

Outcome variables	Observations	Mean	SD	Min	Max
During pregnancy	5,736	0.34	0.47	0	1
Had difficulty with daylight vision	5,736	0.11	0.31	0	1
Had convulsions not from fever	5,736	0.08	0.27	0	1
Had swelling of the legs, body or face	5,736	0.28	0.45	0	1
During delivery	5,736	0.39	0.49	0	1
Experience a breech presentation	5,736	0.09	0.29	0	1
Experience prolonged labour	5,736	0.30	0.46	0	1
Experienced excessive bleeding	5,736	0.21	0.41	0	1
Post delivery	5,736	0.12	0.32	0	1
Massive vaginal bleed	5,736	0.12	0.33	0	1
Very high fever	5,736	0.12	0.32	0	1
Reproductive morbidity	5,736	0.57	0.50	0	1

The study has used 'prevalence of reproductive morbidity' as the dependent variable. There are some questions asked in NFHS-4 related to reproductive morbidity or complications experienced during reproductive period like; had difficulty with daylight vision?, had convulsions not from fever?, had swelling of the legs, body or face?, experience a breech presentation?, experience prolonged labour?, experienced excessive bleeding?, massive vaginal bleed? And very high fever. To measure the prevalence of reproductive morbidity, we reconstructed a dichotomous variable ('1' and '0') from the set of questions related to reproductive morbidity; where '1' is considered as "women having suffered at least one of the morbid conditions" and '0' is considered as "women not having experienced any complication out of these". We used descriptive statistics to find the preliminary results. Bivariate analysis with Chi-square has been performed to understand the prevalence and association of reproductive morbidity among women (15-49 years) in Gujarat. Furthermore, the logistic regression model was used to find out the risk factors associated with reproductive morbidity.

$$\Pr(yj \neq 0 \mid x_j) = \frac{(\exp(x_j\beta)}{(1 + \exp(x_j\beta))}$$

The data is analysed with the help of the STATA version 14.0 (STATA Corp LP College Station, Texas, USA, 2017). We estimate dichotomous logit for the dependent variables and considered 1% ($p<0.1$), 5% ($p<0.05$), and 10% ($p<0.001$) of significance level for all the statistical tests.

RESULTS

Prevalence of different types of reproductive morbidity during pregnancy period

One of the objectives of the study was to understand the prevalence of morbidity during different periods related to pregnancy among mothers (15-49 years) in Gujarat (2015-16). The (Table 2) delineates findings pertaining to the same. As is evident from the table, in Gujarat, out of the 5736 women 3,333 women (58.1%) had experienced any kind of morbidity at any time during her pregnancy or delivery and/or post delivery period. Furthermore, looking to the specific periods, the morbidity suffered was the highest during delivery (39.44%) followed by complications during pregnancy (35.21%) and problems after delivery (12.97%).

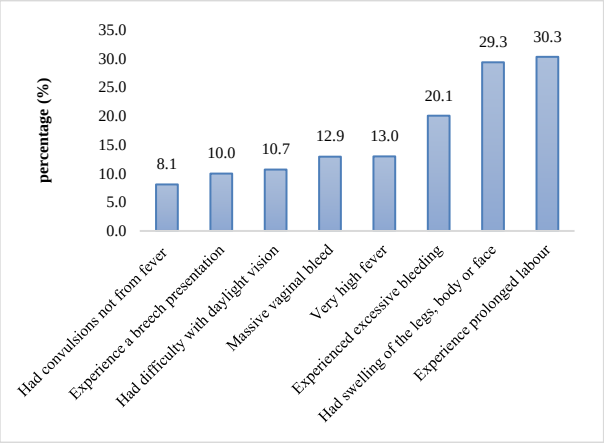

Figure 1: Prevalence of difference types of reproductive morbidity during pregnancy in Gujarat (2015-16).

The prevalence of morbid conditions was only marginally higher in rural (58.5) as compared to urban (57.5) areas. The (Figure 1) illustrates that the prevalence of different types of reproductive morbidity experienced by women (15-49 years) related to her pregnancy in 2015-16. It shows that as high as 30.3 percent and 29.3 percent of women had experienced prolonged labour and had swelling of the legs, body or face during pregnancy respectively. On the other hand only 8 percent had convulsions (not from fever) during pregnancy and 10 percent had experienced breech presentation during delivery.

