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Pattern of Deaths among Women of Reproductive Age in Major Autopsy Centres of Capital Cities of the Seven Provinces of Nepal

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ABSTRACT

Background: The females in the reproductive age group are vulnerable to injuries and diseases. There is no reliable evidence of the pattern of deaths in reproductive age group females from Nepal. This study was conducted to explore the patterns of deaths of females of the reproductive age group in Nepal.

Methods: A multicentric quantitative cross-sectional study was conducted among the 611 deceased females of age 15 to 49 years who had undergone medico-legal autopsy in major autopsy centers of the capital cities of seven provinces of Nepal in a duration of one year. The demographic, clinical, and causes of death data were retrieved from the records and analyzed. The intentional and unintentional causes were compared with the marital status, age groups, ethnicity, and deceased of rural and urban communities.

Results: Female reproductive age group deaths constituted 611 (20.64%) of the total autopsies. Suicide was the most common manner of death (413, 67.59%) followed by accident (121, 19.80%). The most common cause of suicide was hanging (258, 62.47%) followed by poisoning (149, 36.08%) whereas road traffic accident (72, 59.5%) was the commonest cause of accidental death. Intentional deaths were associated with higher risk to the females of younger age groups ($p < 0.001$), ethnicity of the hilly region ($p < 0.001$), and unmarried women ($p = 0.001$).

Conclusions: Suicide was the commonest manner of death among the autopsies of females of the reproductive age group in Nepal. Appropriate preventive strategies need to be developed to uplift the overall health, socioeconomic status, and general wellbeing of the females.

Keywords: Accidents; autopsy; injury; reproductive health

INTRODUCTION

The females in the reproductive age group, mostly from 15 to 49 years are vulnerable to traditional pregnancy-related complications along with injuries and diseases¹ and 99 percent of maternal fatalities among the age group occur in low- and middle-income nations.² They

mostly died of self-inflicted burns in Iran,³ whereas homicide was the most common manner in Egypt with the commonest cause due to sharp traumatic injuries.⁴ In Nigeria, homicide was almost equal to suicidal deaths and was mostly done using firearms.⁵ In India, burn injuries are common and associated with dowry deaths.⁶⁻¹²

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While the patterns of deaths in reproductive age group females have been explored in other countries,³⁻⁶ there is no reliable evidence from Nepal. This study was conducted with the objective to determine the pattern of deaths in women of reproductive age in major autopsy centers of capital cities of seven provinces of Nepal. We also determined the common causes and manners of death and the proportion of deaths among different demographic variables.

METHODS

It was a multicentric quantitative cross-sectional study conducted at each of the major autopsy centers of the capital cities of seven provinces of Nepal. The deceased women of reproductive age group (15 to 49 years) undergone medico-legal autopsy were our study population. This group is more prone to deaths related to violence, including dowry related deaths and suicidal deaths due to various stressors and conditions as they have maximum responsibility and productivity. It is census research including all the available cases falling into the inclusion criteria in the the fiscal year of 2076-2077 BS (16th July 2019 to 15th July 2020). The total number of available cases were 611 and they all were investigated.

Nepal is a landlocked country of South Asia and is divided into seven provinces and the population is 29.2 million as per the national census 2021.¹³ All the unnatural deaths and suspected deaths are subjected to medico-legal autopsy in Nepal, so this covers almost all the unnatural deaths of study population in the study centers. The forensic autopsies are conducted at government hospitals with few exceptions of university teaching hospitals. Though as per the regulations of medico-legal services in Nepal, medico-legal autopsy can be conducted in private medical colleges also, only a few of them have started the service.¹⁴ The study sites were the major autopsy centers of the capital cities of seven provinces of Nepal. We had chosen the centers to make the samples representative of all the provinces of Nepal and majority of the autopsies are conducted in the centers. The population also covers the diverse population- ethnicity, and geographical origin. Thus, we could compare the differences in the patterns of deaths among females of terai and mountains and as well as of different ethnic groups to probe into the patterns of deaths which can provide valuable clues for further study and investigation.

