

Association of Intimate Partner Violence and Nutritional Status of Women (aged 15-49 years) in West Bengal, India

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Abstract

Background: Violence against women- especially Intimate Partner Violence (IPV) and sexual violence is one of the major public health problems in both developing and developed countries. The aim of the present study was to investigate IPV and nutritional status of women ages 15-49 years in West Bengal, India.

Methods: We used National Family Health Survey data, 2015-2016 of West Bengal, India. 1981 sample was used for the present study. Nutritional status was measured by Body Mass Index (BMI) and anemia. IPV included physical, emotional and sexual violence with or without controlled behavior. Other socio economic and demographic factors like educational attainments, age of the respondent, occupation, caste, religion, wealth index, residential pattern etc. were considered in this study for possible predictors of IPV.

Results: The study revealed that prevalence of underweight and anemia among women in West Bengal, India was 20% and 20.1% respectively. More prevalence of underweight and anemia were observed among women who were exposed to physical, emotional and sexual violence by their intimate partner. Though we did not find any significant association of IPV and nutritional status, however a significant association was found between educational attainment and IPV. Study revealed that chances of underweight and anemia among women decreased with increased educational level of women. Respondents belonging in rich family were more likely to have better health status among women in West Bengal. No significant association was found between anemic status of women and their age, educational attainment and occupation. However, logistic regression model demonstrated that Muslim and other women were more likely to have anemia than Hindu women.

Conclusions: The study concluded that IPV played an important role in increasing likelihood of women's nutritional and anemic status. The study also showed that some socio-economic and demographic factors were predictors of women's nutritional and anemic status. Our findings can help government and NGOs for taking health policy to improve the health status of women aged 15-49 years.

Keywords: Partner violence; Nutritional status; Anemia; Women; West Bengal.

Abbreviations: BMI: Body Mass Index; CI: Confidence Interval; HL: Hemoglobin Level; IPV: Intimate Partner Violence; NFHS-4: National Family Health Survey; NGO: Non-Government Organization; OBC: Other Backward Classes; OR: Odds Ratio; SC: Scheduled Castes; SPSS: Statistical Package for the Social Sciences; ST: Scheduled Tribes; WHO: World Health Organization.

Introduction

Intimate Partner Violence (IPV) against women is a leading public health concern as it affects women's physical and mental health. IPV includes physical, sexual, and emotional violence by a current or former partner [1]. World Health Organization (WHO) reveals that IPV constitutes a major threat to health and rights of women. Approximately one-third of women have experienced physical or sexual violence by an intimate partner. Exposure to intimate partner violence is relatively high in Central Sub-Saharan Africa (65.5%), Western Sub-Saharan Africa (41.8%) and South Africa (41.7%) [2]. Approximately 170 million children from low- and middle-income countries, who are stunted, are due to the indirect effect of IPV. Many studies have been conducted to understand the association between nutritional status of children (stunting and wasting) and IPV [3-5]. IPV against women has an impact on growth and nutritional status of their children. Malnutrition is one of the leading risk factors for mortality in developing countries. Globally 12% of all deaths and 16% of all disability adjusted life years lost due to malnutrition [6] and one third of all disability- adjusted life years lost in low-income countries [7]. On the other hand, anemia is also a leading risk factor for a number of health-related outcomes, including poor cognitive development, weakened immunity against infection, maternal mortality, stunting and endocrine disruption [8].

In developing countries like India, burden of malnutrition falls disproportionately. In 1998-1999, anemia afflicted 74% of children and 52% of women of childbearing age, 47% of children and 36% of women of childbearing age were underweight [9]. According to NFHS-3, prevalence of underweight remains unchanged as 46% of children and 33% of childbearing women were underweight, while anemia increased to 79% among children and 57% among childbearing-aged women [9]. India is well known for biomedical and socioeconomic and demographic risk factors for malnutrition [10-12]. Many studies have revealed that intimate partner violence against women results in maternal depression, which in turn affects women's ability to take care for her child and may result into childhood malnutrition even in households that have adequate supply of food [13-16]. Various studies have predicted factors associated with the likelihood of domestic violence among women. Factors responsible for domestic violence are lack of responsibility [17], economic stress, hierarchical gender relations [18], poor household income, illiteracy, belonging to lower caste group [19], not having male child [20], age at marriage, number of living children, occupation of women and dowry [18,20,21].

