Journal of Statistics Applications & Probability
An International Journal

http://dx.doi.org/10.18576/jsap/100110

The Main Factors of Intimate Partner Violence - A Statistical Study

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Received: 2 Sep. 2019, Revised: 21 Jan. 2020, Accepted: 13 Feb. 2020
Published online: 1 Mar. 2021

Abstract: In this present day, people have improved their lives from every angle. They have overcome many difficulties in their lives and becomes more civilised. Apart from that, human life has a very ugly, sad reality, that is, different types of violence that could occur with them. And amongst them, the most cruel is the Intimate Partner Violence or IPV. This type of violence could happen to both men and women. But generally, IPV mostly occurs on women, compared to men. In this kind of violence, the violence takes place on the victims by their intimate partners. For this reason, it is very much painful for the victims as it is done by their intimate partners. In this paper, we are trying to focus on the main causes for occurrence of IPV in India and Bolivia by applying the techniques of cross tabulation and multinomial logistic regression.

Keywords: IPV, cross tabulation, multinomial logistic regression, NFHS-3, emotional violence, physical violence, sexual violence

1 Introduction

From the old age to the new era, humans have improved the quality of their lives in all sides. They have touched the top peak of their socio economic status. They have made their society more cultural and civilized. Gradually, they have become more capable to overcome the hurdles of their lives. But in this situation, when humans are trying to triumph on every darkness in their lives and also have considerable success, there is a gloomy side too. That is the different types of violence that could happen to both men and women. Violence ensues in many ways, but the most atrocious and unbelievable is when it occurs from their intimate partners. This kind of violence, i.e., what is done by their intimate partners is called Intimate Partner Violence or IPV. Because this kind of violence occurs on the victims by their intimate partner, so obviously it is unexpected and unpleasant for them. It is so painful that the victim can not speak about this with someone else. There are three types of IPV, namely, Emotional Violence, Physical Violence and Sexual Violence. Which are briefy discussed below.

(i) Emotional Violence: In this kind of violence, partners emotionally hurt their counterparts. They always do something so that the victims face a shameful situation in front of everybody. Partners always try to have control over their counterparts. Victims cannot do anything in their lives as they wish. Even their partners decide with whom they can keep contact or be in-touch with. Meaning that they cannot freely associate with people. Sometimes, partners also isolate the victims from their family and friends too. Moreover, they cannot use their money which was earned by themselves in their own ways. They often need to take permission before expending money for their own needs. In this type of violence, victims are mentally broken down.

(ii) Physical Violence: In the case of physical violence, the victims are outraged to an extreme point by their partner. A partner physically assault their partner. Partners physically harm them by beating or pushing and in many other brutal ways. Sometimes, they use weapons to harm the victims.

(iii) Sexual Violence: In sexual violence, partners sexually harass the victims. They force victims to be involved in a sexual act against their partner's wish. They apply physical force to involve them in sexual activities. Sometimes, they force their associates to perform some kind of sexual acts in front of others. Which is very much disrespectful for the victims. As a result of sexual violence, victims often encounter different types of life risk or sex oriented disease like HIV.

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IPV is very awful, dangerous and pathetic for men and women. But it is much more worrying in the case of women in comparison to men. It can be seen in most of the times that IPV happens to women. Although, in this century there are some instances of women lifting up their voices against this vicious violence, but the number of such instances is not up to the satisfactory level. No doubt, the IPV entails a significant long term adverse effects on men and women - they get totally exhausted mentally and physically. The dreadful effect of IPV is not limited to the partners themselves, it extends to their children also. This kind of violence has a deep impression on their mind impelling them to carry on the dengerous memory of violence on their parents through out their entire lives.

