

ORIGINAL ARTICLE

Exposure to firearm: impact on psychological health in central IndiaSaxena S¹, Varma RP², Soman B³¹MPH, ²Assistant Professor, ³Associate Professor, Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram

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Article Cycle

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Abstract

Background: The issue of firearm exposure is one of the widespread prevailing problems in today's world but at the same time it is least talked about. Its psychological effects vary from person to person and the degree of consequences has many variables to measure. The firearm exposure not only implies to an individual but also the whole gambit of social structures around him. **Methods:** A cross-section study on 505 subjects of the age group 20-45 years from central India was done, where routine social order depends upon massive armament of the citizen. We studied the relationship between socio-demographic variables and firearm exposure with variables of psychological domain of the WHOQOL-BREF. Multivariate logistic regression model was constructed to find the correlates among them. The objectives of the study were to study the attributes of socio demographic variables, which affects psychological health and exposure to firearms in the study population and to see the impact of exposure to firearms on psychological health. **Results:** Higher education is associated positively with psychological health. The desire to have a gun (OR=1.988, CI 1.306-3.024, p-value <.005) is showing a significant association with low psychological domain score of QOL. Being married (OR=.556, CI .344-.901, p-value <.005) and not living in a joint family (OR=.581, CI .379-.891, p-value <.005) is associated with poor psychological health. **Conclusions:** Higher education is the best predictor for good psychological health. Semiskilled workers (farmers and laborers) should be prioritized as high risk groups for adverse life situations. Firearm exposures have a significant impact on psychological health. So, policies directed at rural population should target at specific needs of community.

Key Words

Firearms; Psychological Health; Mental Health; Gun

Introduction

The issue of firearm exposure is one of the widespread prevailing problems in today's world but at the same time it is least talked about. Physical injuries by firearms are not very common but the undermined social, economic and psychological consequences of the victim, perpetrator and the society are immense and highly traceable. Even the mere presence of

firearms affects not only to the person carrying it but to whole gambit of social structure around him.(1,2) Today in developing countries like India society social order depends upon massive armament of the citizen, but there is not much literature regarding its impact on psychological health. Brain controls the body but when firearms controls the body, brain acts as a uncontrolled

organ leads to a large number of psychological disorders which are still not observed by any organization either govt. or non-govt organizations.

Exposure to firearms can have psychological effects in many ways. Carrying a firearm increases the risk of being involved in violence perpetration and victimization with firearms both in terms of the carrier and other people. (3,4,5,6) Moreover, firearm availability has been used as proxy measure for committed suicides and homicides. (4,7,8) Also mere presence of firearm leads to increased aggressiveness, stress, anxiety, insecurity and depressed mood, feeling of being in an insecure environment which are associated with various psychological problems.(9) Firearm exposures is associated with increased tobacco, cigarettes and other substance abuse which may further aggravate the psychological consequences.

People carrying firearms are more prone to loss their social support. As, In the long term, the individual's reputation as a dangerous person is reinforced, with associated psychological reactions and increased likelihood of loss of social support.(10,11) Being a highly durable consumer product, gun stock changes slowly over time.(12) So, the exposure to firearm keeps increasing with course of time. The present study aimed to study the different socio demographic variables, which affects exposure to firearms in this community and to observe the various attributes of exposure to firearms which influences the psychological health.

Aims & Objectives

The objectives of the study were to study the attributes of socio demographic variables, which affects psychological health and exposure to firearms in the study population

and to see the impact of exposure to firearms on psychological health.

Methods

This descriptive cross-sectional, community based study was conducted in the Chambal area of Madhya Pradesh (district Bhind) which is having agriculture as main occupation for most; the economic resources of the area are inadequate to support the population. Holdings are small. There is little irrigation and there are no subsidiary industries. Literacy level is low and majority of population is living in rural areas. It is well known fact that this region has been subjected to depredations of dacoits since ages. Firearm possession is a matter of pride here. Nearly half of the total firearm shops of the whole country are in Chambal-Gwalior region and more than 102 firearms shops are in Bhind district alone. There are more than 25,000 licensed weapons in this district alone and estimating unlicensed is beyond the scope. Moreover even the State Government has used the special interest of people in firearm for serving various purposes, like clearing electricity bills (The fear of losing their licenses will force people to pay the electricity bill) and for family planning (want a gun? Get a vasectomy).(13,14)

The study had obtained clearance from Technical Advisory Committee and Institute Ethical Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala prior to data collection. The estimation of sample size was performed using the Epi-info version.6 (stat calc) and the calculated sample size was 550.(15) The sampling plan was based on the population proportion to size sampling in rural and urban areas. Twenty clusters (wards) were then randomly identified each with 22 participants in age group between 20 to 45 years. In each cluster 22 households were selected (11 each in north and south direction)

from the probable midpoint of the cluster. One male and one female were approached from every alternative household starting with male from the first household. In case of more than one eligible candidate in a household the eldest eligible candidate was selected.

