Section: Miscellaneous

Original Research Article

EXPLORING SOCIODEMOGRAPHIC AND BIOLOGICAL FACTORS IN FEMALE SUICIDE: AGE, MARITAL STATUS, METHODS, AND MENSTRUAL CYCLE INFLUENCE

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Abstract

Background: Suicide is a critical public health issue and a key indicator of social, physical, and mental well-being. Women are particularly vulnerable to suicide, with contributing factors such as age, marital status, choice of suicide method, and potential menstrual cycle associations. Understanding these patterns can help refine prevention efforts. The aim is to assess the relationship between age, marital status, suicide methods, and menstrual cycle phases among women who died by suicide and to identify predominant risk factors. **Materials and Methods:** This cross-sectional study included female suicide cases, examining demographic characteristics, marital status, suicide methods, and menstrual cycle phases at the time of the attempt. Data were analyzed to identify prevalent patterns and associations, with a comparative analysis conducted using relevant published studies. **Result:** The majority (60.8%) of participants were below 30 years, with 77% being married. Hanging was the most common method (53.3%), followed by burns (41%) and poisoning (6.6%). Menstrual phase distribution showed no significant relationship to suicide risk, though the late proliferative, early secretory, and menstrual phases were observed more frequently among the cases. The findings suggest that young age, marital status, and method accessibility are influential in women's suicide cases, aligning with similar studies that report young, married women as a high-risk group. The menstrual phase did not show a statistically significant association with suicide, suggesting that other psychosocial factors may have a more substantial impact. **Conclusion:** This study highlights age, marital status, and choice of suicide method as primary factors in female suicides, while menstrual phase appears to have a limited role. Interventions focusing on mental health support, particularly for young, married women, are essential. Tailored prevention strategies that address the complex socio-psychological dimensions of suicide could mitigate risk among vulnerable populations.

INTRODUCTION

Each year, approximately one million people die from suicide, while an estimated 10 to 20 million people make suicide attempts. Additionally, about 50 to 120 million people are deeply affected by the suicide or attempt of a friend or family member.[1] Globally, suicide rates rose from 1.8% in 1998 to 2.4% by 2020.[2] Suicidal ideation refers to thinking about one's own death, while a suicide attempt involves self-harming behavior with the intent, whether stated or implied, to end one's life.[3]

Several risk factors are often associated with suicidal behavior, including panic disorder, post-traumatic stress disorder, substance misuse, and cluster B personality disorders. These factors may intensify or hasten the progression from suicidal thoughts to attempts. In women, additional factors—such as the menstrual cycle, pregnancy, postpartum psychosis,

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abortion, and marital stressors—can also influence susceptibility to suicidal ideation.[4,5] While both men and women are affected by suicide, gender differences exist in the rates of both attempts and fatalities. Some studies indicate that women attempt suicide at roughly three times the rate of men, whereas men have a suicide mortality rate approximately three times that of women.[6,7]

Recently, suicide attempts have notably risen among young and middle-aged women, often linked to familial or social discord and mental health issues like depression. Hormonal fluctuations throughout the menstrual cycle, particularly in the proliferative and secretory phases, can contribute to mood changes and depressive symptoms, potentially impacting suicidal thoughts. The proliferative phase, lasting from the onset of menstruation to ovulation, and the secretory phase, extending from ovulation to the start of the next menstruation, both involve hormonal shifts. These hormonal changes can be associated with mood swings and depression, and research reviews have shown a higher prevalence of suicide during the proliferative phase.[8-11] However, some studies suggest that suicides are more frequent during the secretory phase, though comprehensive data remains inconclusive on this matter.

MATERIALS AND METHODS

Study Setting: This hospital-based, cross-sectional study was carried out at MKCG Government Medical College, a tertiary care center located in Berhampur, Ganjam, Odisha. The study spanned one year, from September 2018 to October 2019.

Inclusion Criteria

- Women cadavers aged 15-45 years, determined to be cases of suicide.