Attention should be paid to women in reproductive age due to their unique role and potential influence on the family and the nation's workforce. In order to ensure corrective measures, it is important to investigate the partner violence and nutritional status of women especially in developing countries. Therefore, the aim of the present study is to investigate the association of IPV and health status of women ages 15-49 years. The present study also tries to determine the prevalence of malnutrition, anemia and IPV and their associated factors of women in reproductive age in West Bengal, India.

Methodology

Study area and population: The present data was based on National Family Health Survey (NFHS-4) conducted by International Institution for Population Science during 2015-2016. It provided various information on socio-economic and demo-

graphic variables of women aged 15-49 years, different types of violence, health status of women etc. The present study comprised of 17249 women of West Bengal, India. Amongst these, 1981 households were selected for IPV.

Data collection procedures: The fieldwork was carried out in two phases during the period 2015-16. The researchers used raw data of NFHS-4 for the state of West Bengal, India. In the present study, we considered only those women aged 15-49 years, who had conceived baby within the last 5 years. All the selected women were either the members of the sampled household or visitors who had stayed in the sampled household the night before the survey. NFHS-4 canvassed four types of questionnaires- household questionnaires, women's questionnaires, men's questionnaires, and biomarker questionnaires. As the present study was based on violence against women, the study was restricted to women's questionnaire only. The study was a comparative as well as ex-post-facto research.

Outcome variable: The outcome variable of the present study was women's nutritional status and anemia. Body Mass Index (BMI) was used to measure nutritional status, and it was classified into three classes; (i) under nutrition ($BMI < 18.5 \text{ kg/m}^2$, code=1), (ii) normal weight ($18.5 \leq BMI < 25 \text{ kg/m}^2$, code=2), and (iii) over nutrition ($BMI \geq 25 \text{ kg/m}^2$, code=3). Anemic status was measured by Hemoglobin Level (HL); (i) anemic ($HL < 12.0 \text{ g/dl}$, code=1), (ii) no anemic ($HL \geq 12.0 \text{ g/dl}$, code=0), blood specimens for anemia testing were collected by health investigators from eligible women and men age 15-49. In this study, we only used women who were not currently pregnant. Intimate Partner Violence (IPV) was also another outcome variable, and it was measured by physical, emotional and sexual violence by partner with or without controlled behavior.

Independent variables: The independent variables were respondent's occupation (not working, professional, professional, agriculturist, service and manual skilled labor), educational attainment (no education, primary, secondary and highly educated), age (15-19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49 years), caste (SC, ST, OBC and General); religion (Hindu, Muslim, Christian and others), place of residence (rural, urban) and wealth index (poor, rich).

Statistical analysis

Besides presenting the data in tabular form and carrying out Chi-square test to see the association between the categorical variables. Binary logistic regression models were utilized to find the effect of selected independent variables on outcome variables. Value of $p < 0.05$ was considered as statistically significant in the analysis. All statistical analyses were performed using SPSS 19.0 version.

Results

A total number of 1981 respondents were considered for analysis in this study. Among the participants 18.1% women belonged to age 25-29 years, followed by 30-34, 20-24, 35-39, 15-19, 40-44 and 45-49 years. Highest percentage of women were secondary educated (49.6%), followed by women who had no education (24.4%), who were primary educated (19.9%) and who were highly educated (9.5%). Approximately three-fourth of women was not working. Majority of women belonged to general caste (39.4%), scheduled caste (33.7%), OBC (15.1%) and ST (11.7%). Among the respondents, 73.2% of women belonged to Hindu, followed by muslim (23%) and other religions (3.8%). It was observed that 54.9% of women belonging in poor

family. The study also revealed that majority of women in West Bengal suffered from anemia (62.8%). Among the respondents, 32.4% of the respondents reported that they were victims of physical violence, followed by emotional violence (14.1%) and sexual violence (5.3%). Around 45% of women were controlled by their spouse/husbands. It was found that 21% of women were undernourished and 20% were over nourished (Table 1).