The data was collected after taking an informed consent through a pre-designed, pre-tested, semi-structured questionnaire in local language from 01st July 2010 till 31st August 2010. Psychological health is measured by using psychological domain score of WHOQOL-BREF has been validated in Hindi in 1998 in north India (New Delhi).(16)

The mean score of all items in psychological domain is multiplied by four to obtain a 'domain score' that can range from 4 to 20. This can further be transformed in 0-100 scale using WHOQOL-Bref user's manual guidelines. Exposure to firearms was measured through a questionnaire which included eight questions concerning about attitudes and behavior towards owning firearms. Data were entered with Epi-data version 3.1 and scrutinized in the same software. It was then exported to SPSS for windows version 17.0 for analysis purpose. The baseline characteristics were analyzed by descriptive statistical principles, for example mean age, sex proportion, educational status, income, etc. Bi-variate analysis of the independent variables, with respect to the dependent variable were done by cross tabulation and testing by Chi square test. For adjustment of possible interaction and confounding factors multivariate analysis was considered to arrive at a final model. The effect measure used in the analysis is Odds Ratio and 95 percent confidence interval. The association was considered statistically significant when the null value for the effect measure came within the confidence limit or with a p value of less than 0.05. Results with high strength of association and significant or near significant

p value in bi-variate analysis were considered for the final modeling purpose.

Result

Out of the 544 subjects who agreed to participate in the study in the study, 39 questionnaires were avoided because there were more than 20 percent incomplete items of the WHOQOL-Bref. Hence we report data for 505 subjects (84.8 percent). Also, two clusters were rejected due to law and order problem and alternative clusters (adjoining village with similar population) were selected. In some clusters due to cultural norms it was not possible to interview enough females, so there is overrepresentation of females in other clusters to balance the ratio. The mean age of the sample population was 31.7 years (SD 7.7).

The mean age for males was 31.80 (SD 7.6) which was little higher in comparison to females 31.54 (SD 7.8). For further analysis age was grouped into three categories as: 20-29 years, 30-39 years and 40-45 years for comparison with other nation's data. For analytical purpose the categories- never married, divorcee/separated and spouse died were clubbed together as single. Total number of family members varied from one to thirty five. By taking median value which was six, this variable was dichotomised in small family and large family. For analysis purpose caste was clubbed into two groups as Dominant (Thakurs and Brahmins) and Non-dominant (Jain and others). For analysis purpose farmers and labourers were clubbed as semiskilled, private job, business and government employee were clubbed as skilled and students, unemployed and others were clubbed as others. According to monthly expenditure per month median 4000 (range 200-99999) sample was separated into lower and higher SES ([Table1](#)).

Attributes of firearm exposure: All the questions related to firearm exposure showed

highly significant association with gender. As this was expected, no further gender specific analysis was carried out. Firearm exposure was further analysed by focusing on the location (rural, urban). A new variable predilection towards firearm was formed by summation subjects who either had gun or have a desire to have a gun ([Table 2](#)). Further firearm related questions were correlated with psychological domain scores ([Table 3](#)).

Relation between predictor and dependant variables: bi-variate analysis.

For analysing the education categories (uneducated, primary education, secondary education and higher education) and occupation categories (semiskilled, skilled, housewife and others) three dummy variables were formed and used for multivariate logistic regression analysis. All the predictor variables were cross tabulated with psychological domain. Those which were found significant are listed here in [Table 4](#).

Multivariate logistic regression analysis: Variables which were significant in bivariate analysis and also some variable which the researcher thought to be useful were analyzed with Multivariate logistic regression analysis ([Table 5](#)).

Discussion

The objectives of the study were to study the attributes of socio demographic variables, which affects psychological health and exposure to firearms in the study population and to see the impact of exposure to firearms on psychological health. As described earlier males were found to score higher in psychological domains than females, this may be due to patriarchal nature of the society. When compared across marital status those living as single scored higher than married in psychological domain. This association was

found to be significant with psychological health in bi-variate analysis and this relationship remained significant in multivariate analysis too. The reason behind this may be the increased work load and responsibilities in married to look after their families and earn more.

