**ORIGINAL RESEARCH ARTICLE**

# Determinants of suicide among female population in South Africa: A comparative analysis of socio-economic factors

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## Abstract

This study conducted a comparative analysis of socio-economic determinants of suicide among the South African women using longitudinal data from 1995 to 2020 with five-year intervals. It examined the relationship between female suicide rates and significant economic determinants (per capita income and employment rate) and social determinants (gender inequality and education level in women). Graphical analysis was employed to identify trends and patterns throughout the years. The results showed non-linear and inconsistent patterns, with none of the variables having a direct or consistent effect on female suicide rates. Although some were observed—such as between declining employment and rising suicide—other variables like income and education did not show clear patterns. Based on these findings, the study recommended the implementation of gender-sensitive mental health policies, greater access to mental health care—particularly in poor communities—and the development of employment and education policies that promote women's overall well-being. A multi-sectoral, integrated strategy was deemed necessary to address the complex and interrelated determinants of female suicide in South Africa effectively. *(Afr J Reprod Health 2025; 29 [11]: 145-153).*

**Keywords:** Economic, social, female suicide, South Africa

## Résumé

Cette étude a mené une analyse comparative des déterminants socio-économiques du suicide chez les femmes sud-africaines, à partir de données longitudinales de 1995 à 2020, avec des intervalles de cinq ans. Elle a examiné la relation entre les taux de suicide féminins et les déterminants économiques significatifs (revenu par habitant et taux d'emploi) et sociaux (inégalités de genre et niveau d'éducation des femmes). Une analyse graphique a permis d'identifier les tendances et les schémas au fil des ans. Les résultats ont révélé des schémas non linéaires et incohérents, aucune variable n'ayant d'effet direct ou constant sur les taux de suicide féminins. Bien que certains aient été observés, comme l'association entre la baisse de l'emploi et la hausse du suicide, d'autres variables, comme le revenu et l'éducation, n'ont pas révélé de schémas clairs. Sur la base de ces résultats, l'étude a recommandé la mise en œuvre de politiques de santé mentale tenant compte des sexospécificités, un meilleur accès aux soins de santé mentale, en particulier dans les communautés pauvres, et l'élaboration de politiques d'emploi et d'éducation favorisant le bien-être général des femmes. Une stratégie multisectorielle et intégrée a été jugée nécessaire pour traiter efficacement les déterminants complexes et interdépendants du suicide féminin en Afrique du Sud. *(Afr J Reprod Health 2024; 29 [11]: 145-153).*

**Mots-clés: :** Économique, social, suicide féminin, Afrique du Sud

## Introduction

Suicide is being recognized more and more as an emergent global health issue, particularly in low- and middle-income countries (LMICs), where most suicide-related deaths occur. The heterogeneity of suicide, based on diverse social, cultural, and economic contexts, makes it a challenging phenomenon to define, understand, and, most importantly, prevent at the global level[1,2]. Because the determinants and correlates of suicide are place-specific, international prevention strategies have a poor track record, necessitating local studies to inform effective interventions.

Suicide was the fourth most leading cause of death in 2019 among individuals aged 15 to 29 years, and intentional harm/suicide was the leading cause of death among both males and females aged 15 to 34 years in most countries[3,4]. Despite these grim figures, the overall global suicide rate has

declined steadily over the past two decades, from 14.0 per 100,000 in 2000 to 9.0 in 2019. This downward trend is largely attributed to significant reductions in suicide rates in highly populated countries like China and India. However, even then, LMICs continue to account for an estimated 77% of suicide death globally, illustrating the disproportionate distribution to which they are subjected[5,6].