The women who had experienced IPV (including controlling behavior and excluding controlled behavior) were more likely to be underweight and anemic. No significant relationship was

found except the association between IPV (excluding controlled behavior) and nutritional status (underweight and overweight). The study also revealed that respondents who experienced emotional, physical or sexual violence were more prone to become under weight than over weight. The study also revealed that women who were controlled by their husbands were more prone to be overweight. Women, who were exposed to emotional, physical, and sexual violence and were subject to controlling behavior of spouse/husband, were prone to be more anemic than women who were never exposed to violence as shown in Table 2.

Table 1: Socio-demographic and economic characteristics, exposed to intimate partner violence and nutritional status of the women aged 15-49 years, West Bengal, India.

Factor	Categories	N	%	Categories	N	%
Age-Groups	(15-19) years	249	12.6	(35-39) years	265	13.4
	(20-24) years	335	16.9	(40-44) years	206	10.4
	(25-29) years	359	18.1	(45-49) years	227	11.5
	(30-34) years	340	17.2			
Educational attainments	No education	483	24.4	Secondary	982	49.6
	Primary	395	19.9	Higher	121	6.1
Occupation	Not working	1480	76.0	Service	79	4.1
	Professional	61	3.1	Manual skilled	185	9.5
	Agriculture	142	7.3			
Caste	SC	552	33.7	OBC	247	15.1
	ST	192	11.7	General	647	39.5
Religion	Hindu	1451	73.2	Christian	15	.8
	Muslim	455	23.0	Others	60	3.0
Residence	Rural	1467	74.1	Urban	514	25.9
Wealth Index	Poor	1087	54.9	Rich	894	45.1
Anemia	Not anemic	726	37.2	Anemic	1223	62.8
Physical violence	Yes	546	32.4	No	1139	67.6
Emotional violence	Yes	237	14.1	No	1448	85.9
Sexual violence	Yes	89	5.3	No	1596	94.7
Controlled behavior	Yes	770	45.7	No	915	54.3
BMI	Underweight	419	21.2	Overweight	395	20.0
	Normal	1158	58.7			

Note: Data extracted from NFHS 4

The prevalence of intimate partner violence (including controlled behavior) was observed to be high in the age group 25-29 (19.8%). A high prevalence of IPV was observed among women who had primary (28.5%) and secondary (36.7%) education. Fewer cases of IPV were observed among women who were highly educated. The present study revealed that as the educational attainment among women increased, IPV among women decreased ($p < 0.001$). Fewer percentages of women engaged in professional job and service reported IPV than women who were not working, agricultural labor and manual skilled labor. The study also showed significant association of IPV and oc-

Table 2: Nutritional level wise intimate partner violence against women by nutritional status.

Intimate partner violence (including controlling behavior)	χ^2	Under weight	Overweight	χ^2	Anemic	χ^2
Yes		189 (49.3)	194 (50.7)	0.784	619 (63.5)	0.574
No		135 (45.9)	159 (54.1)		423 (61.7)	
Intimate tribal violence (excluding controlled behavior)						
Yes		122 (54.5)	102 (45.5)	5.854*	380 (64.3)	0.961
No		202 (44.6)	251 (55.4)		662 (61.9)	
Emotional						
Yes		55 (17.0)	48 (13.6)	2.665	153 (65.1)	0.659
No		269 (83.0)	305 (86.4)		889 (62.3)	
Physical						
Yes		113 (53.8)	97 (46.2)	4.321*	346 (64.0)	0.513
No		211 (45.2)	256 (54.8)		696 (62.1)	
Sexual						
Yes		17 (54.8)	14(45.2)	0.634	57 (64.0)	0.069
No		307 (47.5)	339 (52.5)		985 (62.7)	
Controlled behavior						
Yes		145 (47.5)	160 (52.5)	0.022	477 (62.8)	0.008
No		179 (48.1)	193 (51.9)		565 (62.6)	

