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Suicide in Global Mental Health

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Abstract

Purpose of Review We review recent research on the epidemiology and etiology of suicide in the global context. We focus on data from low- and middle-income countries (LMIC), with the goal of highlighting findings from these under-researched, over-burdened settings.

Recent Findings Prevalence of suicide in LMIC adults varies across region and country income-level, but is, on average, lower than in high-income countries. Recent gains in suicide reduction, however, have been smaller in LMIC compared to global rates. LMIC youth have much higher rates of suicide attempts than youth from high-income countries. Females as well as people with psychiatric disorders, those living with HIV, those who are LGBTQ+, and those with poor socioeconomic status are highly vulnerable populations in LMIC.

Summary Limited and low-quality data from LMIC hinder clear interpretation and comparison of results. A greater body of more rigorous research is needed to understand and prevent suicide in these settings.

Keywords Suicidal thoughts · Suicidal behaviors · Epidemiology · Etiology · LMIC

Introduction

Suicide is a major global health issue. More than one in 100 deaths result from suicide. Each year, it is estimated that more than 700,000 people globally die by suicide [1], almost 10 per 100,000 population [2], or one person every 40 s. Suicide is the 17th leading cause of death across the lifespan and is ranked as the fourth leading cause of death among people aged 15–29 years [1]. More alarmingly, actual suicide rates may be even higher than reported owing to stigma, misclassification, and limited surveillance systems [3].

Almost 80% of global deaths by suicide occur in low- and middle-income countries (LMIC) [4]. However, less than 15% of suicide-related research is conducted in LMIC, and therefore, much less is known about the epidemiology and etiology of suicide in these settings [5, 6]. Additionally, human and financial resources dedicated to mental health in LMIC are extremely limited [2]. To lessen the burden of suicide in LMIC and meet global goals for suicide reduction [7, 8], we must develop a better understanding of at-risk populations in LMIC so they may be efficiently targeted in prevention efforts [9].

Identification of those with suicidal thoughts and behaviors (STB) can support prevention of suicide [10–13]. Suicidal thoughts are the consideration of or desire to end one's life and range from passive ideation (e.g., thoughts of wanting to be dead) to active ideation (e.g., wanting to kill oneself) [14]. Suicidal behaviors include self-directed, potentially injurious behavior accompanied by intent to die [15]. Although the progression from ideation to behavior is not always linear, these have been traditionally theorized as taking place over a continuum from thoughts to attempt or death from suicide [16].

In this article, we review recent findings on suicide epidemiology and etiology in the global context. We focus on data from LMIC, as defined by the World Bank [17], with the

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goal of highlighting findings from these under-researched, over-burdened settings. We discuss research related to both completed suicides and STB, to build as comprehensive of a picture as possible based on the oftentimes limited available data from these contexts. Throughout our review, we highlight results related to suicide and STB in adult as well as youth LMIC populations. We also discuss current data regarding the impact of the COVID-19 pandemic on suicide in LMIC.

Search Strategy and Selection Criteria

We searched PubMed for articles using the indexed terms (suicide OR suicidality OR suicidal) and (Afghanistan OR Albania OR Algeria OR Samoa OR Angola OR Antigua OR Barbuda OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Bulgaria OR "Burkina Faso" OR Burundi OR Cambodia OR Cameroon OR "Cabo Verde" OR "Central African Republic" OR Chad OR Chile OR China OR Colombia OR Comoros OR Congo OR "Costa Rica" OR Ivoire OR Ivory OR Cuba OR Djibouti OR Dominica OR Dominican OR Ecuador OR Egypt OR Salvador OR Eritrea OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guinea-Bissau OR Guyana OR Haiti OR Honduras OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyz OR Lao OR Laos OR Latvia OR Lebanon OR Lesotho OR Liberia OR Libya OR Lithuania OR Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall OR Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova OR Mongolia OR Montenegro OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nepal OR Nicaragua OR Niger OR Nigeria OR Pakistan OR Palau OR Panama OR "Papua New Guinea" OR Paraguay OR Peru OR Philippines OR Romania OR Russia OR Russian OR Rwanda OR Samoa OR "Sao Tome" OR Senegal OR Serbia OR Seychelles OR "Sierra Leone" OR "Solomon Islands" OR Somalia OR "South Africa" OR "Sri Lanka" OR "St. Lucia" OR "St. Vincent" OR Grenadines OR Sudan OR Suriname OR Swaziland OR Syrian OR Syria OR Tajikistan OR Tanzania OR Thailand OR Timor-Leste OR Togo OR Tonga OR Tunisia OR Turkey OR Turkmenistan OR Tuvalu OR Uganda OR Ukraine OR Uruguay OR Uzbekistan OR Vanuatu OR Venezuela OR Vietnam OR "West Bank" OR Gaza OR Yemen OR Zambia OR Zimbabwe OR Africa OR sub-saharan OR "developing country" OR "developing countries" OR "low-resource" OR "resource-limited" OR "resource-constrained" OR "low- and middle-income" OR LMIC OR "third world" OR "low-income country" OR "middle-income country") in combination with section-specific terms, which included epidemiology OR prevalence OR rate, "risk factor*" OR "association" OR etiology, youth OR child* or adolescen*, HIV, humanitarian OR refugee OR migrant, and COVID. We gave precedence to the most recent publications and systematic reviews identified through these searches. We do, however, also reference older, seminal publications on suicide globally to better situate current information within the literature.