South Africa is a case in point. Suicide remains among the leading causes of mortality in South Africa, characterized by alarming gender-based tendencies. A study in 2018 had a female suicide rate of 4.5 per 100,000 and found that women were twice as likely as men to have attempted suicide[7]. In contrast, a study in 2020 on national trends in suicide mortality found that South African men had increased rates of suicide completion, providing a complex and dynamic view of gender disparities in suicidal behaviour[8,9,10]. Notably, South Africa has not seen the same broad trend of reducing suicide mortality rate seen elsewhere globally, indicating that chronic risk is being fuelled by national and regional influences.

A range of socio-economic stressors like violence exposure, inadequate access to mental health care, alcohol dependency, and occupational or educational stress, among others, have also been identified as key predictors of suicide risk[2,10,11]. These risks are particularly relevant in South Africa, where economic inequalities, social exclusion, and under-resourced public health systems exacerbate psychological distress among vulnerable groups.

Despite the prevalence of female suicide and the clear effect of socio-economic variables on mental illness, there remains a lack of focused research into how these variables affect South African women's suicide rates in particular. Existing studies have overlooked the intersection between gender and socio-economic variables, thus creating a large gap in scholarly understanding and policy.

This study aims to close this gap through graphically analysing the relationship between socio-economic determinants and female suicide in South Africa. With a data-driven approach, the study aims to establish patterns that inform future policy action. Through explaining the socio-economic factors that drive female suicide in the South African context, the study contributes to the global discourse on targeted suicide prevention efforts.

## *Literature review*

Kootbodien *et al*.[8] explored trends in suicide death in South Africa from 1997 to 2016 from national death registrations. There were 8,573 suicides in individuals aged 15 years and older, which accounted for 0.1% of total deaths. Suicide was much greater among men (2.07 per 100,000) than women (0.49 per 100,000). Joinpoint regression analysis showed that overall male suicide rates were flat, but deaths from hanging and poisoning rose annually by 3.9% and 3.5%, respectively. Female death from suicide rose 12.6% between 1997 and 2004 and then stabilized, while deaths from hanging rose 3% annually. The mean annual years of potential life lost (YPLL) to suicide were 9,559 for men and 2,612 for women. The findings underscored suicide's significant contribution towards premature death and highlighted the explicit need for focused interventions, especially in young males.

Choi *et al*.[12] investigated the role of job loss, financial distress, and housing issues (JFH) as suicide precipitants among U.S. adults using 2017–2019 data from the National Violent Death Reporting System. Among 94,454 suicide fatalities, JFH was most common in the 45–64 age group, particularly males (22%) and females (15.1%). Generalized linear models found that suicides due to JFH were independently associated with relationship issues, mental illness, alcohol abuse, and simultaneous multiple crises. For men, JFH was linked with depressed mood and alcohol problems, for women, with legal problems and relationship stress.

Higher risk for suicide due to JFH was found in college graduates and unmarried women. Some individuals escalated to depression and drug issues following JFH, while others had persistent issues that resulted in JFH. The study emphasized the significance of both systemic (e.g., unemployment benefits) and individual-level (e.g., mental health services) suicide prevention interventions.

Rafiei *et al*.[13] conducted a systematic review and meta-analysis to estimate the global prevalence of suicide among HIV/AIDS patients. The study protocol was registered on PROSPERO, and literature was retrieved from four large databases between January 2000 and April 2022.

After applying the inclusion criteria, 60 studies involving 61,904 participants from 24 countries were included. The estimated prevalence of suicide was 24.9% (95% CI: 20–30.6%). Singles had the highest prevalence at 25.7% (95% CI: 18.4–34.7%). Prevalence was higher among women (22%) compared to men (17%) on gender analysis. The authors concluded that single young women with HIV/AIDS were more vulnerable and advocated special suicide prevention in them. They recommended incorporation of mental health into HIV/AIDS programs for protection of vulnerable individuals.

Chuene and Kgarose[14] conducted a narrative review to examine campus-based responses to students' suicidal behaviors in universities in South Africa. Purposive sampling was utilized in gathering secondary data from the following databases: Google Scholar, JSTOR, EBSCOhost, ProQuest, Scopus, and Sabinet. The review indicated that students' suicidal ideation was fueled by complex and individualized causes.