Table 2: Prevalence of Reproductive morbidity during periods related to pregnancy among mothers (15-49 years) in Gujarat (2015-16).

Outcome variable	Total		Urban		Rural		Total sample size
	N	%	N	%	N	%	
During pregnancy	2,020	35.21	870	35.37	1150	35.1	5,736
Had difficulty with daylight vision	613	10.68	233	9.47	380	11.59	5,736
Had convulsions not from fever	464	8.09	175	7.13	289	8.81	5,736
Had swelling of the legs, body or face	1,683	29.34	746	30.33	936	28.59	5,736
During delivery	2,262	39.44	941	38.27	1321	40.32	5,736
experience a breech presentation	573	9.98	209	8.51	363	11.09	5,736
experience prolonged labour	1,737	30.29	704	28.60	1034	31.55	5,736
experienced excessive bleeding	1,150	20.05	447	18.19	703	21.46	5,736
Post delivery	744	12.97	321	13.03	423	12.92	5,736
massive vaginal bleed	741	12.92	341	13.87	400	12.20	5,736
very high fever	744	12.97	321	13.03	423	12.92	5,736
Reproductive morbidity related to pregnancy	3,333	58.1	1,415	57.5	1,918	58.5	5,736

Socio-economic and demographic profile

The socio-demographic profile of women aged 15-49 years eligible for interview regarding reproductive morbidities during the last 5 years preceding the survey has been presented in (Table 3). A higher proportion of women were Hindu (89.49%) and belonged to rural areas (57.11%). Half of the women were from the rich quantile and most of the women belonged to 20-24 years of age group. More than one-third of women had completed secondary and above level of education. The majority of the women had exposure to mass media. Moreover, 57.72% of the women were suffering from anaemia and 52.93% of the women reported having normal nutritional status. Interestingly one third of the women were married before 18 years of age. It was discouraging to find that 77.41 percent of the women did not have autonomy and 23.2 percent women had experienced intimate partner violence (IPV).

Prevalence of morbidity related to pregnancy among women according to background characteristics

The bi-variate analysis with Chi-square test was carried out in order to find out the overall prevalence of morbidities related to pregnancy in the state of Gujarat, as presented in (Table 4). It was found that as high as 58.1% of women in Gujarat had suffered pregnancy related morbidity. All the selected variables were significantly associated with prevalence suggesting that the morbidity related to pregnancy was higher among the women from rural (58.54%) background; from those who followed Hindu (58.29%) religion; those who belonged to SC/ST (59.96%) category; who were from middle class (59.21%) followed by rich class (59.05%) and poor (55.45%). Interestingly the prevalence decreased with increase in age of the women. it was highest among the women whose current age was less than 20 years (60.09%) and was lowest among women aged 25 years or more (56.21%). Surprisingly the prevalence was found to be the lowest among the illiterate women (54.15%) whereas it was highest among the primary educated women followed by women with secondary and above level of education. Morbidity prevalence was relatively higher among the women who were anemic (59.03%) and among those who were overweight (60.53%). The prevalence was highest among women whose age at marriage was 26 and above (62.71%). It was highest among women with parity upto 2 (60.11%) and decreased as the parity increased. Women who never had an exposure to mass media reported lowest prevalence (51.68%). Women with no autonomy reported marginally higher prevalence (58.45%). As one would expect, those women who had experienced IPV had much higher prevalence (72.04%) of pregnancy related morbidity as compared to those who did not have such experience.

Determinants of morbidity related to pregnancy: on studying the determinants of pregnancy related morbidity (Table 5), caste, education, women's autonomy and experience of IPV were found to be significant predictors of morbidity. This indicates that women belonging to castes other than SC/ST and OBC have higher risk of experiencing pregnancy related morbidities (OR:1.58; CI:1.03-2.40); those who have studied upto primary (OR:1.56; CI:0.99-2.45) as well as secondary & above level (OR:2.02; CI:1.35-3.03) have higher chances of experiencing such morbidities as compared to illiterate mothers. Moreover, women who have autonomy (OR:1.56; CI:1.08-2.25) in their lives are more likely to suffer from such conditions. Women who have experienced IPV (OR:2.34; CI:1.67-3.28) are also at higher risk of suffering from such morbidities.