Exclusion Criteria

- Age below 15 or above 45 years
- Decomposed bodies
- Hermaphrodites
- Death occurring over 24 hours post-suicide attempt
- Pregnant women

Sample Size: Based on the findings of the Leenaars AA et al. study, "Menstruation and Suicide: A Histo-Pathological Study," where the rates were p1=25% and p2=4.5%, the sample size was calculated using the following formula:

With 80% power and a 95% confidence interval, the study recruited 100 cadavers of reproductive age, with 50 designated as cases and 50 as controls who had died from non-suicidal causes.

Data Collection: Details including name, age, gender, marital status, occupation, socioeconomic status, factors leading to suicide, and the cause of death were documented. After obtaining general consent from relatives, uterus specimens from female cadavers aged 15-45 years were examined during autopsies. The procedure involved holding the fundus and lifting it while severing the cervix and vagina with a knife, then detaching the uterus along with ovaries and fallopian tubes. The uterus size was measured, and to access the interior, the cervical canal was opened with scissors and incisions extended toward the uterine horns. A 5 mm-wide tissue sample involving the full thickness from endometrium to serosa was extracted from the fundus of the anterior wall for histo-pathological analysis and stored in 10% buffered formalin. The specimen was fixed in a volume 20 times greater than its own for about 8 hours at room temperature, with complete fixation within 12-24 hours. Thin sections of endometrial tissue were prepared and placed in capsules for further processing.

Statistical Analysis: Data entry was conducted in MS Excel on Windows 10, with statistical analysis carried out using R software. Continuous data were reported as Mean ± Standard Deviation, while categorical variables were presented as counts (percentages). A P-value of <0.05 was considered statistically significant.

RESULTS

The majority of study participants were aged 26-30 years, with 17 individuals in the case group and 16 in the control group. Participants under 20 years were also a prominent group, with 17 in the case group compared to 7 in the control group. Most participants were married, with 41 married individuals in the case group and 52 in the control group. In terms of socioeconomic status, a higher percentage of participants in the control group were above the poverty line (APL) (53, or 88.3%) compared to 37 (61.7%) in the case group [Table 1].

Regarding the endometrial phase, most participants in the case group were in the late proliferative phase, early secretory phase, and menstrual phase, each with 13 participants (21.7%), followed by the late secretory phase with 10 participants (16.7%). In the control group, most participants were in the early proliferative and early secretory phases (15 participants, or 25.0% each), followed by the late proliferative and menstrual phases (11 participants, or 18.3% each). No significant differences were observed between the groups [Table 2].

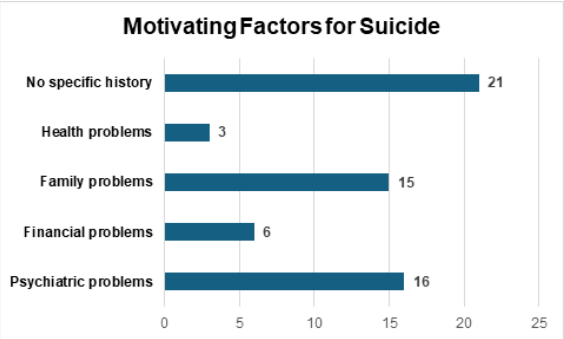

Figure 1 Motivating factors for suicide

Analysis of suicide factors showed that a significant portion of participants committed suicide during the late proliferative phase (14 participants), followed by

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the early secretory (13), menstrual (12), and late secretory (11) phases. Psychiatric problems were a primary motivation in the late proliferative phase (16 participants, 26.6%), followed by family problems (15 participants, 25%). In the early secretory phase, family issues were predominant. Overall, lack of a specific motivating factor was most common, with 21 participants (35%) [Table 3].

Among the study participants, no specific motivational factor was identified in 35% (21 individuals), making it the most common finding. This was followed by psychiatric issues, affecting 26.6% (16 participants), and family-related problems at 25% (15 participants) [Figure 1].