It emphasized the need for interventions such as gatekeeper training, campus-wide suicide prevention awareness, computerized mental health interventions, counseling, and psychotherapy. The authors highlighted the need for universities to implement multifaceted, multi-sector solutions in accordance with the complexity of suicide.

They asserted that the complexity of suicide demanded a clearer understanding and thus empirical reinforcement and evaluation of interventions on a regular basis. The study suggested suicide risk reduction and protective factor enhancement immediate action in student populations through collaborative efforts.

Hodgson *et al*.[15] also reflected on the impact of alcohol bans on suicides in South Africa during the COVID-19 pandemic by comparing suicide rates according to postmortem examination data in 2017 and 2020/21. Suicide deaths proceeded relatively steadily overall between the two periods, without alteration (RR = 1.04). Suicide rates increased among young adults and adolescents aged 15–24 years, with an 11% increase in males and 31% in females. Whereas partial alcohol restrictions were without effect on suicide risk, full restrictions were associated with an 18% overall reduction of suicides, and a 22% reduction in men. No reduction was observed among women. The study supported the hypothesis that total bans on alcohol would reduce suicide rates, especially among men, and suggested that the restrictions may have prevented a global surge in suicides during the pandemic

# Methods

This study employed a comparative analysis framework to explore the socioeconomic drivers of female suicide in South Africa. Drawing on time series datasets over a period of 25 years from 1995 to 2020 (collected at five-year intervals) sourced from the United Nations database[16] and World Bank's World Development Indicators (WDI) records[17], the research analysed two key dimensions: (1) the association between economic determinants (per capita income and employment rates) and female suicide, and (2) the relationship between social determinants (gender inequality and level of education) and female suicide.

## *Estimation procedures*

To examine the relationship between female suicide, income per capita, employment, gender inequality, and level of education in South Africa, GDP per capita and employment rate were utilized in this study as economic indicators, while gender inequality and level of education served as social indicators. Given the scope of the study, graphical analysis was employed for comparison as it gives a clear and comprehensive representation of the subject in question. Table 1

## *Data analysis*

To achieve the objectives of this study, graphical analysis was employed as the primary data analysis technique. Graphs enable examination and observation of patterns, trends, and changes over time in the data, providing visual comprehensive description of the subject matter[23-31].

**Table 1:** Measurement of variables

| Variable | Code | Measurement | Source | References |
|---|---|---|---|---|
| | | **Economic factors** | | |
| Income per head | IPH | GDP per capita growth (annual %) | WDI | Wu *et al*.[18] |
| Employment rate | EMP | Employment to population ratio, 15+, total (%) (modeled ILO estimate) | WDI | Wang *et al*[19] |
| | | **Social factors** | | |
| Gender Inequality | GIN | Gender Inequality Index (0 to 1 higher disparity) | UN | Xue *et al*[20] |
| Education | EDU | Secondary education, general pupils (% female) | WDI | Li *et al* [21] |
| | | **Variable of interest** | | |
| Female Suicide | FS | Suicide mortality rate, female (per 100,000 female population) | WDI | Luo *et al* [22] |

### *Ethical considerations*

This research used statistical data released on World Development Indicators (WDI) and United Nations databases, which are aggregated and anonymized and carry no risk of harm or identifiable information disclosure. No individual-level data were used, and the authors have respected terms of use provided by data providers. The analyses were done after applying a systematic, transparent, and rigorous methodology and made public. Ethical clearance was not required as there were no animal or human subjects.