Our study found that subjects living in joint family scored higher in psychological domain as compared to nuclear and extended. This relationship was found significant in bi-variate analysis with psychological health. One other study also found that living in multi-generational family structures should be viewed as a form of social support and act as a buffer against certain deleterious health outcomes of daily life. (17) Size of family was found not to have much impact on psychological health. As observed in previous studies our study also found the positive correlation between SES and psychological health.(18,19,20) Education play a major role in predicting psychological health as the uneducated scored least in psychological domain and the higher education group scored the highest and this relationship remained so after multivariate analysis. These findings were concurrent with other studies.(15,21,22) Like previous studies our study also found that among various occupation groups farmers and labourers were found to be the most vulnerable and scored lowest in psychological health. (23) Subjects of dominants caste scored higher in psychological domain, this finding contradicts a study from Nepal where they found that dalits /non-dominants have high perception score for general health and social functioning. This may be attributed to the differences in the caste perceptions and practices between the two areas. Rural people had poor psychological health as compared to urban people. This finding is in the line of previous studies.(15,22)

There was a shortage of data showing association between firearm exposure and psychological health. The rate of knowing someone who owns a firearm (69%) was similar to a study done among students in Turkey. Hearing sound of firearm explosion was found to be significantly positively correlated with psychological health domain.(23) these finding may be due to general acceptability of firearms in the community because of long term exposure and accommodating with these circumstances as a part of routine life. These findings were in line with other studies.(9,12) Most important finding was the association of desire of owning a gun among those who were not having it. This association was found to be significantly negatively correlated with psychological health. This association retained significant in multivariate analysis with psychological domain only. The reason behind this desire of owning a gun might be the higher perception of threats coming from the environment. The increased stress level might cause the increased desire for owning a gun.(24)

Rural areas have same firearm possession and firearm handling rate as urban areas. Mortality and morbidity associated with firearm are higher in urban areas than, but even than people living in rural areas have significantly higher desire to own a gun. This desire to own a gun is showing a significant association with psychological health. The probable reasons behind this may be that as most of the rural areas are out of reach from main roads and emergency security from police and as there is a lot of rivalry because of land and other factors among nearby villages their urge to carry a weapon can be explained. Most of the rural population was semiskilled laborers (farmers and laborers). Lower education and earning resources is making them more vulnerable for living in a poor psychological health. Rural habitants are more vulnerable for

psychosocial problems, from public health point of view, rural habitants should be considered separate from others and specific health programs targeting them should be considered.

To our knowledge, our study is the first in developing countries to show the association between socio-demographic variables, firearm exposure and psychological health. Instead of asking 'why this individual has poor psychological health?' we should ask 'why does this population have this level of poor psychological health. In the classic work of Rose, he showed the society is consistently responsible for most intimate of individual acts society. Individuals may come and go, but society rates remain constant and hence no matter how many counseling hotlines for some particular problem we might set up, the rates will not change until we change society. (25) We found that psychological health is good and effective way to understand the daily life problems of general population. Although it may be difficult to improve the factors on which psychological health resides, there are potential measures to enhance psychological health in communities.

Strengths and limitations of the study: To our knowledge no authentic studies have been undertaken assessing the relationship psychological health in the context of exposure to firearm in India. Implications of firearm exposure on public health are usually never looked into in India. The study effectively covered urban and rural areas in a generally difficult area of the country. Since it was a self-administered questionnaire survey, the credibility of the answers may be questioned. There was no way of ascertaining if the subjects truthfully answered the questions. Limited ability to compare with other data and lack some useful information. Telescoping might have played a role in the reporting, as the recall period was two weeks.

Conclusion

Since socio-demographic factors, firearm exposure has a significant impact on psychological health. The links between these factors need to be understood and the missing threads need to be worked upon. In this context, an important task for future researchers would be to identify the connection between the characteristics of vulnerable sections and public policies that are more likely to serve the common interest, and improving psychological health. So, community specific factors should be identified and taken in account in improving psychological health.

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Tables

TABLE 1: DESCRIPTION OF SOCIO-DEMOGRAPHIC VARIABLES AND THEIR ASSOCIATION WITH PSYCHOLOGICAL DOMAIN SCORE.

Variables	Total n (%)	Psychological domain score	
		Mean	SD
Location (n=505)			
Rural	58.4	50.67	14.2
Urban	41.6	52.30	14.5
Gender (n=505)			
Male	53.5	51.49	15.3
Female	46.5	51.18	13.2
Age groups (n=505)			
20-29	43.0	51.84	14.6
30-39	35.0	49.69	13.7
40-45	22.0	53.04	14.7
Marital status (n=505)			
Single	24.6	53.83	15.3
Married	75.4	50.54	14.0
Type of family (n=505)			
Joint/non-nuclear	71.1	52.45	14.8
Nuclear	28.9	48.99	13.1
Family size (n=505)			
Small family	50.5	51.25	14.2
Large family	49.5	51.45	14.6
Education (n =505)			
Uneducated	7.5	45.61	15.5
Primary (1-4years)	13.5	52.20	13.3
Secondary (5-10years)	35.0	48.28	13.0
Higher	44.0	54.52	14.7
Occupation (n=505)			
Semi-skilled	42.6	48.75	14.2
Skilled	20.9	56.68	14.6
Others	16.1	53.08	13.4
Housewives	20.4	49.91	13.5
Caste (n=505)			
Dominant	59.0	52.60	14.1
Non-dominant	41.0	49.55	14.5
Socio Economic Status (n=505)			
Low	61.4	49.51	14.2
High	38.6	54.27	14.0
Earning members (n=505)			
One	66.3	50.72	14.0
More than one	33.7	52.59	15.0