Note: Data extracted from NFHS 4

cupation of respondent. Higher prevalence of IPV was observed among women belonging to General Caste (42.3%), followed by SC (33.9%), OBC (13.6), ST (10.2%). In the present study, majority of Hindu women reported intimate partner violence against them. The study also observed a significant association of IPV and residential pattern of respondents. Majority of women were residing in rural areas reported intimate violence against them (78.8%). The higher prevalence of IPV against women were found, who belonged to poor wealth index. The study also depicted that younger woman experienced more intimate partner violence than old women except few cases. The results showed significant association between nutritional status and respondent's age. Women belonging to age groups 45-49 years (68.8%) and 15-19 years (64.5%) were more prone to be anemic than to women in other age groups. Respondents with no education suffered more from underweight (68.7%) and anemic (65.6%) as shown in Table 3.

Table 3: Nutritional level wise intimate partner violence against women by socio-economic and demographic factors.

IPV (including controlling behavior)	χ^2	Underweight	Overweight	χ^2	Anemic	χ^2	IPV (including controlling behavior)
Woman's age							
15-19	49 (5.0)	7.679	97 (88.2)	13 (11.8)	97.458**	156 (64.5)	9.019
20-24	165 (16.7)		78 (67.2)	38 (32.8)		201 (61.1)	
25-29	195 (19.8)		65 (46.8)	74 (53.2)		223 (63.0)	
30-34	193 (19.6)		57 (38.3)	92 (61.7)		192 (57.5)	
35-39	153 (15.5)		48 (44.0)	61 (56.0)		172 (65.4)	
40-44	99 (10.0)		36 (40.0)	54 (60.0)		125 (61.6)	
45-49	133 (13.5)		38 (37.6)	63 (62.4)		154 (68.8)	
Education							
No education	203 (23.6)	86.174**	145 (68.7)	66 (31.3)	53.375**	313 (65.6)	4.284
Primary	170 (28.5)		83 (50.9)	80 (49.1)		235 (60.6)	
Secondary	219 (36.7)		181 (47.1)	203 (52.9)		608 (62.9)	
Higher	5 (0.8)		10 (17.9)	46 (82.1)		67 (56.8)	
Occupation							
Not working	692 (71.3)	20.622**	312 (50.2)	309 (49.8)	11.686*	905 (62.2)	12.340* (0.015)
Profession	29 (3.0)		8 (36.4)	14 (63.6)		37 (60.7)	
Agriculture	99 (10.2)		32 (71.1)	13 (28.9)		106 (75.2)	
Service	52 (5.4)		14 (46.7)	16 (53.3)		48 (63.2)	
Manual skilled	98 (10.1)		46 (59.7)	31 (40.3)		104 (56.8)	
Caste							
Schedule caste	282 (33.9)	10.257*	133 (59.4)	91 (40.6)	43.338**	357 (65.0)	6.562
Schedule tribe	85 (10.2)		54 (74.0)	19 (26.0)		130 (68.4)	
OBC	113 (13.6)		58 (57.4)	43 (42.6)		146 (59.8)	
None of them	352 (42.3)		104 (37.5)	173 (62.5)		377 (60.1)	
Religion							
Hindu	711 (72.0)	3.797	296 (49.1)	307 (50.9)	5.692	930 (65.2)	22.658**
Muslim	237 (24.0)		104 (57.5)	77 (42.5)		257 (57.2)	
Christian	8 (0.8)		4 (66.7)	2 (33.3)		12 (80.0)	
Others	31 (3.1)		15 (62.5)	9 (37.5)		24 (41.4)	
Residence pattern							
Rural	778 (78.8)	17.911**	358 (63.4)	207 (36.6)	104.514**	942 (64.9)	11.447**
Urban	209 (21.2)		61 (24.5)	188 (75.5)		281 (56.4)	
Wealth index							
Poor	583 (69.1)	11.162**	323 (72.4)	123 (27.6)	173.303**	720 (66.8)	16.846**
Rich	404 (40.9)		96 (26.1)	272 (73.9)		503 (57.7)	