## Results

### *Results of economic factors*

Figure 1 shows the correlation of income per head (IPH) and female suicide (FS) in South Africa between 1995 and 2020. It does not appear to be consistent and does not display the typical negative pattern. For instance, when IPH rose between 1995 and 2005, FS fluctuated- declining slightly from 10.1 to 9.7 for the year 2000 and then climbing to 11.5 for 2005. Similarly, in 2010, while IPH growth slowed to 1.55%, FS climbed to a high of 12.3. By 2015, IPH had slipped marginally into negative (-0.21%), but FS dropped sharply to 9.9, which is contrary to what one would expect. In 2020, while income growth fell sharply to -7.61%, FS rose once more to 11.2. These trends indicate that income per head alone cannot explain changes in female suicide rates. The figure 2 below which shows the relationship between employment (EMP) and female suicide (FS) in South Africa from 1995 to 2020 is a mixed trend. In 1995 when employment stood at 40.63%, the female suicide rate was 10.1. In 2000, employment dropped to 39.93%, and FS dropped to 9.7, as expected. However, this is not the pattern between 2000 and 2010. Employment dropped by a negligible margin from 39.93% to 39.37%, but the female suicide rate increased significantly from 9.7 to 12.3, which means that negligible changes in employment cannot possibly explain changes in suicide rates. In 2015, employment recovered to 40.86%, and FS dipped to 9.9, demonstrating again that there might be a negative relationship. But in 2020, the employment plummeted to 35.77%, and female suicides went up to 11.2, again establishing the suspicion that declining employment may have a connection with rising suicides.

### *Results of social factors*

Moving on to social factors, from figure 3, the data on gender inequality (GIN) and female suicide (FS) in South Africa from 1995 to 2020. The Gender Inequality Index steadily decreased from 0.48 to 0.41, indicating gradual improvements in gender equality. However, the female suicide rate fluctuated during this period. For instance, between 1995 and 2000, both GIN and FS declined slightly, which could suggest a positive impact of reduced gender inequality. Yet from 2000 to 2010, even as GIN continued to decline (from 0.46 to 0.44), the suicide rate rose significantly from 9.7 to 12.3. A drop in FS is observed again in 2015, coinciding with a continued decrease in GIN, but this trend does not persist. By 2020, even though gender inequality reached its lowest point (0.41), female suicide increased once more to 11.2.