All the deaths of females within the reproductive age group (from 15 to 49 years) were included whereas the

deceased with age less than 15 years and more than 49 years, unidentified bodies and the foreigners were excluded. The demographic and clinical information, hospitalization and treatment history were taken from the inquest papers, autopsy reports and any other documents attached with the autopsy reports kept at the record sections of study sites. The classification of ethnicity was based on that used in Nepal Demographic and Health Survey,¹⁵ and the geographic origin categorized on the basis of the address of the deceased, where the urban and rural municipalities were categorized as “urban” and “rural” respectively. The classification of manner of death was based on the inquest and autopsy report and cause of death recorded from the opinion expressed in the autopsy report. The violent causes of death were classified to “intentional” and “unintentional” whenever the cause was identified, where unintentional injury includes road traffic accident, poisonings, falls, burns, and drowning whereas intentional injuries include self-inflicted injuries or poisoning and physical violence.¹⁶ The intentional and unintentional causes, when they were identified in the reports, were compared with the marital status (ever married and unmarried), age group (15 to 29 years and 30 to 49 years), ethnicity (hill caste and terai caste) and deceased of rural and urban community. If the classifications were not made and left unidentified in the report, the cases were omitted during analysis. Data were collected in a structured case report form developed for the study.

The data were entered in Microsoft Excel and further analysis done by statistical software Statistical Package for Social Sciences (SPSS) version 16.0. Mean, standard deviation and percentage were calculated and the association of fatality with different variables was analyzed by Chi square test at 95% confidence interval with P value of <0.05 considered as significant.

The research was ethically approved by the ethical review board (ERB) of Nepal Health Research Council (NHRC) with Ref, No 2896 dated 18th April 2021. As this is a record-based study, direct involvement of patients was not required so there was no requirement of consent, and the need of consent was waived off by the ERB. We had obtained administrative approval to conduct the study from each of the seven study sites. The research was conducted following the principles embodied in the Declaration of Helsinki.

The study was funded by the Nepal Health Research Council under provincial research grant and the sponsor did not have any involvement in designing the study, analysis and reporting of the findings.

RESULTS

The distribution of total number of autopsies of female reproductive age in relation to the total autopsies conducted in each study sites is presented in table 1. The proportion of the cases ranged from 26.03% in Lumbini province to 15.82% in Hetauda hospital in Bagmati province and in aggregate, it was 20.64%.

Table 1. Distribution of cases in seven provinces in the study duration.

Study center	Total number of autopsies	Total no of autopsies of female reproductive age	Percent
Koshi Hospital, Biratnagar	551	105	19.06
Provincial Hospital, Janakpurdham	490	112	22.86
Hetauda Hospital, Hetauda	493	75	15.82
Pokhara Academy of Health Sciences, Pokhara	439	84	19.13
Lumbini Provincial Hospital, Butwal	365	95	26.03
Seti Provincial Hospital, Dhangadi	453	110	24.28
Province Hospital, Karnali Province, Surkhet	169	30	17.75
Total	2960	611	20.64

The mean age of the cases was 28.26 years with standard deviation of 10.28. The demographic details of cases are presented in table 2. The most common age group was 20-29 years with 207 (33.88%) cases, majority of cases (157, 25.7%) falling to hill-Brahmin and Chhetri ethnicity, 377 (61.70%) were married and 415 (67.92%) were from urban community.

Table 2. Demographic details of the cases.

Variables	Number	Percent
Age group (years)		
15-19	154	25.20
20-29	207	33.88
30-39	112	18.33
40-49	138	22.59

Ethnicity

Hill-Brahmin and Chhetri	157	25.70
Hill Dalit	91	14.89
Hill Janajati	133	21.77
Terai Brahmin and Chhetri	11	1.80
Other Terai caste	112	18.33
Terai Dalit	25	4.09
Terai Janajati	64	10.47
Muslim	18	2.95

Marital status

Married	377	61.70
Unmarried	142	23.24
Widow/divorced	4	0.65
Unknown	88	14.40

Geographic origin

Rural	196	32.08
Urban	415	67.92

The causes of death and distribution with respect to study site in each of seven provinces is shown in table 3. The most common cause identified was hanging in 260 (42.55%) followed by poisoning in 152 (24.88%) cases. Burns constituted to 14 (2.29%) cases and eight of them were reported from province no 2 alone.

The manner of death in relation to the age groups is demonstrated in table 4. The most common manner was suicidal (413, 67.59%) followed by accidental (121, 19.80%). The most common cause of suicide was hanging (258, 62.47%) followed by poisoning (149, 36.08%). Road traffic accident was the commonest case of accidental deaths contributing to 72 (59.50%) cases followed by drowning in 13 (10.74%). In our observation, only 13 (2.13%) of the total cases were classified as homicidal deaths, among which physical assault was the cause in nine (69.2%) cases and firearm injury, strangulation, poisoning were the causes in one case each. The offender was already identified during the starting of investigation in eight cases of homicides among which husband was the perpetrator in four cases, father in law and son in one case each and other family members in two cases whereas the offender was not identified in five cases. It was evident that most of the cases (220, 36.01%) had died in the hospital, followed by at home (202, 33.06%). A total of 383 (62.68%) had not received any treatment and among 413 cases of suicide, treatment was not done in 278 (67.31%) cases.

