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Original Article

Adolescent Mortality – Causes and Correlation with Socio-Demographic Profile in a City Located in the National Capital Region of India

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ABSTRACT

The adolescents in age group of 10–19 years constitute 21.4% of the Indian population. Adolescents are basically considered a healthy group and mostly ignored in mortality surveys conducted by Government agencies and NGOs. The leading cause of mortality among youth in the world is injuries (75%) including motor vehicle injuries. In India, suicide is the second leading cause of death in this group. Adolescent deaths and social aetiology of these untimely mortalities have been studied in both the developing as well as developed countries of the world indicating varying trends. Rohtak is a city located in NCR of India which has experienced a large influx of people from rural areas in recent times. This has resulted in exposure and adjustment-related social problems in the youth leading to their increased mortality. This prospective study was planned at General Hospital Rohtak to estimate the total number of autopsies performed in the second decade of life and analyse and correlate the cause of death with socio-demographic profile of the deceased individuals.

Keywords: Adolescent, Mortality, Injuries, Homicide, Suicide, Rohtak, India

INTRODUCTION

The adolescents in age group of 10–19 years constitute 21.4% of the Indian population. Within this paradigm of population the role of adolescents is vital for the development and progress of the nation. Adolescents include a whole gamut of categories – school and nonschool going, school drop outs, sexually exploited children, working adolescents both paid and unpaid, unmarried adolescents as well as married females and males having experience of parenthood. Adolescents are basically considered a healthy group and mostly ignored in mortality surveys conducted by Government agencies and NGOs.

The leading cause of mortality among youth in world is injuries (75%) including motor vehicle injuries. Other major reasons for death are suicide and homicide caused by intentional poisoning, drowning and discharge from firearm[1]. In Western countries, homicide is the second leading cause of death in second decade and 82% of homicides are firearm related. In India, suicide is the second leading cause of death in this group. Badrinarayana found that suicidal attempts are most common in young people and according to the Youth Risk Behavior Survey, 13.8% youth attempted suicide[2,3] but this has risen to 20–22% from 2010 to 2014, which is a disturbing trend. Adolescent deaths and social aetiology of these untimely mortalities have been studied in both the developing as

well as developed countries of the world indicating varying trends depending upon the socio-demographic profile of regions[4–10].

Rohtak is a city located in NCR of India with a population 1,061,204. Urban population comprises 57.96% and rural 42.04% in this district. Because of massive development of infrastructure, increased employment opportunities and establishment of educational institutions, the city has experienced a large influx of people from rural areas in recent times. This has resulted in exposure and adjustment-related social problems in the youth in a society where rigid cultural norms and family honour still play a vital role.

A prospective study was planned at General Hospital Rohtak (GH Rohtak) to estimate the total autopsies conducted on people in the second decade. The reason for the death as mentioned in the post mortem report (PMR) and inquest papers were correlated with the socio-demographic profile and analysed so as to implement and rectify policies to retard this serious issue with damaging long-term repercussions on society.

The knowledge of epidemiology of adolescent deaths is needed to develop appropriate prevention strategies to decrease their incidence, which is a very challenging task.

AIM AND OBJECTIVES

1. To estimate the total number of adolescents on whom post-mortem examination (PME) was conducted from the total autopsies done by doctors of GH Rohtak.
2. To correlate the reasons for death with the socio-demographic profile (age, sex, marital status with time since marriage, no. of children, residence in rural/urban and occupation) of these individuals and identify causative factors.

MATERIAL AND METHODS

This is a prospective hospital-based study. All the PMEs conducted by the doctors at GH Rohtak from 1 April 2012 to 31 March 2014 (2 years) were studied. The data were collected on a prescribed proforma, keeping in view various factors namely, age, sex, marital status, occupation, address (present and permanent), and cause of death as mentioned in inquest papers and so on. All the data were entered in an excel sheet and various tables were prepared.

OBSERVATIONS

In 2012–2013 and 2013–2014, a total of 742 and 838 post-mortems were conducted by doctors at GH Rohtak on persons dying within the geographical boundaries of the district. From these in each year 115 (15.49%) and 128 (15.27%) were adolescents with an overall average of 15.38%.

Out of the total sample size of 243, males comprised 199 (81.89%) and females 44 (18.1%), respectively (Table 1). From these 170 (69.9%) were from rural and semi-urban areas and 57 (23.45%) were from urban localities. Six (2.47%) were migrant labourers and 10 (4.2%) bodies were unknown and unclaimed (Table 2).

From the sample size, most were in the age group of 16–18 yr (84) and 19–20 yr (92) followed by 50 in 13–15 yr and 17 in 10–12 yr group (Table 3).

Table 1: Distribution of total post-mortems according to sex

Year	Total PME	Adolescents	Percent of Adolescents	Male Adolescents	Percentage	Female Adolescents	Percentage
2012–2013	742	115	15.49	101	13	14	1.9
2013–2014	838	128	15.27	98	12	30	3.6

PME: post-mortem examination.

Table 2: Distribution of sample size as per geographical locality

Year	Rural	Percentage	Urban	Percentage	Migrants/Unknown	Percentage
2012–2013	75	65.21	31	26.95	9	7.5
2013–2014	95	74.21	26	20.8	7	5.42

Table 3: Distribution of sample size according to age

Age group years	Number
10–12	17
12–15	50
15–18	84
18–20	92

Four females were married and two males, all in the age group of 19–20 years. One married female who committed suicide on railway track was pregnant and one had a 6-month-old son.