TABLE 2: ATTRIBUTES OF FIREARM EXPOSURE

	Total yes N=505		Rural N=295		Urban N=210		P-value
	n	%	N	%	N	%	
Know someone who owns a gun	346	68.5	205	69.5	141	67.1	.58
Ever fired gun	143	28.3	81	27.5	62	29.5	.61
Morbidity related to firearm (participant or neighbor)	63	12.5	26	8.8	37	17.6	.003
Mortality related to firearm (neighbor)	75	14.9	34	11.5	41	19.5	.01
Firearm sound in neighbourhood	302	59.8	180	61.0	122	58.1	.51
Threatened by a firearm	76	15.0	45	15.3	31	14.8	.88
Gun possession	83	16.4	46	15.6	37	17.6	.55
Predilection towards firearms	248	49.1	161	54.6	87	41.4	.004
	N=422		N=249		N=173		
	Yes	%	Yes	%	Yes	%	
Desire for gun	165	39.1	115	46.2	50	28.9	<.001

TABLE 3: DISTRIBUTION OF PSYCHOLOGICAL HEALTH DOMAIN SCORES ACROSS FIREARM RELATED QUESTIONS

	Psychological health score	
	Mean	SD
Know someone who owns a gun		
Yes	51.32	14.6
No	51.41	13.8
Ever fired gun		
Yes	52.24	15.0
No	51.00	14.1
Morbidity related to firearm		
Yes	50.19	14.4
No	51.51	14.3
Mortality related to firearm		
Yes	52.16	16.1
No	51.21	14.0
Firearm sound in neighbourhood		
Yes	52.48	14.5
No	49.67	14.0
Threatened by a firearm		
Yes	49.89	16.5
No	51.61	13.9
Gun possession		
Yes	51.10	15.4
No	51.40	14.1
Desire for gun		
Yes	48.15	14.1
No	53.48	13.8

TABLE 4: VARIABLES ASSOCIATED WITH PSYCHOLOGICAL DOMAIN AFTER BIVARIATE ANALYSIS

Variable		Psychological health domain score		OR	95% C.I.	P-value
		Low	High			
Occupation	Semiskilled	130(60.5)	85(39.5)			

	Skilled	41(38.7)	65(61.3)	.412	.256	.665	<.001
	Others	41(50.6)	40(49.4)	.670	.401	1.121	.127
	Housewife	59(57.3)	44(42.7)	.877	.544	1.412	.589
Education	Uneducated	27(71.1)	11(28.9)				
	Pri(1-4yrs)	35(51.5)	33(48.5)	.432	.185	1.008	.052
	Sec(5-10yrs)	108(61.0)	69(39.0)	.638	.297	1.368	.248
	Higher	101(45.5)	121(51.5)	.340	.161	.719	.005
Sound of firearm	Yes	146(48.3)	156(51.7)				
	No	125(61.6)	78(38.4)	.584	.407	.839	.003
Desire for gun	Yes	104(63.0)	61(37.0)				
	No	122(47.5)	135(52.5)	1.887	1.265	2.814	.002
Socio economic score	Low	185(59.7)	125(40.3)				
	High	86(44.1)	109(55.9)	1.876	1.305	2.695	.001
Family type	Joint	174(50.6)	170(49.4)				
	Others	97(60.2)	64(39.8)	.675	.462	.987	.042
Marital status	Single	58(46.8)	66(53.2)				
	Married	213(55.9)	168(44.1)	.693	.462	1.04	.077

*subgroup in bold is the reference category

TABLE 5: FINAL MODELS AFTER MULTIVARIATE LOGISTIC REGRESSION ANALYSIS FOR PSYCHOLOGICAL HEALTH

Psychological health domain		Unadjusted odds	Adjusted odds	95% C.I.		p-value
Psychological health domain	Higher education	.432	.662	.441	.996	.048
	Desire for gun	1.88	1.988	1.30	3.02	.001
	Sound of firearm	.584	.580	.384	.875	.009
	Marital status(referent-single)	.693	.556	.344	.901	.017
	Type of family (referent-joint family)	.675	.581	.379	.891	.013

Figures

FIGURE 1

Key points
<ul style="list-style-type: none"> Higher education is significantly and positively associated with psychological health. The desire to own a gun is significantly associated with low psychological health.
Policy implications
<ul style="list-style-type: none"> Uneducated and semiskilled (farmers and laborers) should be prioritized as high risk groups for adverse life situations. From public health point of view, uneducated, farmers and laborers should be considered separate and specific health programs targeting them should be considered.