Note: Data extracted from NFHS 4

It was found that the educational attainments of the respondents increased, prevalence of underweight and anemia more or less decreased. Underweight and anemic women were mainly engaged as agricultural labor. Women in professional jobs tend to be overweight. Prevalence of underweight was 71.1% among women engaged as agricultural labor and 50.2% among women who were not working. This was followed by manual skilled (59.7%) and service (46.7%) groups. Higher percentage of anemia was observed among women who were engaged as agriculture labor. Respondent prone to be underweight and anemic belonged to Scheduled tribes. The highest percentage of overweight was found among general caste women. Higher percentage of underweight and anemia were found among

Christian women. Respondents residing in rural areas tend to be underweight and anemic than in urban areas and the result was statistically significant. The study also revealed that respondents belonging to poor wealth index group were more prone to be underweight (72.4%) and anemic (66.8%) as shown in Table 3.

Table 4 shows the association of IPV and nutritional status through BMI and anemic status of respondents in West Bengal, India. We did not find any significant association of IPV and underweight or anemia. Adjusted odds ratios indicate that only controlling behavior of husband/partner and sexual violence of IPV were associated with an increased risk of being underweight, though no significant results were observed.

Table 4: Logistic regression showing effect of intimate partner violence on nutritional status of women in West Bengal, India.

Independent variables	OR	95% C.I for OR		OR	95% C.I for OR	
	Underweight	Lower	Upper	Anemic	Lower	Upper
IPV including controlled behavior						
No [®]						
Yes	0.901	0.488	1.662	0.997	0.605	1.645
IPV excluding controlled behavior						
No [®]						
Yes	1.378	0.523	3.629	1.211	0.539	2.721
Types of violence						
Emotional violence						
No [®]						
Yes	0.781	0.480	1.270	1.129	0.743	1.714
Physical violence						
No [®]						
Yes	0.759	0.326	1.764	0.806	0.395	1.647
Sexual violence						
No [®]						
Yes	1.355	0.688	2.665	0.716	0.412	1.245
Controlled behaviour						
No [®]						
Yes	1.154	0.718	1.854	1.084	0.725	1.620

Note: Data extracted from NFHS 4

Table 5: Logistic regression showing effect of socio-economic and demographic factors on different types of violence among women, West Bengal, India.

Independent variables	OR	95% C.I for OR		OR	95% C.I for OR	
	Underweight	Lower	Upper	Anemic	Lower	Upper
Socio-economic and demographic variables						
Caste						
SC [®]						
ST	0.793	0.503	1.252	1.185	0.767	1.830
OBC	0.745	0.470	1.183	0.956	0.659	1.387
General	1.100	0.754	1.604	1.045	0.781	1.399
Religion						
Hindu [®]						
Muslim	1.271	0.812	1.989	0.550**	0.392	0.772
Christian	.861	0.168	4.426	1.028	0.245	4.316
Others	.947	0.437	2.053	0.400**	0.218	0.734
Residence						
Rural [®]						
Urban	1.193	0.784	1.815	0.769	0.575	1.029
Age						
15-19 [®]						
20-24	1.524	0.817	2.844	0.896	0.499	1.608
25-29	1.989*	1.066	3.712	0.955	0.537	1.699
30-34	2.453**	1.287	4.673	0.741	0.413	1.327
35-39	2.420*	1.232	4.755	0.928	0.507	1.699
40-44	3.008**	1.475	6.134	0.905	0.483	1.696

