

# Geographic Distribution of Suicide in Kavrepalanchok District, Nepal: A Retrospective Study

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## ABSTRACT

### Background

Suicide remains one of the oldest and most pressing public health challenges, causing profound emotional, psychological, and social trauma for affected families and communities. Common contributing factors include psychological disorders, marital and family disputes, and financial difficulties influenced by geography, gender, and socioeconomic status. While causes may vary, hanging remains the most prevalent method of suicide, followed by poisoning.

### Objective

To examine the geographic and sex-wise distribution of suicide cases and identify high-burden municipalities in Kavrepalanchok District, based on medicolegal autopsies performed at Dhulikhel Hospital from 2<sup>nd</sup> November 2020 to 13<sup>th</sup> April 2023.

### Method

A retrospective cross-sectional study was conducted at the Department of Forensic Medicine, Kathmandu University School of Medical Sciences, Dhulikhel. All suicide cases brought for medico-legal autopsy between 2<sup>nd</sup> November 2020 and 13<sup>th</sup> April 2023 were included in the study. These individuals were either deceased at the scene or passed away during treatment at the hospital. Cases with an unclear history of suicide or those involving decomposed or skeletonized bodies were excluded. Data were analyzed descriptively using Microsoft Excel and R version 4.4.3.

### Result

A total of 697 autopsies were conducted over a three-year period, of which 468 (67.14%) were identified as suicide cases. Among these, 235 (33.71%) were from outside Kavrepalanchok, and 233 (50.43%) were from within the district. Hanging was the predominant method, accounting for 75.74% of cases overall. Males consistently accounted for a higher proportion of suicides (overall 61.36%) across all three years. An increasing trend in suicide cases was observed over the years, particularly with a rising proportion of suicides due to hanging. The highest number of suicides within the district was reported in Panchkhal municipality (n=32), suggesting a geographic concentration of cases.

### Conclusion

The observed increasing trend in suicide cases over the three-year period, especially among males and through the method of hanging, highlights a significant public health concern. Targeted and coordinated interventions from both government and community stakeholders are essential to mitigate this growing burden.

## KEY WORDS

*Autopsy, Hanging, Kavre, Poisoning, Suicide distribution*

## INTRODUCTION

Suicide is a conscious act of self-inflicted harm resulting in death, best understood as a multidimensional crisis in a distressed individual who perceives it as the only viable solution to their problems.<sup>1</sup> It is a major public health issue, that affects not only individuals but also families, communities, and nations, leaving behind long-term social, emotional, and psychological trauma.<sup>2</sup> Globally, an estimated 720,000 individuals die by suicide each year, and for every suicide, almost 135 people are directly affected.<sup>3,4</sup>

According to World Health Organization, around 73% of global suicide occur in low and middle income countries, with particularly high rates in many Asian countries.<sup>5</sup> According to the 2023/2024 Annual Factsheet published by the Nepal Police, a total of 7,221 suicide deaths were recorded during the fiscal year. Of these, approximately 85% were attributed to hanging. Among the deceased, 56% were men and 33% were women.<sup>6</sup> Findings from a survey indicate that suicidality was present among 7.2% of the adult.<sup>7</sup> The determinants of suicide are multifactorial, including factors such as low education levels, economic hardship, violence, migration-related stress, family conflicts and histories of suicidal behavior.<sup>8-10</sup>

This study aimed to determine the prevalence of suicide among autopsied cases and to identify municipalities with a high burden of suicides in Kavrepalanchok district, based on data from the Department of Forensic Medicine and Toxicology at a tertiary care center in Dhulikhel, Nepal. The findings are intended to inform targeted mental health interventions and strengthen suicide prevention strategies in the region.

## METHODS

A retrospective cross-sectional study was conducted at the Department of Forensic Medicine, Kathmandu University School of Medical Sciences (KUSMS), Dhulikhel, after institutional ethical approval from IRC-KUSMS with approval number 163/23, to assess suicide cases brought for medico-legal autopsy from 13 municipalities of the Kavrepalanchok district. A total of 233 suicide cases from Kavrepalanchok District were included in the final analysis, employing a census sampling method to ensure comprehensive inclusion of all eligible cases.