Hanging was the primary method of suicide among study participants, with 80% (8 participants) choosing this method during the early proliferative phase. In the late proliferative phase, hanging remained the predominant method, selected by approximately 78.6% (11 participants), with poisoning as a secondary choice at 14.3% (4 participants). In the early secretory phase, burns were the most frequently used method at 84.6% (11 participants), followed by hanging. Burns also remained the leading method in the late secretory phase, used by 66.7% (6 participants). During the menstrual phase, hanging was the most common method, accounting for 63.6% (7 participants) [Table 4].

The study found that hanging was the most frequent suicide method, chosen by 32 participants (53.3%), followed by burns in 41% of cases.

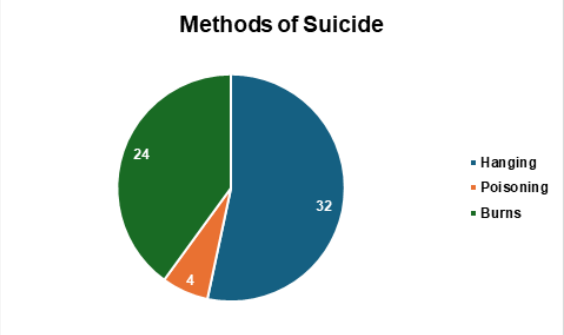

Figure 2: Methods of suicide

Table 1: Participant Characteristics by Group.

Variables	Cases	Percentage	Controls	Percentage
Age category				
Less than 20	17	28.3	7	11.7
21-25	11	18.3	5	8.3
26-30	17	28.3	16	26.7
31-35	2	3.3	12	20
36-40	13	21.7	8	13.3
More than 40	0	0	12	20
Marital status				
Married	41	68.3	52	86.7
Unmarried	19	31.7	8	13.3
Socioeconomic status				
APL	37	61.7	53	88.3
BPL	23	38.3	7	11.7

Table 2: Endometrial Phases by Group

Endometrial phase	Cases	Percentage	Controls	Percentage
Early proliferative	11	18.3	15	25.0
Late proliferative	13	21.7	11	18.3
Early secretary	13	21.7	15	25.0
Late secretary	10	16.7	8	13.3
Menstrual phase	13	21.7	11	18.3

Table 3: Motivating Factors by Endometrial Phase

Motivating factors	Endometrial phase									
	Early proliferative phase	Percentage	Late proliferative phase	Percentage	Early secretary Phase	Percentage	Late secretary phase	Percentage	Menstrual phase	Percentage
Psychiatric problems	6	60	4	28.6	2	15.4	2	18.2	2	16.7
Financial problems	0	0	4	28.6	1	7.7	1	9.1	0	0.0
Family problems	2	20	2	14.3	4	30.8	3	27.3	4	33.3
Health problems	0	0	2	14.3	0	0.0	0	0.0	1	8.3
No specific history	2	20	2	14.3	6	46.2	6	54.5	5	41.7
Total	10		14		13		11		12	

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Table 4: Methods of suicide among study participants

Method	Endometrial phase									
	Early proliferative phase	%	Late proliferative phase	%	Early secretary Phase	%	Late secretaryphase	%	Menstrual phase	%
Hanging	8	80	11	78.6	2	15.4	3	27.3	8	66.7
Poisoning	0	0	2	14.3	0	0.0	1	9.1	1	8.3
Burns	2	20	1	7.1	11	84.6	7	63.6	3	25.0
Total	10		14		13		11		12	

DISCUSSION

Suicidal deaths are significant markers of an individual's social, physical, and mental well-being, presenting complex challenges to forensic experts. Identifying risk factors, methods used, and potential influencing factors is essential in understanding patterns of suicide, especially given that suicide incidence and methods can vary widely among women in different age groups and life situations. Factors such as marital status, method of suicide, timing of attempts, and menstrual cycle phases can influence the likelihood and nature of these incidents. Additionally, variations may arise from psychological, socioeconomic, educational, cultural, and geographic factors, underscoring the need for a nuanced approach in assessing these cases.[12-16]