45-49	3.687**	1.797	7.565	1.306	0.693	2.462
Educational attainments						
No education®						
Primary	2.276**	1.523	3.401	0.816	0.579	1.151
Secondary	2.452**	1.673	3.594	0.986	0.710	1.370
Higher	3.486*	1.275	9.531	1.016	0.562	1.838
Occupation						
Not working®	1.435	0.482	4.277	1.109	0.574	2.140
Profession	1.227	0.739	2.039	1.501	0.932	2.416
Agriculture	1.207	0.579	2.515	1.320	0.753	2.316
Service	0.923	0.589	1.448	0.750	0.514	1.093
Manual skilled	1.435	0.482	4.277	1.109	0.574	2.140
Wealth Index						
Poor®						
Rich	2.470**	1.690	3.609	0.630**	0.477	0.832
Constant	0.717			2.626		

Note: Data extracted from NFHS 4

In the present study, we found no significant association of underweight with caste, occupation status and religion of respondent were observed. The study also revealed that the chance of being underweight increased as respondent's age increased and the result was statistically significant except respondent's age group 20-24 years. Educational attainment of respondent played an important role in determining the nutritional status of women. The present study showed some association between IPV and educational attainment of the respondents. As the respondents got better education, chance of being underweight decreased. Wealth index also showed association with underweight and anemic status. Respondents belonging to rich wealth index group had chance of having better health status in West Bengal as reflected in Table 5. Similarly, no association of anemic status with caste, age, educational attainment, occupation of respondent were found. Respondent belongs to Muslim and others religions showed positive association with anemia (Table 5).

Discussion

Intimate partner violence and socio-demographic factors:

The present study tries to investigate the association of IPV and socio-demographic factors among women in West Bengal, India based on NFHS 4 data. Among the sample population, malnutrition is a major health problem. Percentage of underweight is higher among those women who are subjected to IPV along with controlling behavior, whereas the situation is reversed when we exclude the controlling behavior. Percentages of anemic women are higher among women subjected to intimate partner violence regardless of whether we include controlled behavior [22]. The study also revealed that controlling behaviors generate prolonged psychological stress. This is a known risk factor for oxidative stress, which results in anemia [23]. Chronic stress generated by controlling behavior of husband/spouse may be one of the reasons why women are more at risk of being anemic [24]. In other words, anemic women are more prone to victim of violence, though the result is not found to be significant. Many studies have found that physical and nonphysical IPV increases the risk of overweight/obesity of women [25-27].

Limitation: The present study was based on secondary data. It helps us to understand the status of women in West Bengal. Secondary data shows imperfect reflection of primary data. As secondary data is usually not collected for the same purpose as original researcher had, so sometimes the purpose of original researcher gets biased.

Conclusions

Our analysis is based on secondary and cross-sectional survey data. The present study finds that IPV plays important role in women's nutritional and anemic status. The study also focuses that socio-economic and demographic factor affects women's nutritional and anemic status. In the present study 62.8 percent of women are anemic in West Bengal and 21.2 and 20.0 percent of women are underweight or obese. The present study also found that women exposed to IPV have high chance of becoming underweight and anemic except in few cases.

Recommendation: The present study highlights the urgency of effective interventions to address violence against women and nutritional based policies and programs to fight against women and their future generation. The present study may help government and NGOs for taking health policy to improve the health status of women aged 15-49 years.

Declarations

Ethics approval and consent to participate: This study is based on the secondary data which is freely available in the public domain (<https://dhsprogram.com/data/>). The authors assert that all procedures contributing to this work comply with the ethical standards of the National Family Health Survey. The ethical clearance was scientifically followed and taken by International Institute for Population Sciences who have initiated and conducted the whole surveys throughout the India. All information is freely available in the survey report (<http://rchiips.org/nfhs/NFHS-4Report.shtm>). Hence, the local institutional review committee ruled that no formal ethical approval was required in this particular study. The survey received written informed consent from participants or their next of kin/legally authorized representative of them.

Consent for publication: Not applicable for this study.

Availability of data and materials: The NFHS-4 datasets are freely available at https://dhsprogram.com/data/dataset/India_Standard-DHS_2015.cfm?flag=0.

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

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Authors' contributions: SB, PB designed the experiment. SB, CSB, SB drafted the manuscript. GH, PB, MP, SB were involved in data interpretation and statistical analysis. SB, PB, MP, GH critically revised the manuscript. All the authors read and approved the manuscript.

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