2 Literature Review

Coker L Ann et al. (2000) [1] have found that out of 1401 eligible women 772 were experienced some type of intimate partner violence in a current, most recent or past intimate relationship with a male partner, they have used Multiple polytomous logistic regression for their research purpose. Decker. R Michele et al. (2009) [2] used logistic regression models for estimating odds ratios and 95% confidence intervals to show that women could face AIDS for intimate partner violence. It implies that if the partners of the women are violent, then their chances of being affected by HIV is high. Gina Dillon et al. (2012) [3] have noticed that the women whose partners are violent, those women more likely than other women to experience a range of psychological and physical symptoms and illnesses, for this review literature research work they have used 75 research papers. Godha Deepali et al. (2012) [4] found that child marriage is one of the most influential cause for IPV. They observed the association between child marriage and IPV through regression analysis. Gonzalez-Gil. D et al. (2006) [5] have used Systematic review and meta-analysis for showing that alcohol consumption and intimate partner violence. Hossain Mazeda et al (2014) [6] have found that IPV in conflict-affected areas can be reduced through concerted efforts to include men directly in violence prevention programming. Joyner Kate et al. (2011) [7] have found that the female who have faced IPV in their life are in primary care experience benefit from an empathic approach to assessing with the clinical, mental, social and legal aspects, their work is a type of project evaluation work. Koen Nastassja et al. (2014) [8] noticed a very high association between IPV and low infant birth weight in South Africa. They used frequency distribution, bivariate correlation analysis and multiple correlation analysis for the purpose of identifying the said association. Lee Minjee et al. (2014) [9] by using multivariate logistic regression analysis in Korea, found that in a heterosexual relationship, women are more prone to face Intimate Partner Violence than men. McGarry Julie et al. (2016) [10] have shown that intimate partner violence has a significant effect on older women's mental health. Meekers Dominique et al. (2013) [11] have used Probit regression models for showing that Bolivian women who have faced physical violence are more prone to experience symptoms of depression. Palermo Tia et al. (2013) [12] have shown that forty percent of women experiencing gender based violence previously disclosed to someone. Salihu HM et al. (2012) [13] in their study argued that the violence can be done in many ways, and one of the most serious and cruel ways is Female Genital Mutilation (FGM). In their study, they used Wald chi-square tests of independence to compare the differences in socio demographic characteristics between FGM and the non-FGM groups. Schafer John et al. (1998) [14] have used multistage probability sampling design for showing that in United States the high rates of intimate partner violence support the fact that the amount of intimate partner violence is substantial in that country. Tumwesigye Mbona et al. (2012) [15] have shown that drinking problem of male partners is a cause for physical intimate partner violence among women of Uganda by using multivariate analysis. Uthman A Olalekan wt al. (2009) [16] have shown that in Sub-Saharan Africa women are more prone to justify than men intimate partner violence against women by using meta analysis technique.

3 Objective of the Study

In most of the studies made so far, researchers have made an effort to identify the major factors responsible for the incidence of IPV. Most of them, to achieve the objectives of the studies, have applied either multivariate logistic regression or multiple logistic regression in their researches. But the application of multivariate logistic regression or multiple logistic regression in categorical data, where responses have more than two categories, seems inappropriate statistically. Hence, the authors of this study think a study applying more appropriate statistical techniques is highly needed to extend the literature. In this study, we have made an attempt to investigate the main factors which are responsible for the occurrence of IPV in India and Bolivia by applying cross-tabulation and multinomial logistic regression. By using the technique of cross-tabulation, we have tried to find out the significant covariates influencing the different response variables, while the significant influencing covariates for different categories of response variables

have been identified by employing the multinomial logistic regression.

4 Methodology of the Study

Statistical Techniques
For the purpose of analyzing the data, the following statistical techniques have been used.
Cross Tabulation
In order to assess the relationship among two or more variables, the technique of cross tabulation can be used. It is one of the most useful analytical tools for getting the idea of the dependency of the variables. Chi-square statistic is the primary statistic used for testing the statistical significance of the cross-tabulation table, from which we know whether the variables are independent or not. The joint frequency distribution can also be analyzed with the Chi-square statistic (χ^2) to determine whether the variables are statistically independent or if they are associated.

Multinomial Logistic Regression
After making the cross tabulation analysis, we have an idea about the variables which are mainly responsible for the occurrence of IPV. Thereafter, we have used the multinomial logistic regression. The multinomial logistic regression is used to predict categorical placement in or the probability of category membership on a response based on multiple covariates. The covariates can be either dichotomous or continuous. One fairly simple way to arrive at the multinomial logit model is to imagine, for k possible outcomes, running k-1 independent binary logistic regression models in which one outcome is chosen as a "pivot", and then the other k-1 outcomes are separately regressed against the pivot outcome. This would proceed as follows, if outcome k is chosen as the pivot,

$$\ln \frac{Pr[Y_i=1]}{Pr[Y_i=k]} = \beta_1 X_i$$
$$\ln \frac{Pr[Y_i=2]}{Pr[Y_i=k]} = \beta_2 X_i$$
$$\ln \frac{Pr[Y_i=k-1]}{Pr[Y_i=k]} = \beta_{k-1} X_i$$

Quantification of Significance
In the present study, we have considered five categories of response variables, amongst them, category "NO" has been treated as the reference category. The remaining four categories have been regressed against this reference category. If a covariate is found to be statistically significant at the 0.05 level for at least three categories, it is considered as the significant covariate of the response variable. However, in a situation where a covariate is found to be significant for only two categories, the decision regarding statistical significance of the covariate has been taken based on its p-values in all the categories. If the p-value of a covariate in two categories are below 0.05 and much closer to 0.00, such covariate has been treated as the significant covariate, while a covariate having two p-values below 0.05, but the other two remaining far above of 0.05, it is considered as the insignificant covariate for the response variable as a whole.