DISCUSSION

To achieve the target of SDG 3.1 to reduce the global MMR, India needs to continue strengthening of its efforts for improving maternal health.

Table 3: Socio-economic and demographic profile of women (15-49 years) eligible for interview regarding reproductive morbidities in Gujarat in 2015-16.

Parameters	N	%	Parameters	N	%
Place of residence			**Nutrition status**		
Urban	2,460	42.89	Thin	1,561	27.86
Rural	3,276	57.11	Normal	2,967	52.93
Total	5,736	100	Overweight	1,077	19.21
Religion			Total	5,605	100
Non Hindu	603	10.51	**Age at marriage (years)**		
Hindu	5,133	89.49	<18	2,555	46.91
Total	5,736	100	19-25	2,600	47.73
Caste group			26 & above	292	5.35
SC/ST	1,573	28.4	Total	5,447	100
OBC	2,569	46.37	**Parity**		
Others	1,397	25.23	Two	4,152	72.39
Total	5,539	100	Three	889	15.49
Wealth index			Four and above	695	12.12
Poor	1,572	27.41	Total	5,736	100
Middle	1,274	22.22	**Mass media exposure**		
Rich	2,889	50.37	Never	902	15.73
Total	5,539	100	Sometimes	4,570	79.67
Women age (years)			Everyday	264	4.61
<20	1,775	30.95	Total	5,736	100
20-24	3,406	59.38	**Women autonomy**		
25 and above	555	9.67	No	4,440	77.41
Total	5,539	100	Yes	1,296	22.59
Education			Total	5,736	100
No education	1,199	20.9	**Intimate partner violence (IPV)**		
Primary	820	14.3	No	856	76.8
secondary	3,717	64.81	Yes	259	23.2
Total	5,539	100	Total	1,115	100
Anaemic status					
No	2,351	42.28			
Yes	3,209	57.72			
Total	5,560	100			

Table 4: Prevalence of morbidity related to pregnancy among women aged 15-49 years by socio-economic and demographic characteristics.

Socio-economic and demographic characteristics	N	%	Chi square p value
Reproductive morbidity related to pregnancy			
No	2,403	41.9	NA
Yes	3,333	58.1	
Place of residence			
Urban	1,415	57.51	<0.001
Rural	1,918	58.54	
Religion			
Non-Hindu	340	56.45	<0.001
Hindu	2,992	58.29	
Caste group			
SC/ST	943	59.96	<0.001
OBC	1466	57.06	
Others	826	59.11	
Wealth index			
Poor	872	55.45	<0.001
Middle	755	59.21	

Continued.

Socio-economic and demographic characteristics	N	%	Chi square p value
Rich	1,706	59.05	
Women age (years)			
<20	1,067	60.09	<0.001
20-24	1,954	57.37	
25 and above	312	56.21	
Education			
No education	649	54.15	<0.001
Primary	491	59.87	
Secondary and above	2193	58.98	
Anaemic status			
No	1,354	57.62	<0.001
Yes	1,894	59.03	
Nutritional status			
Thin	900	57.67	<0.001
Normal	1716	57.84	
Overweight	652	60.53	
Age at marriage (years)			
<18	1,506	58.93	<0.001
19-25	1,517	58.33	
>26	183	62.71	
Parity			
Up to two	2,496	60.11	<0.001
Three	491	55.25	
Four and above	346	49.71	
Mass media exposure			
Never	466	51.68	<0.001
Sometimes	2714	59.39	
Everyday	152	57.65	
Women autonomy			
No	2,595	58.45	<0.001
Yes	737	56.89	
Intimate partner violence			
No	452	52.79	<0.001
Yes	186	72.04	

Table 5: Odds Ratio from logistic regression model for determinants of reproductive morbidity during pregnancy periods among women aged 15-49 years in Gujarat.