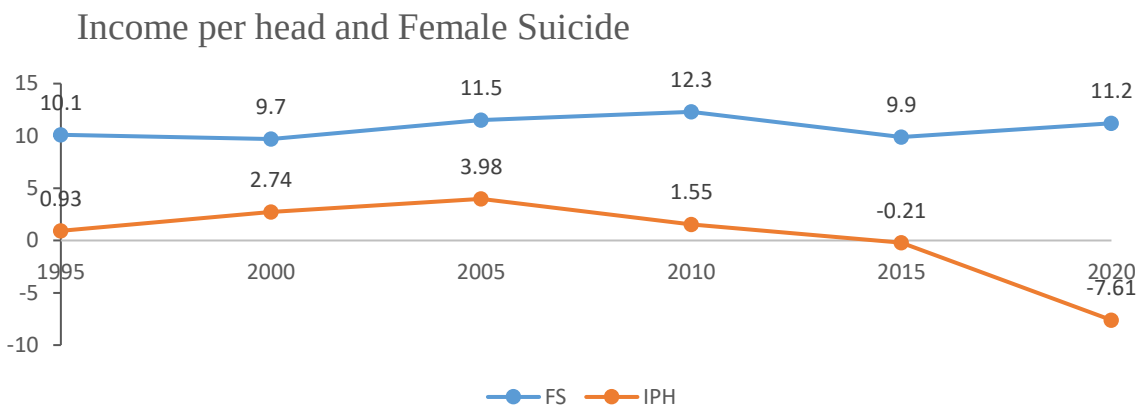


**Figure 1:** Relationship between income per head and female suicide in South Africa

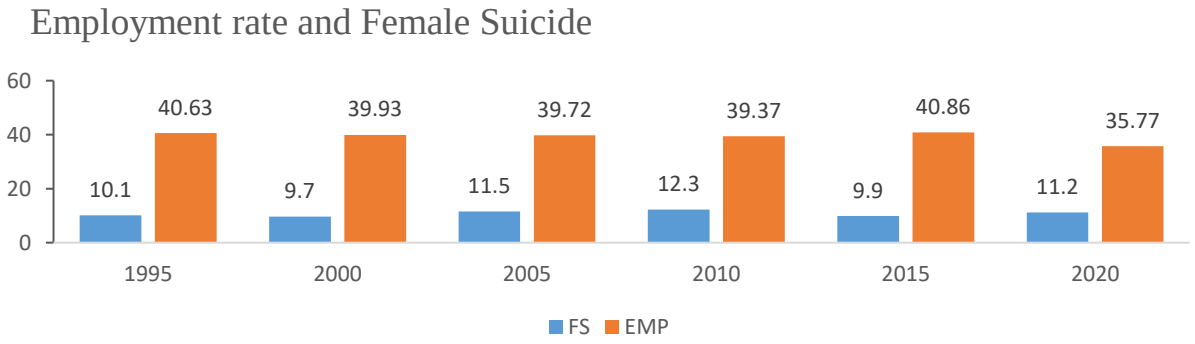


**Figure 2:** Relationship between employment rate and female suicide in South Africa

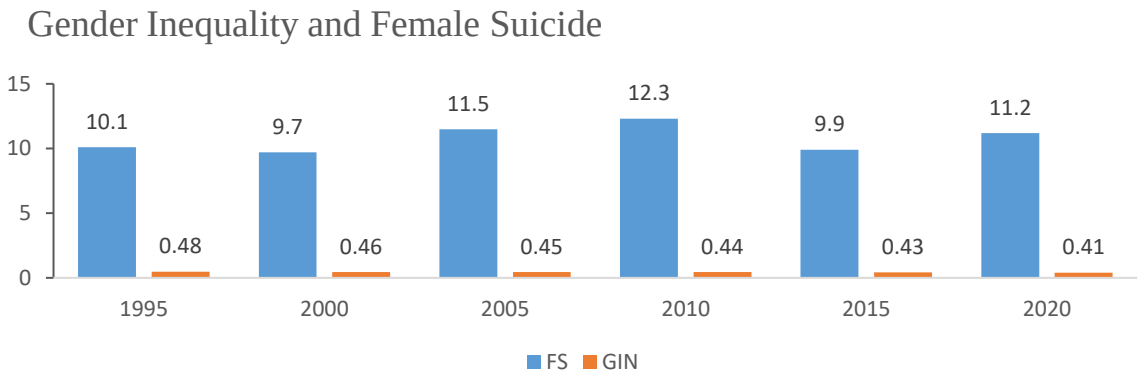


**Figure 3:** Relationship between gender inequality and female suicide in South Africa

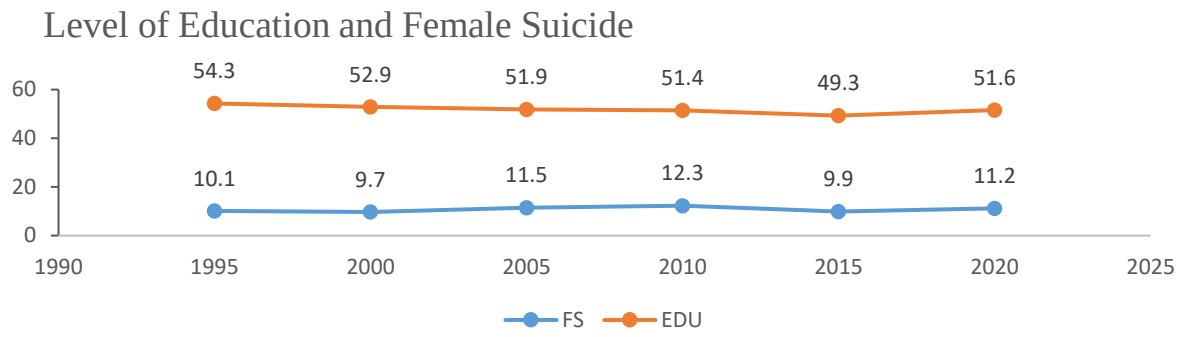


**Figure 4:** Relationship between level of education and female suicide in South Africa

Figure 4 shows the relationship between the level of education among females (EDU) and female suicide rates (FS) in South Africa from 1995 to 2020. It appears to be inconsistent, with no clear or direct correlation between the two variables. Between 1995 and 2000, both education levels and female suicide rates declined slightly- EDU from 54.3% to 52.9%, and FS from 10.1 to 9.7. This may suggest a potential link between education and reduced suicide risk. However, from 2000 to 2010, even though the percentage of females in secondary education continued to drop gradually (reaching 51.4%), female suicide rates increased significantly from 9.7 to 12.3. In 2015, both EDU and FS decreased again- education dropped to its lowest point (49.3%) and FS to 9.9- challenging the expected inverse relationship. By 2020, there was a slight recovery in education levels to 51.6%, but the female suicide rate increased to 11.2, once again showing no clear pattern.

## Discussion

The comparative analysis of economic and social determinants of female suicide in South Africa between 1995 and 2020 indicates multifaceted, non-linear associations. Even though it has been argued that improvements in economic well-being and social conditions would reduce suicide, the evidence discussed presents a mixed picture that reflects the limitation of employing only macro-level determinants to explain individual and societal health issues like suicide.

Economic measures, i.e., employment (EMP) and income per head (IPH), are supposed to be negatively correlated with female suicide rates in South Africa- i.e., as economic conditions improve, suicide rates should decrease. But the evidence from 1995 to 2020 does not consistently support this hypothesis. From 1995 to 2005, for instance, income per head rose steadily, but female suicide first fell and later rose significantly to in 2005. The same trend was observed during 2010 when IPH's increase declined, but FS also rose to the highest for the study period. Again during 2020, IPH also fell steeply and FS rose. These discrepancies suggest that growth in the economy is insufficient on its own to provide safety from suicide as suicide rates increase have been recorded in economically developed countries in past years. Growth in the economy may go along with increased inequality, social dislocation, or pressure on mental health, especially for women who are not necessarily joint beneficiaries of national income growth.