Kavrepalanchok covers an area of 1,396 square kilometers with a population of 366,879 and consists of 6 urban municipalities (Dhulikhel, Banepa, Panauti, Panchkhal, Namobuddha, and Mandandeupur) and 7 rural municipalities (Khanikhola, Chaurideurali, Temal, Bethanchok, Bhumlu, Mahabharat, and Roshi).<sup>11,12</sup> The study covered the period from 2<sup>nd</sup> November 2020 to 13<sup>th</sup> April 2023 (Bikram Sambat 2077/06/17 to 2079/12/30). The study was based on the Bikram Sambat (Nepali) calendar, which runs from 15 April of a given year to 14

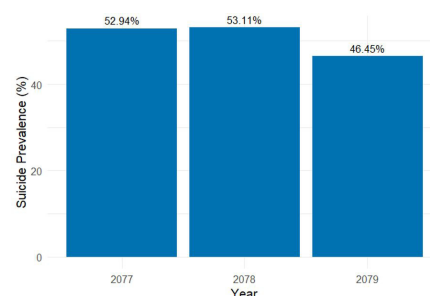
April of the following year, while the Gregorian calendar dates are provided for reference. Cases with a clear history of suicide, as determined by the investigating authority, and cases brought to the forensic department for medicolegal autopsies were included. Exclusion criteria included cases without a clear history of suicide, decomposed bodies, and skeletonized remains, as these were deemed unsuitable for inclusion due to insufficient forensic evidence. All relevant data were systematically entered into Microsoft Excel for organization, and descriptive statistical analysis was performed using R version 4.4.3 to summarize and interpret the findings.

## RESULTS

During the three years, a total of 697 autopsies were conducted at our center, of which 33.71% (n=235) were suicide cases brought from outside Kavrepalanchok district. Among these, 75.74% (n=178) were cases of hanging, while the remaining 24.26% (n=57) were cases of poisoning. Males constituted 60.85% (n=143), and females constituted 39.15% (n=92) of the total suicides.

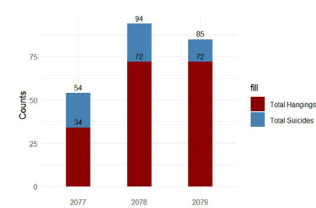
Among the 697 autopsies conducted at our center, 462 were from the 13 municipalities of Kavrepalanchok district. Of these, 233 (50.43%) were identified as suicide cases.

In Kavrepalanchok district the proportion of suicide among the autopsied cases varied across the three years, with 52.94% in 2077 B.S., 53.11% in 2078 B.S., and 46.45% in 2079 B.S. as shown in figure 1.

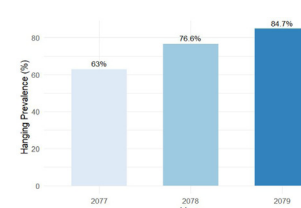


**Figure 1.** Bar graph showing the prevalence of year-wise suicides among autopsies conducted

Hanging was the predominant method of suicide throughout the three-year study period. Out of 54 autopsied cases in 2077 B.S., 34 (63.0%) were suicides; in 2078 B.S., 72 out of 94 (76.6%) were suicides; and in 2079 B.S., 72 out of 85 (84.7%) were suicides, indicating an upward trend in the use of this method over time, as shown in figures 2 and 3.



**Figure 2.** Bar graph showing year wise suicide and hanging



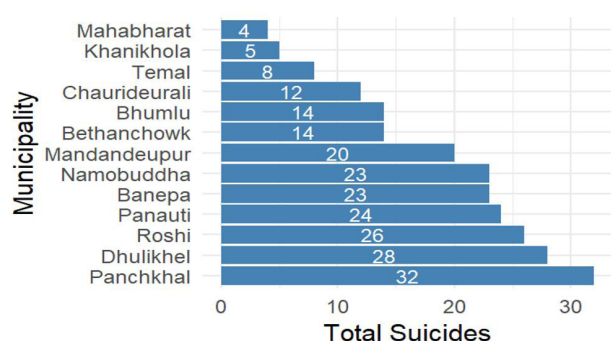
**Figure 3.** Bar graph showing the prevalence of hanging among suicide cases over the three-year period

The gender distribution of suicides remained consistent across the years, with a higher percentage of male suicides compared to female suicides. In 2077 B.S., 38.9% of suicides were female and 61.1% male. In 2078 B.S., 39.4% were female and 60.6% male and in 2079 B.S., 37.6% were female and 62.4% male, indicating a consistently higher proportion of male suicides over the three years as shown in figure 4.



**Figure 4.** Gender wise distribution of suicide over three years

Figure 5 shows the Municipality-wise, suicide count, the highest number of suicides was reported in Panchkhal municipality, which accounted for 32 cases, making it the most affected area within the district. This suggests a potential hotspot for suicide within Kavrepalanchok, highlighting the need for targeted mental health interventions in this region.



**Figure 5.** Total Suicide counts by Municipality between 2020-2023 A.D.

## DISCUSSIONS

Our study found that suicide accounted for 67.14% of the 697 medico-legal autopsies conducted over a three-year period, with a district-specific prevalence of 50.43% in Kavrepalanchok. These findings align with previous studies in Nepal. For instance, a study conducted at Patan Hospital reported that 53.23% of autopsies were suicide cases.<sup>13</sup> This significantly high prevalence highlights that suicide has become a major public health concern in the Country.