Epidemiology of Suicide and STB in LMIC

Prevalence in Adults

Population-level data have demonstrated a number of important themes regarding suicide rates in LMIC. Though most of the world's suicides occur in LMIC, the suicide rates, which range from 7.3 per 100,000 in upper-middle-income countries to 9.9 per 100,000 in low-income countries and 10.1 per 100,000 in lower-middle-income countries, are slightly lower compared to high-income countries (HIC), with 10.9 per 100,000 deaths by suicide [1]. In addition to diversity across income level, suicide rates also vary widely at the WHO region and country level. For example, the highest suicide rates globally are found in Lesotho (African region, lower-middle income) and Guyana (American region, upper-middle income), and Grenada (American region, upper-middle income) and Sao Tome e Principe (African region, lower-middle income) have among the lowest global suicide rates [1]. Despite the lower average suicide rates currently observed in LMIC, temporal trends in these settings are very concerning. Global suicide rates have decreased by over 30% in the past 30 years. Yet, gains in suicide reduction have been smaller overall in LMIC, and many have even shown increased rates of suicide in recent years. Zimbabwe, Jamaica, Paraguay, Zambia, and Belize have had the highest increase in suicide rates since 1990, ranging from 52 to 96%. There are exceptions to this, though, with suicide rate reductions greater than the global average in some LMIC, including China and the Philippines (64% and 58% reduction, respectively) [18].

Demographics of those who die by suicide differ in HIC and LMIC. Globally, more men die by suicide than women. In HIC, men have a rate of suicide death more than three times that of women; in LMIC, the ratio of male to female deaths is lower (low-income countries: 2.9; lower-middle-income countries: 1.8; upper-middle-income countries: 2.6) [1]. Additionally, suicide rates generally increase with age. Yet, in LMIC, the suicide rate for females is higher in younger than older adulthood [19].

While more limited in quantity and with samples often not representative of the general population, more recent

research has explored the prevalence of STB in LMIC adults [20•, 21–23, 24•, 25–28]. Data has varied widely in these studies. Some of this is likely owing to sample characteristics (e.g., primary care versus community settings) and measurement tools used, but it does not explain all variation. Using the same methodology to obtain a nationally representative sample of STB in adults from Bhutan [22], Zambia [28], Malawi [27], and Eswatini [26], past-year suicidal thoughts ranged from 3.1% in Bhutan to almost 8% in Zambia and Malawi; past-year suicide attempts ranged from 0.4% in Malawi to 1.1% in Zambia. In another study evaluating cross-national STB in a representative community sample of adults from Ethiopia, Uganda, South Africa, India, and Nepal [24•], rates for past-year suicidal thoughts ranged from 3.5% in Nepal to 11.1% in India, and past-year attempts ranged from 0.4% in India to 3.7% in Ethiopia. Moreover, a systematic review of studies on STB in Ethiopia alone found rates of past-year suicidal thoughts ranging from 1 to 55% and past-year attempts from 0.6 to 14%. The authors were not able to identify the source of heterogeneity assessing sample size, study setting, publication period, or measurement tool. There remains uncertainty, therefore, in what underlies the variation in STB rates observed among different adult samples.