In our study, 60.8% of the participants were under 30 years of age, which aligns with findings from Biswas et al,[13] where 58.2% of suicides in women were among those below 30. Supporting this, AASRA,[14] statistics also reported that, on average, 139 women under 30 years commit suicide each day. This trend is further reflected in Patel's work,[15] identifying women aged 15-29 as particularly vulnerable to suicide. Factors such as social and psychological stressors during these age ranges, coupled with life changes, may heighten susceptibility.

Marital status also plays a notable role, as observed in our study, where 77% of the participants were married. Similar trends were seen in Biswas et al,[13] where 68.1% of suicide victims were married. AASRA[14] also found that among 130 women who committed suicide, 69 were housewives. Patel,[15] highlighted marriage as a psychological factor associated with suicide risk. For many women, marriage may introduce added responsibilities, social expectations, or even isolation, which could contribute to mental health challenges. Supporting this, Randy A. Sansone et al,[16] similarly concluded that marital status may increase suicide risk, aligning with findings from our study.

Regarding the method of suicide, hanging emerged as the most prevalent choice in our study, seen in 53.3% of cases, followed by burns (41%) and poisoning (6.6%). These findings are supported by studies from Balaram NA et al,[17] and Dr. Surjith Sreenivas.[18] In contrast, Biswas et al,[13] observed burns as the most frequent method (54.9%), followed by poisoning (27.5%) and hanging (6%). AASRA's,[14] findings varied, with poisoning being the leading method (33.1%), followed by hanging (31.4%), burns (10%), and drowning (4%). Such differences may reflect regional, cultural, and socioeconomic factors that influence access to specific means of suicide, as well as social perceptions about these methods.

Menstrual cycle phases have also been considered in understanding the timing of suicide attempts. In our study, most participants were in the late proliferative, early secretory, or menstrual phase, each accounting for 21.7% (13 participants), followed by the late secretory phase at 16.7% (10 participants). This differs from findings by Biswas et al,[13] where most suicides occurred during the early secretory phase (45.1%), followed by the proliferative phase (23.1%). Studies examining the relationship between menstrual phases and suicide, such as those by Ekeberg O and Vanezis P,[19,20] have yielded mixed results, with some indicating a higher risk associated with specific phases, while others do not find a significant correlation. In our study, no statistically significant relationship between menstrual phases and suicide was observed, mirroring the conclusions drawn by Ekeberg and Vanezis.[19,20] This lack of association suggests that menstrual cycle phases alone may not serve as strong indicators of suicide risk, though they may still interact with other psychological and physiological factors.

In summary, our findings contribute to the understanding of suicide patterns among women, highlighting age, marital status, chosen methods, and the potential but inconclusive influence of menstrual cycles. These observations underscore the complex and multifactorial nature of suicide, advocating for holistic approaches in both prevention and intervention strategies.

CONCLUSION

This study offers insights into the factors associated with suicide among women, highlighting the significant roles of age, marital status, and suicide methods, with inconclusive yet potentially relevant observations concerning menstrual cycle phases. Young women, particularly those under 30, and married individuals emerged as the most vulnerable groups. Hanging and burns were identified as the predominant methods, suggesting that accessibility and social factors may influence the choice of method. The menstrual phase, while investigated as a variable, showed no statistically significant link to suicide, underscoring the complexity of predicting suicide risk based on biological cycles alone.

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The findings reinforce the importance of addressing psychological, social, and marital pressures through mental health support, community education, and accessible intervention programs. Effective suicide prevention requires a multifaceted approach that considers the psychological, socioeconomic, and cultural dimensions influencing women. Future research could benefit from exploring these factors longitudinally, examining their interplay with mental health and life events, and developing targeted preventive strategies to reduce suicide risk among vulnerable groups.

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