Suicide is a complex phenomenon influenced by variety of socio-cultural, psychological, and economic factors. While religious philosophies may differ in their view on how life should be lived, they commonly agree that life is sacred and should not be prematurely ended by oneself or others also

suicide is often viewed as a “sin” beyond redemption and is widely condemned as an unforgivable act. Nevertheless, it has continued to occur throughout human history.<sup>14</sup>

Our study found a higher prevalence of suicide among males (61.11%) compared to females (38.89%), which is consistent with findings from other studies. For example, a study conducted at Patan Hospital reported that 60.17% of suicide cases involved males, while 39.83% involved females.<sup>13</sup> Another study based on autopsy cases showed that 57% of suicide deaths were among males.<sup>15</sup> Several contributing factors may explain this gender difference. Among men, suicide is often linked to alcohol use and internalized stigma, such as feelings of failure due to financial hardship or the inability to support their families.<sup>9</sup> In contrast, research on suicide attempt survivors revealed that females accounted for a higher proportion of attempts (68.1%), suggesting that gender differences exist in suicidal behavior and the lethality of methods used.<sup>16</sup>

While the reasons for suicide have evolved over time, hanging and poisoning have remained consistently prevalent.<sup>7</sup> This rising trend was also evident in our study, which found that hanging accounted for 75.74% of all suicide cases, with prevalence rates of 63.0%, 76.6%, and 84.7% for the years 2077, 2078, and 2079, respectively, in Kavrepalanchok district. Similar findings have been reported in other studies, where hanging accounted for 64.98% of suicides.<sup>17</sup> Hanging is mainly chosen for two reasons: perceived reliability and accessibility. Many individuals view it as a rapid, certain, and relatively painless method, with minimal awareness of the dying process. Additionally, the materials required for hanging are typically easy to obtain, as common household items such as clothes, belts, and ropes can be used as ligature material.<sup>18</sup>

Our study identified Panchkhal Municipality as the most affected area in Kavrepalanchok district, with the highest number of suicide cases (n=32). This geographic clustering suggests a potential hotspot that warrants targeted intervention. Supporting this finding, a previous study in this district reported that over half of the elderly population suffers from some degree of depression, with an age- and gender-standardized prevalence of 53.1%. The coexistence of high suicide rates and a substantial burden of depression may indicate unmet mental health needs in the region.<sup>19</sup>

Mental health disorders are a significant contributor to suicidality in Nepal. A National Survey estimate that about 7.2% of Nepalese adults experience suicidality at some point in their lives.<sup>7</sup> Suicide deaths are strongly associated with underlying mental illnesses. According to the National Mental Health Survey 2020, nearly 80% of individuals in need of mental health care in Nepal do not receive it, highlighting a substantial treatment gap.<sup>20</sup> Delivering effective mental health care at the district level is further hindered by multiple challenges, including overburdened healthcare workers, limited availability of psychotropic medications, and inadequate mental health training.<sup>21,22</sup>

These systemic challenges are further compounded by broader social and structural factors. Socioeconomic issues such as marital conflict, family disruption, and financial hardship are difficult to address medically. While foreign employment has helped ease some economic burdens, it has also led to increased family instability, reflecting the complex interplay of risk factors that drive suicide in Nepal.<sup>9,23</sup> Despite growing global efforts in suicide prevention, including mental health awareness, resource-limited countries like Nepal face ongoing barriers due to constrained health budgets and a predominant focus on treatment over prevention. Nevertheless, the contributions of individuals, communities, and organizations remain vital, as preventing even a single suicide is a meaningful achievement.

In this regard, community medicine doctors can play crucial role. With their background in public health, epidemiology, and community-based care, they are uniquely positioned to support early identification, ensure timely treatment, and implement local mental health initiatives, thereby improving the overall effectiveness of mental health services. Equipping primary care physicians with the skills to identify and treat depression has proven effective in lowering suicide rates.<sup>24</sup> Similarly, increasing awareness among young people about depression and suicidal tendencies, as well as maintaining regular contact with psychiatric patients following hospital discharge or a suicidal episode, can significantly reduce the risk of future attempts.<sup>24</sup>

Despite the valuable insights provided by this study, there are several limitations that must be acknowledged. First, it relied on retrospective hospital records of medicolegal autopsies, which may have resulted in incomplete or missing data. Additionally, the use of convenience sampling could have introduced sampling bias. Since the research was carried out at a single center, the findings may not be generalizable to other hospitals or regions.

## CONCLUSION

This study highlights that suicide remains a significant public health concern in Kavrepalanchok district, accounting for over half of all autopsied deaths. The persistent gender disparity, with a higher proportion of male suicides, and the identification of Panchkhal municipality as a potential hotspot, underscore the importance of developing targeted, context-specific suicide prevention strategies. These findings warrant further research into underlying community-level risk factors and the evaluation of locally tailored mental health interventions.

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