Prevalence in Youth

It is estimated that almost 90% of adolescents who die by suicide are from LMIC, reflecting the proportion of the world's adolescents that live in these regions [1]. A recent cross-national study [29] reported a global adolescent suicide rate of 3.8 per 100,000 people, with higher rates found in older adolescents. Male adolescents were shown to have a suicide rate more than double that of female adolescents, a finding echoed in a global systematic review of 67 population-based, longitudinal studies [30]. However, analyses were based on data from the WHO Mortality Database, and data quality criteria resulted in only 45 of the 194 WHO member countries being included. Of these, 34 were high, nine were upper-middle, and two were lower-middle countries; no low-income countries were included. While the authors found no association between country income level and suicide rate, these findings on suicide prevalence may not be generalizable to LMIC that were not included.

Two recent studies [31••, 32••] have collated data on adolescent STB specifically across LMIC, based on data from the Global Student Health Survey [33]. Past-year prevalence of suicidal thoughts and attempts was found to be 16.9 and 17%, respectively. Prevalence varied by region, with African countries having the highest prevalence of suicidal thoughts (20.4%) and the western Pacific region having the highest prevalence of attempts (20.5%). Prevalence also varied by income level, with suicidal thoughts being highest (19.7%) in low-income countries and attempts highest (17.6%) in upper-middle-income countries. Compared to recent cross-national data from HIC [34, 35], prevalence of suicidal thoughts was similar, but prevalence of attempts was over three-fold higher in LMIC adolescents. It should be noted, however, that the Global Student Health Survey was administered only to school-going adolescents, a sample shown to have higher prevalence of suicide attempts [35], and prevalence of STB in a general population of LMIC adolescents may not differ from that of HIC adolescents.

Global student health survey data also demonstrated that older adolescents and female adolescents have a higher prevalence of STB [31••, 32••], similar to what has been observed in HIC [34, 35]. The ratio of female:male adolescent STB, however, has been shown to be higher in both population-based and school-based samples from LMIC [34, 35], indicating that sex may have a larger role in STB among LMIC adolescents.

While research on suicide and STB in adolescents has grown over the years, there remains little data available on suicide and STB in preadolescent children. A 2022 systematic review of STB prevalence in children 12 and under [36] identified just 28 articles, only one of which was from an LMIC (Mexico). Pooled prevalence of suicidal thoughts and attempts was 7.5% and 1.3%, respectively, highlighting the early appearance of suicide risk and the need for more research in this area.

Etiology of Suicide in LMIC

A socioeological model of suicide allows for consideration of an individual's risk factors within their environmental context [19, 37]. This model organizes factors that contribute to suicide risk at the individual (e.g., genetics, health, occupation, sociodemographics), interpersonal (e.g., interpersonal violence, family history of mental illness, social isolation), and community (e.g., access to means, societal norms, instability related to war or national disaster, resource availability) levels. Below, we highlight recent data regarding the risk factors for suicide and STB in LMIC according to the three levels of the suicide socioecological model (Table 1).

Adult Etiology

Individual Level

The bulk of research on risk factors for suicide in LMIC has focused on those at the individual level, in particular related to mental health and physical health. With regard to psychiatric disorders, the prevalence in people with STB and those that die by suicide in LMIC has been found to be lower than in HIC [38, 39••]. Estimates indicate that

Table 1 Socioecological model of factors suggested to increase suicide risk in LMIC

Level	Adults	Youth
Community	Adverse childhood experiences Refugees seeking asylum	Adverse childhood experiences Limited access to health services
Interpersonal	Family alcohol problems Family history of suicide Interpersonal violence Adverse childhood experiences	Weak family relationships Family conflict Weak social relationships Bullying Interpersonal violence Romantic relationship problems Adverse childhood experiences
Individual	*Psychiatric disorders HIV Family history of suicide Low socioeconomic status Low educational attainment Unmarried *Perinatal LGBTQ +	*Psychiatric disorders HIV Low socioeconomic status Food insecurity Low educational attainment LBGTQ +

*Differs in magnitude or direction of impact from data on risk factors for suicide in high-income settings