5 Data and Selected Variables

The data used in this study have been mainly collected from secondary sources. The data relating to IPV for Indian women have been taken from the dataset of the National Family Health Survey-3 (NFHS-3), while the data relating to IPV of women residing in Bolivia have been collected from the dataset of Demographic Health Survey (DHS). On the basis of relevant past studies and the availability of data in the datasets of NFHS-3 and DHS, we have selected some questions indicating the incidence of IPV and some covariates that may have significant influence on the occurrence of IPV in India and Bolivia. We have selected 8 questions and 21 covariates from the dataset of NFHS-3, and 8 questions and 14 covariates from the dataset of DHS for measuring the degree of IPV and identifying the factors responsible for IPV in India and Bolivia, respectively. The set of questions selected from the two datasets are not same, but they reflect the incidence of different types of IPV, namely, Emotional Violence, Physical Violence and Sexual Violence. Each of the responses of the selected questions has 5 categories as stated below. The selected questions (response variables) and covariates used in this study for both countries have been mentioned in the following paragraphs.

(**A**) **Response Variables for India**:
In this study we have used 8 questions taken from NFHS-3 women questionnaire, which are considered as the response variables. These eight response variables have been used for the quantification of IPV.
The selected response variables are as follows:

(1) Spouse ever threatened her with harm (D103B)
(2) Spouse ever pushed, shook or throw something (D105A)
(3) Spouse ever slapped (D105B)
(4) Spouse ever punched with fist or something harmful (D105C)
(5) Spouse ever kicked or dragged (D105D)
(6) Spouse ever tried to strangle or burn (D105E)
(7) Spouse ever threatened or attacked with knife or other Weapon (D105F)
(8) Spouses ever twisted her arm or pull her hair (D105J).

The categories of response are as follows:
"0" = "No".
"1" = "Often during last 12 months".
"2" = "Sometimes during last 12 months".
"3" = "Not in last 12 months".
"4" = "Yes but currently a widow".

(B) Covariates for India:
We have considered nineteen covariates which may be continuous or categorical. The selected covariates are as follows:
(1) Current age-Respondent (V012)
(2) Type of place of residence-Respondent (V025)
(3) Highest education level-Respondent (V106)
(4) Has radio (V120)
(5) Has television (V121)
(6) Religion-respondent (V130)
(7) Sex of household head (V151)
(8) Wealth index (V190)
(9) Total children ever born (V201)
(10) Current marital status (V501)
(11) Number of other wives (V505)
(12) Marital duration (grouped) [excludes: married gauna not perf (V513)
(13) Partner's education level (V701)
(14) Respondent's occupation (V716)
(15) Partners age (V730)
(16) Times partner gets drunk (D114)
(17) Did her father ever beat her mother (D121)
(18) Have ever told anyone else about violence (D128)
(19) Age at first marriage [include: married gauna] (S310C).

(C) Response Variables for Bolivia
In the present study, five questions (response variables) and fourteen covariates have been taken from the DHS dataset (couple data) for the selected South American country, Bolivia. These five response variables have been used for the quantification of IPV.
After eliminating all the missing values, we have worked with the remaining 2743 data from the data set. The selected questions are as follows:
1. Partner pushed or pinched respondent.(S1205A)
2. Partner beat or kick respondent.(S1205B)
3. Partner beat her with an object.(S1205C)
4. Partner tried to strangle or burn her.(S1205D)
5. Partner tried to force sex with her.(S1205E).

For each response, we have 5 categories. The categories are as follows:
1."No", 2."Yes often", 3."Yes: a few times", 4."Yes one times", 5."Dont know".