Table 5 represents the analysis of intentional and unintentional deaths with demographic variables.

Intentional deaths were associated with higher risk to ethnicity of hilly region (P <0.001, OR=20.663) and the females of younger groups (P<0.001, OR=3.419), unmarried women (P=0.001, OR=2.688).

Table 3. Cause of death and distribution with respect to study site in each of 7 provinces.

Cause of death	Study site in each province							Total n (%)
	1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	6 n (%)	7 n (%)	
Hanging	36 (34.29)	48 (42.86)	35 (46.67)	32 (41.56)	46 (48.42)	49 (44.55)	14 (46.67)	260 (42.55)
Poisoning	35 (33.33)	18 (16.07)	18 (24.00)	17 (22.08)	14 (14.74)	38 (34.55)	12 (40.00)	152 (24.88)
Road traffic accident	20 (19.05)	14 (12.50)	8 (10.67)	10 (12.99)	13 (13.68)	5 (4.55)	2 (6.67)	72 (11.78)
Drowning	1 (0.95)	2 (1.79)	5 (6.67)	11 (14.29)	6 (6.32)	0 (0)	1 (3.33)	26 (4.26)
Burns	3 (2.86)	8 (7.14)	0 (0)	2 (2.60)	0 (0)	1 (0.91)	0 (0)	14 (2.29)
Assault	2 (1.90)	2 (1.79)	2 (2.67)	0 (0)	3 (3.16)	1 (0.91)	0 (0)	10 (1.64)
Others	5 (1.90)	12 (7.14)	5 (5.33)	5 (2.6)	7 (0)	5 (0.91)	0 (0)	39 (2.78)
Unknown	3 (2.86)	8 (7.14)	2 (2.67)	7 (9.09)	13 (6.32)	11 (10.0)	1 (3.33)	38 (6.22)
Total	105 (100)	112 (100)	75 (100)	77(100)	95 (100)	110 (100)	30 (100)	611 (100)

Table 4. Manner of death with relation to age group of deceased.

Age group (years)	Manner					Total n (%)
	Accidental n (%)	Suicidal n (%)	Homicidal n (%)	Natural n (%)	Undetermined n (%)	
15-19	14 (11.57)	135 (32.68)	0 (0.0)	0 (0.0)	5 (9.26)	154 (25.20)
20-29	33 (27.27)	150 (36.32)	7 (53.85)	2 (20.0)	15 (27.78)	207 (33.88)
20-39	29 (23.97)	58 (14.04)	1 (7.69)	3 (30.0)	21 (38.89)	112 (18.33)
40-49	45 (37.19)	70 (16.95)	5 (38.46)	5 (50.0)	13 (24.07)	138 (22.59)
Total	121 (100)	413 (100)	13 (100)	10 (100)	54 (100)	611 (100)

Table 5. Relationship between intentional and non-intentional violence with demographic variables.

Variables	Causes of death		Odds Ratio	P value
	Intentional violence n (%)	Non-intentional violence n (%)		
Age group (n=546)				
15-29	291 (86.09)	47 (13.91)	3.419 (15-29/20-49)	<0.001
30-49	134 (64.42)	74 (35.58)		
Ethnicity (n=546)				
Hill castes	303 (95.89)	13 (4.11)	20.633 (Hill/Terai)	<0.001
Terai castes	122 (53.04)	108 (46.96)		
Marital status (n=466)				
Unmarried	123 (89.13)	15 (10.87)	2.688 (Unmarried/ Ever married)	0.001
Ever married	247 (75.30)	81 (24.70)		
Geographic origin (n=546)				
Rural	143 (81.25)	33 (18.75)	1.752 (Rural/Urban)	0.186
Urban	282 (76.22)	88 (23.78)		

DISCUSSION

We had explored the pattern of death among females of the reproductive age group in the major autopsy centers in capital cities of the seven provinces of Nepal. The number of unnatural deaths in a locality reflects the social and mental wellbeing of a society and in addition, it also represents the prevalence of fatal violence and injuries of various kinds. Particularly, in relation to the unnatural deaths of females, this can reflect violence of different kinds in the society and their deprivation of socio-economic and human rights. The study of unnatural deaths is important to a nation, and it is required to prepare or revisit the policies to develop preventive measures. Such data has to be generated and studied for a particular population as a reference to the observation of a different setting may be misleading.