80–90% of HIC adults who die by suicide [40, 41] and over 90% of those that attempt suicide [42] have a psychiatric disorder. In contrast, a review of 112 studies from 26 LMIC [39••] showed that just 56% of adults who die by suicide and 45% with suicidal behavior had a psychiatric disorder. Similarly, a systematic review of suicidal thoughts in people with schizophrenia found a higher prevalence in samples from HIC than LMIC [38]. It should be noted that while findings are consistent between these systematic reviews, both studies' authors highlight the need for more high-quality data to confirm these findings. Regarding physical health conditions, the most commonly studied with regard to influence on suicide risk is HIV infection. Multiple systematic reviews have demonstrated increased rates of suicide and STB in people living with HIV. Suicide deaths in people living with HIV have been shown to be 100 times greater than the general population [43, 44]. When comparing sexes, females living with HIV have higher STB than males, as is seen in the general population; unlike the general population, however, females living with HIV have an equal rate of suicide death as males living with HIV [45, 46]. Finally, sociodemographic factors commonly associated with suicide risk in HIC that have been linked to increased risk in LMIC include low economic status [48], engaging in sex work [47], low educational attainment [24•], being unmarried [21, 23, 25], and being LGBTQ + [48, 49]. Distinct from HIC, data indicate that perinatal women have increased prevalence of suicidal attempts in LMIC [50].

Interpersonal and Community Levels

Though less commonly explored, interpersonal risk factors previously shown to increase STB in HIC have been recently demonstrated in LMIC populations, including family alcohol problems, family members who have died by suicide [26] (which may also be an individual-level risk factor based on genetics), and interpersonal violence [51]. A 2022 systematic review of studies on adverse childhood experiences, which occur at both the interpersonal and community levels, demonstrated a two-fold increase in STB in HIC, but data from LMIC was too limited to draw conclusions [52]. Research around suicide and STB in humanitarian settings and refugee populations has grown in recent years, though a clear picture still emerging. One systematic review demonstrated higher prevalence of suicidal thoughts but similar prevalence of attempts in refugee compared to non-refugee populations; of note, this report highlighted the heterogeneity in studies and suggested interpretation with caution [53]. Another systematic review found that refugee status was an important factor in suicide, with refugees seeking asylum having higher risk of suicide but refugees granted asylum having lower risk of suicide than the host population [54]. Despite the fact that nearly 70% of refugees reside in LMIC [55], most of the current research has been conducted in HIC, resulting in an important gap in the literature regarding suicide risk among refugee and humanitarian populations.

Youth Etiology

Individual Level

Like in adults, the majority of research on youth suicide has focused on risk factors at the individual level. In global studies, presence of any psychiatric disorder has been associated with a ten-fold increase in odds of suicide death and over three-fold increase in suicide attempt among adolescents [56]. Looking at specific disorders, only affective

disorders—not anxiety, disruptive behavioral disorders, or substance use—are associated with suicide attempts [56]. Similarly, in preadolescent children worldwide, depression but not anxiety, PTSD, or disruptive behavioral disorders are associated with STB [57]. Data on psychiatric disorders and suicide risk specifically among LMIC youth are much more limited, however, with three different systematic reviews from 2019 identifying less than 10 studies from LMIC [39••, 56, 58]. There is evidence, however, that the profile of psychiatric disorders among adolescents with STB may be different than in HIC. For example, anxiety has been shown to be more strongly associated with STB than depression or substance abuse in LMIC adolescents [31••, 59]. Regarding physical health risk factors, LMIC youth living with HIV have been shown to have a higher prevalence of STB than the general population, though data is lacking on current rates of suicide in LMIC youth living with HIV compared to the general LMIC youth population [60]. Sociodemographic factors associated with STB in cross-national studies of LMIC include low socioeconomic status [31••], food insecurity [61], academic failure [62], and being LGBTQ + [63, 64].

Interpersonal and Community Levels

Weak family and social relationships, being a victim of bullying, interpersonal violence, romantic relational problems, and family conflict have all been associated with STB in LMIC youth [31••, 62, 65]. However, heterogeneity in samples has precluded conclusions around which of these may have the strongest impact [62]. Adverse childhood experiences, including sexual, emotional, and physical abuse, have also been associated with increased STB in youth [62]. Finally, at the structural level, more limited access to health services has been posited to interact with individual-level risk factors to increase suicide risk among LMIC adolescents [66].

Impact of the COVID-19 Pandemic on Suicide in LMIC

The onset of the COVID-19 pandemic and subsequent disruptions in the daily life of adults and youth across the globe resulted in great concern around the potential impact on suicide. Systematic reviews focused on suicide during the pandemic have since shown there is no consistent evidence for a change in suicide rates [67, 68]. However, data from LMIC remains very sparse, with a 2022 systematic review [69•] identifying just 22 studies from 12 LMIC, and no studies from Africa, the Pacific, or the Caribbean. Moreover, most studies of LMIC populations were of low quality methodologically and included samples largely from the early pandemic period. Reviews exploring the impact of the COVID-19 pandemic on youth have demonstrated increases in STB [70, 71], but, similar to studies on adults, have identified very limited data from LMIC. Further research is required to determine the current and longer-term impact of the COVID-19 pandemic on suicide in LMIC.