(D) Covariates for Bolivia
The selected fourteen covariates which may be continuous or categorical, are as follows:
1. Current age respondent.(V012)
2. Type of place of residence.(V025)
3. Highest education level.(V106)

4. Educational attainment.(V149)
5. Sex of house hold head.(V151)
6. Wealth index.(V190)
7. Total children ever born.(V201)
8. Age at first intercourse.(V525)
9. Partner's education level.(V701)
10. Respondent's occupation.(V716)
11. Partner's educational attainment.(V729)
12. Partner's age.(V730)
13. Drink alcoholic beverages.(S124)
14. Father of respondent beat her mother.(S1228)

6 Results and Discussions

India: Cross Tabulation Result

Table 1: Spouse ever slapped * Frequency of alcohol use cross tabulation

	Frequency of alcohol use			
Spouse ever slapped	Almost everyday	About once a week	Less often	Total
No	143	491	689	1323
Often during last 12 months	21	46	53	120
Sometimes during last 12 months	83	205	241	529
Not in last 12 months	38	95	161	294
Yes but currently a widow	12	25	30	67
Total	297	862	1174	2333

Table 2: Chi-square test

	Value	df	p value
Pearson chi-square	18.955	8	0.015

Here, S = Significant , I = Insignificant.
The other tables are presented as follows:

Table 3: Results on different states

	Response Variables							
Covariates	D103B	D105A	D105B	D105C	D105D	D105E	D105F	D105J
V012	I	S	S	S	S	S	I	S
V025	I	S	I	S	S	I	I	S
V106	S	S	S	S	S	S	I	S
V120	S	S	S	S	S	S	I	S
V121	S	S	S	S	S	S	S	S
V130	I	S	S	S	S	I	S	S
V151	S	I	S	I	I	S	I	I
V190	S	S	S	S	S	S	S	S
V201	I	S	S	S	S	S	I	S
V501	Cont	Cont	Cont	Cont	Cont	Cont	Cont	Cont
V505	S	S	I	S	S	I	S	I
V513	S	S	S	S	S	S	I	S
V701	S	S	S	S	S	S	I	S
V716	I	S	S	S	I	S	I	I
V730	S	S	S	S	S	S	I	S
D114	S	S	S	S	S	S	S	S
D121	S	S	S	S	S	S	I	S
D128	S	S	S	S	S	S	S	S
S310C	I	S	S	S	S	I	I	S

India: Multinomial Logistic Regression Result

By applying multinomial logistic regression, we are trying to find out the significant relationships between the covariates and the categories of the responses. From the analysis of cross tabulation result (see Table 3), it is observed that some covariates are statistically significant, whereas some are found to be insignificant, but one covariate is found constant, which is not considered in the multinomial logistic regression. Here, the response variables have k categories (k>2), and all the covariates are either dichotomous or continuous.

After analysing the multinomial logistic regression, we have obtained the following results.

Table 4: Response variable= "Spouse ever threatened her with harm" (D103B)

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V121, V190, V505, D128	V106, V151, D114, D121, D128	V151, V513, D128	V730

Table 5: Response variable= "Spouse ever pushed shook or throw something" (D105A)

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V120, V121, V190 V701, D114, D128	V106, V190, V505, D114, D128, V201, V716	V190, V513, D128, V025, V201	V106, V701

Table 6: Response variable= "Spouse ever slapped" (D105B)

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V106, V120, V190, V701, D114, D128, V201, V716, V151	V106, V701, V730, D114, D128, V201, V151	V106, V730, D114, D121, D128, V012, V201, S310C	V730

Table 7: (Response variable= "Spouse ever punched with fist or something harmful" (D105C))

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V106, V190, D114, D128	V106, V190, V701, D114, D121, D128, V201, V505	V106, V513, D128, V201, V025	

Table 8: (Response variable= "Spouse ever kicked or dragged" (D105D))

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V106, V190, D114, D128, V012	V106, V190, D114, D121, D128, S310C, V505	V190, V513, D128	V130

Table 9: Response variable= "Spouses ever twisted her arm or pull her hair" (D105J)

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V190, D114, D128, V106, V201, V701	V190, D114, D128, V106, V201, V701	V190, D114, D128, V130, V106, V513	

Table 10: (Response variable= "Spouse ever tried to strangle or burn" (D105E))

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V190, D128	D128, D121	V513	

Table 11: (Response variable= "Spouse ever threatened or attacked with knife or other weapon" (D105F))

often during last 12 months	Sometimes during last 12 months	Not in last 12 months	Yes but currently a widow
V190, D128, V130	V190, D128		V130

Table 3 depicts the results obtained from the cross tabulation analysis. It is observed from Table 3 that the following covariates, namely, has a television (V121), wealth index (V190), times partner gets drunk (D114) and have ever told anyone else about violence (D128), are found to be statistically significant for all the responses, implying that those four factors have major roles on the occurrence of IPV in India. It is also noticed from Table 3 that the covariates - highest education level-respondent (V106), has radio (V120), marital duration (grouped) [excludes: married gauna, not performed] (V513), Partner's education level (V701), Partners age (V730) and Did her father ever beat her mother (D121), are statistically significant in case of seven responses except the response: Spouse ever threatened or attacked with knife or other weapon (D105F). Which indicates that these six covariates also play a significant role in the incidence of IPV in India.