Employment (EMP), another key economic indicator, has a relatively stronger, yet still tenuous, relationship with female suicide in South Africa. Both EMP and FS were relatively high in 1995. By the year 2000, the slight fall in employment was met with a drop in female suicide inconsistent with trends expected. Between the years 2000 and 2010, EMP fell modestly and FS rose noticeably- supporting the fact that small changes in employment levels can account for changes in suicide rates. A more marked negative correlation appeared in 2015 when employment was at 40.86% and FS fell to 9.9. It fell sharply to 35.77% in 2020, while FS also rose again, again raising the suspicion that job loss might induce psychological or emotional distress leading to suicide. Again, these tendencies are not straight and emphasize how crucial it is to look into the quality of work, employment insecurity, and the gender-

disaggregated nature of employment so as to compile the picture.

Social determinants including gender inequality (GIN) and education (EDU) also correlate inconsistently with female suicide in South Africa. Between 1995 and 2020, GIN gradually fell, reflecting continuous improvement in gender equality. Intuitively, this should be accompanied by decreasing female suicide rates. The evidence, however, shows otherwise. While both GIN and FS declined marginally from 1995 to 2000, the suicide rate increased significantly from 2000 to 2010 despite continuing advances in gender equality. The trend only follows the expected correlation when GIN declined in 200 following a decline in FS and 2015 when the same happened. This may suggest that reducing gender inequality at a structural level will not necessarily be felt immediately at a community or individual level, particularly if deeper societal issues like gender violence, mental illness stigmatization, or unequal access to help services persist. The EDU and FS pattern is not clear. While from 1995 to 2015 the female education levels dropped, FS was not always consistently increasing. In some years, for example, 2015, both variables dropped, which is against the anticipated reverse effect. In the year 2020, an increase in education enrolment did not result in a drop in suicide, which again goes against the expectation of more education being equivalent to healthier mental states or resilience.