The prevalence of deaths among the reproductive age group of females was 20.64% in our observation. It ranged from 26.03% to 15.82% across the sites from each province. In a similar observation from Vanarasi area of India, the prevalence was 22.25% where the most common cause of death was burns in 58%.¹¹

The violence against women and in particular, deaths of women in their homes of in-laws, often referred to as “deaths by burning” or “dowry deaths”, were identified and raised as a problem by women’s movements in India in the 1980s.¹⁷ Subsequently, studies have been conducted to explore information about the causes of burn injuries. The studies from India have demonstrated burns as the commonest cause of death.^{18,19} In an observation among unnatural deaths of females in Srilanka, burns constituted 10% of cases.²⁰ But in our setting, burns constituted only 2.29%, which is exactly the same as observed in an epidemiological study of injury and violence by NHRC where data from emergency departments of representative hospitals of the then five developmental regions was used.²¹ An observation from a district hospital of Lumbini province has shown burns in 17.9% of the total 184 autopsies in a fiscal year and it was mostly present in females (25 of total 33 cases),²² whereas it was seen only in six of total autopsies among 100 females in a tertiary referral center of eastern Nepal.²³ The variations in prevalence of burns could be due to the differences in lifestyle and use of fire in different settings, but it can also reflect the manner of death. As shown by different observations from Indian settings, burn is the common observation in dowry deaths.⁸⁻¹² There is no legal provision of dowry related deaths in Nepal, but domestic violence related to such affairs is reported at times.^{24,25} There is a need

for decreasing domestic violence against females and the participation of men in such campaigns is essential for success.²⁶ The females of the younger age group were observed to have a higher risk of intentional deaths in our study. This could be due to the ambitions in life, family conflicts, academic and professional stressors, etc.

The most common manner of death in our observation was suicide followed by accident. This implies the development of strategies for improving the overall health status of females. The females of reproductive age groups need to deal with pregnancy and childbearing and raising responsibility, they have the potential to be more stressed which could complicate to suicidal ideations. The strategies to prevent suicide could include awareness of strategies to cope with stressors, timely treatment of psychiatric illness, and economic and social empowerment of the females, to point out some. The findings are in contrast with that presented from studies in Egypt⁴ and Nigeria⁵ where homicide was the commonest manner. Though there are several issues with female empowerment in Nepal, the rate of homicide is fairly low. The study of the manner of death is important to develop preventive strategies⁹ and this presentation can be taken as evidence that can be of use to the stakeholders concerned.

The females of the hill caste had a higher risk of intentional deaths in our observation. In Terai region, men hold primary power, and patriarchy is deeply rooted in the society in comparison to hilly areas. In Terai, patriarchal ideology is dominant and most of the females are devoid of education, they are not capable of standing on their own and do not argue for the existing inequality in the society and family whereas females of hill caste are comparatively literate, they speak out for the existing gender inequality, protest and thus may be more susceptible for violence. This also highlights the further need to explore the factors associated. Likewise, the females of age group less than 30 years and unmarried had a higher risk of intentional violence. This could be attributed to the stressors associated with various challenges to overcome including career and education related issues.

This study has explored the patterns of deaths in females which will be useful to develop preventive measures by the concerned stakeholders. This can also be a basis to conduct further research to explore the factors of unnatural deaths in different ethnic groups and geographical regions of Nepal. Verbal autopsies can also be used to better explore the factors associated

with fatalities along with identification of the barriers of health systems in deaths due to natural causes which also includes maternal deaths. The major strength of this study is the inclusion of cases from the major autopsy centers of the capital cities of each of all the seven provinces of Nepal. This is expected to provide an overall picture of the deaths of female reproductive age groups undergone medico-legal autopsy in a year. There are other centers in Nepal where autopsies are conducted so the present study might have missed the exact prevalence of Nepal. Some of the deaths might have not been autopsied so, could have been missed which is the limitation of this study.

The health of the females of the reproductive age should be prioritized and preventive strategies developed to protect them from unnatural deaths. Awareness programs should be developed for empowerment of females, minimizing stressors in the family and works, etc. Equal access of education to the females could be beneficial to overcome such issues from the grassroots level. Strengthening the health facilities will help to minimize accidental deaths for people of all ages and gender.

CONCLUSIONS

Among the deaths of female reproductive age undergone medico-legal autopsy, suicide was the most common manner followed by accident. The most common cause of suicide was hanging followed by poisoning whereas road traffic accident was the commonest case in accidental death followed by drowning. Intentional deaths were associated with higher risk to the females of younger groups, of hill caste and unmarried women. Appropriate strategies need to be developed to uplift the overall health, socioeconomic status, and general wellbeing of the females to prevent the unnatural deaths.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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