The results obtained from the analysis of multinomial logistic regression are presented in Tables 4 to 11. From the analysis of the results shown in the above mentioned tables, it is observed that there is no common covariate which is found to be significant for all the response variables. It is also noticed that there is no common covariate which is observed to be significant for all the 4 categories of a particular response variable. But it is observed that some covariates are found to be frequently significant in case of most of the responses. Those significant covariates are have ever told

anyone else about violence (D128), has radio (V120), wealth index (V190), has television (V121), highest education level respondent (V106), times partner gets drunk (D114), marital duration (grouped) [excludes: married gauna not performed] (V513), partner's education level(V701), current age-respondent (V012) and partner's age (V730). From the above analysis, it can be inferred that the above ten covariates have a significant role in the occurrence of IPV in India. Therefore, if we can control these factors, the occurrence of IPV will be reduced.

Bolivia: Cross Tabulation Result

Table 12: A

	Covariates						
Response variables	V012	V025	V106	V149	V151	V190	V201
S1205A	I	I	S	S	I	I	I
S1205B	I	I	S	S	I	S	I
S1205C	I	S	S	S	I	S	S
S1205D	I	I	S	S	I	I	I
S1205E	I	I	S	S	I	S	I

Table 13: B

	Covariates						
Response variables	V525	V701	V716	V729	V730	S124	S1228
S1205A	S	S	S	S	I	S	S
S1205B	I	S	S	S	S	S	S
S1205C	S	S	I	S	I	S	S
S1205D	S	I	I	I	I	S	S
S1205E	S	S	I	S	I	I	I

Bolivia: Multinomial Logistic Regression Result

Table 14: (Response variable= "Partner pushed or pinched respondent" (S1205A))

Yes often	Yes : a few times	Yes one time
S124	V025, V201, V716, V730, S124	V025, S124

Table 15: (Response variable= "Partner beat or kicked respondent" (S1205B))

Yes often	Yes : a few times	Yes one time
V106, V149, S124	V012, V201, V716, S124	V025, V190, V201

Table 16: (Response variable= "Partner beat her with an object" (S1205C))

Yes often	Yes : a few times	Yes one time
V149	V025, V201, V190, S124	V190, V729

Table 17: Response variable= "Partner tried to strangle or burn her" (S1205D)

Yes often	Yes : a few times	Yes one time
S1228	V149	V716, S124

Table 18: Response variable= "Partner tried to force sex with her" (S1205E)

Yes often	Yes : a few times	Yes one time
V025	V151, V716	V201

The results derived from the cross tabulation analysis are shown in Tables 12: A and 13: B. These tables show that covariates highest educational level (V106) and educational attainment (V149) are significant for all the responses. Whereas age respondent (V012) and sex of house hold head (V151) are found to be statistically insignificant for all responses. From this result, it can be concluded that highest educational level (V106) and Educational attainment (V149) have significant influence on the occurrence of IPV in Bolivia.

Tables 14 to 18 disclose the results obtained from the analysis of multinomial logistic regression. It is observed from those tables that the covariates: drink alcoholic beverages (S124), type of place of residence (V025), total children ever born (V201) and respondent's occupation (V716) are found to be significant for four responses out of five responses. Although the above covariates are not found to be significant for all the categories of a particular response but since they are observed to be significant in at least one of the three categories of the responses, it can be concluded that the above four covariates are mainly responsible for the occurrence of IPV in Bolivia.

7 Conclusion

From the analysis of the results derived for both countries, it can be concluded that the education level and drinking habit of the partners exert a significant role in the occurrence of IPV in India as well as in Bolivia. The sex of household head and current age of respondent have a significant influence on IPV in India, but they have no significant effect on the incidence of IPV in Bolivia. The ocupation of respondent considerably impacts the occurrence of IPV in Bolivia, but it has no significant influence on IPV in India. Moreover, the covariates - has television, has radio, wealth index, marital duration, did her father ever beat her mother and have ever told anyone else about violence have impacted the incidence of IPV in India significantly. Similar studies can be conducted for different countries.

Acknowledgement

The authors are grateful to the referees for their valuable suggestions.

Conflict of Interest

The authors declare that they have no conflict of interest.

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