Further evidence from the extant literature supports the patterns observed in this study. For example, Li *et al*.[32] showed that educational reforms often yield delayed wellbeing effects, while Xue *et al*.[33] emphasized institutional influences on health outcomes. Wang *et al*.[34] linked travel burdens to disparities in access. Gao *et al*.[35] and Hong *et al*.[36] highlighted non-linear family dynamics and time-use effects on wellbeing. Wu *et al*.[37], Lin and Zhang[38], and Fei and Li[39] demonstrated the roles of stress, emotion, and gender norms. Biological and clinical findings by Liang *et al*.[40], Luo *et al*.[41], Kang *et al*.[42], and Hu *et al*.[43] showed neurocognitive, hormonal, and reproductive pathways affecting women's mental health

## Study strengths and limitations

The study offers a comprehensive analysis by exploring both economic and social determinants of female suicide, providing a well-rounded understanding of the issue in the South African context. By utilizing data spanning two decades in five-year intervals, it captures long-term patterns. The graphical approach enhances clarity by effectively illustrating trends and enabling straightforward comparisons, making the findings more accessible to a broad audience. However, the study is not without its limitations. Its reliance on graphical analysis restricts the depth of interpretation, as it excludes other potentially significant factors such as lifestyle choices, availability of healthcare facilities, and genetic predispositions- largely due to data constraints.

## Policy implications

To address the complex drivers of women's suicide in South Africa, there needs to be a multi-sectoral policy intervention. To start with, there needs to be an increase in integrated mental health services, particularly reaching women through community-based services, schools, and workplaces. Mental health care needs to be made affordable, accessible, and stigma-free. Second, labour market policies need to be focused not only on creating jobs but also on quality, secure employment for women, with policies to promote entrepreneurship and flexible work arrangements. Third, despite better indicators of gender inequality, more efforts are needed to address long-standing social issues such as gender-based violence, discrimination, and caregiving inequalities that still erode women's mental health. Fourth, education policies should promote not just access to education but also life skills, emotional resilience, and mental health literacy, beginning at the secondary level. Lastly, all suicide prevention policies should be gender-responsive, collecting sex-disaggregated data, and ensuring that interventions are grounded in the realities of women. By tackling economic, social, and psychological determinants simultaneously, these recommendations can reduce female suicide rates and improve overall well-being.

## Conclusion

The present paper examined the socio-economic determinants of suicide among South Africa's women through a comparison of economic and social statistics of five years interval for over 25 years (1995–2020). Taking per capita income and employment as proxies for economic status and gender equality and education attainment level as variables for social measures, the study showed how each corresponds to the rates of suicide among South Africa's women during the given time frame. The graphical analysis allowed for easy visual comprehension of patterns and correlation between periods. It has been established in the results that there is no linear or constant correlation between selected socio-economic variables and female suicide. While it has been seen that some level of association between employment fluctuation and suicide trends exists i.e., lower levels of employment playing a role in higher suicide, the per capita income had very little explanatory power of its own. Social determinants also provided a mixed result. While gender inequality improved steadily, female suicide did not reduce accordingly, suggesting structural or psychosocial determinants in operation. Education level of women also did not demonstrate any consistent negative relationship with suicide rates. Women's suicide in South Africa appears to be determined by a complex interaction of socio-economic and possibly other unmeasured individual or structural determinants. This requires multi-dimensional policy interventions that go beyond economic determinants to include mental health services, social support systems, and gender-sensitive programming.

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