Reproductive morbidity related to pregnancy	Odds Ratio	P>z	95% CI
Place of residence			
Urban	Ref. 1.23593	0.189	0.9012447-1.694905
Rural			
Religion			
Non Hindu	Ref. 0.8568867	0.524	0.5328488-1.37798
Hindu			
Caste group			
SC/ST	Ref. 1.23032	0.211	0.8889333-1.702812
OBC			
Others	1.577468	0.034	1.034747-2.404844
Wealth index			
Poor	Ref. 1.088347	0.664	0.7431367-1.593917
Middle			
Rich	0.8915672	0.598	0.582028-1.365728
Women's age (years)			
<20 years	Ref. 1.10041	0.573	0.7887444-1.535226

Continued.

Reproductive morbidity related to pregnancy	Odds Ratio	P>z	95% CI
20-24 years			
25 and above	1.365265	0.305	0.7528599-2.475823
Education			
No education	Ref. 1.559119	0.055	0.9910284-2.452859
Primary			
Secondary and above	2.024194	0.001	1.353901-3.026337
Age at marriage (years)			
<18	Ref. 0.7523861	0.066	0.5557539-1.018589
19-25			
26 and above	1.153341	0.7	0.5575196-2.385919
Anaemic status			
No	Ref. 1.239577	0.122	0.944518-1.626809
Yes			
Nutritional status			
Thin	Ref. 1.255523	0.159	0.9144229-1.72386
Normal			
Overweight	1.203151	0.409	0.7754243-1.866814
Parity			
Two	Ref. 0.9668169	0.867	0.6519052-1.433851
Three			
Four and above	0.8883655	0.628	0.5506561-1.433187
Mass media exposure			
Never	Ref. 0.9126339	0.655	0.6112077-1.362713
Sometimes			
Everyday	0.6617186	0.326	0.2904984-1.507311
Women's autonomy			
No	Ref. 1.558611	0.018	1.080284-2.248729
Yes			
Intimate partner violence			
No	Ref. 2.342707	0.000	1.674395-3.277766
Yes			

Note: Ref.=reference category.

NFHS-IV provides important information related to reproductive morbidity including maternal morbidity i.e., pregnancy related morbid conditions among women of reproductive age. The study has attempted to examine the prevalence and the factors associated with reproductive morbidities among women in Gujarat. Bi-vitiate analysis with chi square test and logistic regression analysis were carried out, with the help of STATA 14 version. The study showed that 58.1 percent of women had experienced any kind of morbidity at any time during their pregnancy or delivery and/or post delivery period. The morbidity was the highest during delivery (39.44%) and lowest in post-delivery period (12.97%). As high as 30.3 percent and 29.3 percent of women had experienced prolonged labour and had swelling of the legs, body or face during pregnancy respectively. On the other hand, only, 8 percent had convulsions (not from fever) during pregnancy. Looking to the determinants of pregnancy related morbidity, caste, education, women's autonomy and experience of IPV were found to be significant predictors of morbidity. Thus, the women belonging to castes other than SC/ST and OBC have higher chances of experiencing such morbidities (OR:1.58; CI: 1.03-2.40). Interestingly as the educational level increased, the risk of morbidities also increased.

Similar finding has been reported by other study.[25] Thus women with primary (OR:1.56; CI:0.99-2.45) as well as secondary & above level of schooling (OR:2.02; CI:1.35-3.03) had higher chances of experiencing such morbidities as compared to illiterate mothers. A study has also shown that women with primary education had higher risk of maternal complications as compared to illiterate mothers.[21] Moreover, women who have autonomy (OR:1.56; CI: 1.08-2.25) in their lives are more likely to suffer from such conditions. Those who have experienced IPV (OR:2.34; CI: 1.67-3.28) are also at higher risk of suffering from such morbidities.

CONCLUSION

To conclude the present study has highlighted the prevalence of specific types of pregnancy related morbidity among women in the state of Gujarat. It also suggests that health programmers need to focus on violence on women. Targeted measures in these directions can help in improving the reproductive health

and thereby reduce maternal morbidity among women in Gujarat.

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