In the youngest age group, accidental drowning and pillion riding were major culprits but snake bites, accidental hanging and electrocution were also seen.

Regarding the cause of death, the major reason was road-side accidents followed by railway accidents, poisoning (suicidal/homicidal, drug over dosage, substance abuse, alcohol intoxication, carbon monoxide etc.), hanging (suicidal, homicidal), drowning (ante-mortem and post-mortem), homicidal injuries, electrocution and firearm injuries. Other rare causes included collapse of roof with accidental burial, burns and snake bite (Table 4).

Road-side accidents were responsible for 38.68% deaths of which 64.4% were from rural areas and 34.10% were urbanites and the remaining migrants. From the total of 94 adolescents succumbing to injuries in vehicular accidents, only 9 (9.57%) were females whereas in railway accidents they constituted 12.38%. In hanging and poisoning cases, females comprised 51.72% and 30%, respectively. In females, all but one case (11-year-old) of poisoning were of suicidal nature. In males, poisoning was suicidal in 60% cases whereas alcohol intoxication (21%), substance abuse (9%) and homicidal poisoning (7%) were main reasons.

Table 4: Distribution of sample according to cause of death

Cause of death	No. of cases	Percentage
Road-side accident	93	38.27
Rail accident	33	13.5
Hanging	8	11.5
Poisoning	29	11.93
Drowning	22	9
Homicidal injuries	17	6.9
Firearm injuries	6	2.4
Electrocution	12	4.93
Burns	1	0.41
Snake bite	1	0.41
Collapse of roof	1	0.41

Deaths due to homicidal injuries, electrocution, firearms and drowning included mainly males except for occasional cases where other social factors like honour killing and dowry were also responsible. In these cases except for drowning, homicidal and firearm injuries which were slightly predominant in rural areas, no correlation with residential locality could be established. Suicidal hanging and poisoning in urban areas was higher in males and significantly prominent in slums and unrecognised colonies whereas in rural areas females showed a greater incidence.

Two couples in the age group of 17–18 years, one with homicidal sharp weapon injuries along with post-mortem burns and the other (unknown) of post-mortem drowning with aluminium phosphide poisoning confirmed on chemical analysis of viscera were of honour killing. Out of four cases of gunshot injuries, two were school dropouts doing small time property dealing, one was a 16-year–old class X student who was shot by fellow colleagues over an affair and one was a 10-year-old who sustained accidental bullet injuries along with his father.

DISCUSSION

In the present study, it is revealed that 15.8% post-mortem in two years were performed on adolescents which is quite significant considering the productive loss to the nation. This decreased slightly from 15.49% to 15.23% in a year. Male mortality was substantially higher and more so in rural areas. Road-side accidents were the commonest cause accounting for 38.6% adolescent deaths. A study by the Centre for Science and Environment (CSE) found that 11% of the world's road-injury deaths took place in India and 40% of all victims of fatal road mishaps were in 15–24 years age group. Health Information Center (2006) shows unintentional injuries (48%) by motor vehicle as the leading cause of mortality in the youth followed by homicide (13%) and suicide (11%). If we consider the railway accidents then our study is in accordance with this US-based study[11]. Deaths due

to unintentional injuries with males facing a consistently greater risk in mortality as reported by Mulye *et al.* matches with our study[2]. In 2007, World Development Report[12] showed homicidal firearm-related deaths at 95% whereas in our study it is 100%. Considering the high incidence and diversity of fatal adolescent injuries, solving this problem is a challenging task for public health and medical experts and a number of expert committees have set up to deal with this issue[13]. Youth Risk Behavior Survey conducted in 2009 analysed trends in suicide-related behaviours and showed a suicide rate of 13.8%[14]. In our study, suicidal mortality was mainly due hanging and poisoning and rarely drowning and railway. In the study of socio-demographic profile and outcome of poisoning cases in northern India by Sukhbir *et al.* 20% patients were in the age group of 11–20 yr and in 43.48% consumption of the poison was with a suicidal intent[15]. From these, 26.47% were females and 15.79% were males. Our study correlates with their observation. Ropmay *et al.* in their study in north-east India found that majority of the cases were suicidal in nature and in adolescents one-third of unnatural deaths were because of suicidal poisoning[16]. Therefore, emphasis should be laid on individual therapy and also family interventions should be included to reduce suicidal tendencies in this group[17].

This study also focuses on migrant people from other states. Mortality in them all through low is attributed to their poor housing conditions for example carbon monoxide poisoning, falling of roof, drowning electrocution and so on.

The desire of easy money through real-estate dealing and subsequent professional rivalry is also reflected in this study along with the orthodox structure of our society which still endorses honour killings. The incidences of teenage marriages and pregnancies although low but is relevant taking into account the productive loss to society.

CONCLUSION

It is concluded on the basis of this study that around 15% of the adolescent section of our population is vulnerable for untimely mortality. It is the need of the hour to preserve these precious lives. This requires changes towards a healthier and more educated and empathetic society and stricter laws for safe-driving, possessing firearms, availability of the poisons and so on. Along with this, improved infrastructure such as wider roads and manned railway crossings with rural connectivity, breakaway lights and wide median divides, highway medical aid, ambulances and so on are responsibility of the state. Management of stress in the adolescent population which is related to academic performance, self-esteem issues, fear of alienation, making friends and meeting parents and teachers' expectations is very important and needs sensitive handling. The government has started counselling centres in hospitals and a national adolescent health programme has also been initiated under the aegis of National Health Mission but still a lot has to be done to prevent mortality in this section of population.

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