Conclusions

Recent years have seen a marked growth in the literature around suicide epidemiology and etiology in LMIC. Together, these studies have yielded some consistent conclusions, but also many areas of heterogeneity, across these countries. The main area of heterogeneity among reviewed studies was the prevalence of suicide and STB across LMIC, which varied greatly by WHO region, cross-nationally, and even within-country. This may be due to true differences among populations based on exposure to specific or combinations of risk factors [72]. This may also be due to inaccurate reporting of suicide and STB, driven by poor surveillance and registration systems [1], misclassification [73, 74], criminalization of the act [75–77], and stigma [78]. For studies of STB, differing definitions, methods of evaluation, or time frames for assessment may also result in artificial variability across study populations.

One area of consistency across studies was the high rate of suicide attempts among LMIC youth, a particularly concerning finding considering that previous attempt is one of the greatest risk factors for suicide death [10]. Moreover, considering the majority of LMIC youth with suicidal thoughts also made suicide attempts, the trajectory of suicidal behaviors in LMIC youth may differ from that of HIC youth, and existing theoretical models developed in HIC may need to be adapted for LMIC [79]. Another area of consistency is the relationship between psychiatric disorders and suicide in both LMIC adults and youth, though specific disorder and the magnitude of the association appears different than in HIC. Finally, emerging evidence highlights females, adults and youth living with HIV, those who are LGBTQ + , and those with poor socioeconomic status as highly vulnerable populations in LMIC.

Limited and low-quality data from LMIC were identified as a main issue in interpretation and comparison of results. Thus, future research should address the following gaps. Though more research is required in all LMIC, low-income countries in particular have very scant data and require more focus in future studies. Moreover, more research is needed on preadolescent populations, a group that comprises a small portion of the total number of suicides in the general population but may be an important target for early intervention and prevention of suicide [36], and for whom there is almost no data from LMIC. Finally, while evidence of individual risk factors for

suicide in LMIC is growing, little research in this area has explored biological factors, for which numerous associations have been reported in HIC [19]. Risk factors for suicide at the interpersonal and community levels also have received little attention in LMIC and require further exploration.

In addition to increased focus on these areas of research, methodological improvements need to be made to improve interpretability across studies of suicide in LMIC. For one, development of robust national death registration systems is critical to determining the prevalence of suicide in LMIC and vulnerable populations within them. To better understand the etiology of suicide in LMIC, research including samples representative of the general population in adults are needed; in youth, studies exploring STB in those who do not attend schools, and have been shown to have poorer mental health overall [17, 80], are also required. Regarding study design, standardization of assessment measures and the time frames evaluated can promote clearer comparison of prevalence and risk factors across studies. Finally, research should aim to evaluate multiple types of risk factors and use longitudinal study designs to support exploration of interactions between factors at different socioecological levels and identify who among the many with STB are most likely to die by suicide.

In this review, we present recent evidence regarding suicide and STB in both adults and youth from LMIC. We focus on LMIC to enable comparison with the majority of research on suicide, which has been conducted in HIC. However, we recognize that LMIC are not monolithic, but rather have distinct cultural and structural environments that must be considered so as not to obscure both similarities and differences across these contexts [81]. Moreover, in HIC, significant socioeconomic and cultural differences in STB have been observed [82–84]. In LMIC, where income inequality is on average higher than HIC [17], there may be similar intra-country disparities. Therefore, as research in LMIC grows, clear documentation and comparison of the unique characteristics of study populations between and within specific LMIC will be essential to understanding the factors contributing to suicide in these settings.

Declarations

Conflict of Interest Dr. Oquendo receives royalties from the Research Foundation for Mental Hygiene for the commercial use of the Columbia Suicide Severity Rating Scale. She serves as an advisor to Alkermes, Mind Medicine, Sage Therapeutics, St. George's University and Fundacion Jimenez Diaz. Her family owns stock in Bristol Myers Squibb. All other authors declare no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by the authors.

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- •• Of major importance

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