



# Association of Perceived Health, Happiness, and Quality of Life With Morbid Thoughts and Suicide Ideation: Evidence From the Study on Global AGEing and Adult Health

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## Abstract

**Background and aims:** This study aimed to determine the prevalence of morbid thoughts and suicide attempts as well as their relationship with perceived health status, quality of life, and happiness in five low-middle-income countries.

**Methods:** Data on 3373 men and women aged 40 years and above were collected from the World Health Organization's (WHO's) study on global AGEing and adult health (SAGE) survey on five countries: China (830), Ghana (438), India (1602), Russia (175), and South Africa (830). Outcome variables were morbid thoughts and suicide attempts, and the main explanatory variables were health status, quality of life, and happiness.

**Results:** The findings indicated that among the five countries, India had the highest prevalence of both morbid thoughts 79.5% (95% CI: 73.4-84.5) and suicide attempts 75.4% (95% CI: 61.0-85.7), while Ghana had the lowest prevalence of both morbid thoughts 1.9% (95% CI: 1.3-2.7) and suicide attempts 2.5% (95% CI: 1.1-5.5). Furthermore, regression analysis revealed a significant association between perceived health, quality of life, and happiness with morbid thoughts and suicide attempts. However, the association between perceived health and happiness was significant only among women. Men and women reporting dissatisfaction with the quality of life had 1.521 times (95% CI: 1.126-2.056) and 1.762 times (95% CI: 1.406-2.209) higher odds of morbid thoughts compared with those who reported satisfaction with the quality of life.

**Conclusion:** Perceived poor health, quality of life, and happiness are significantly associated with higher odds of morbid thoughts of suicidal ideation, especially among women. In line with the past findings, these findings support the importance of focusing on these perceived constructs of health and life for mental health promotion and suicide prevention programs.

**Keywords:** Perceived health, Quality of life, Happiness, Morbid thoughts, Suicide ideation

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## Introduction

The past few decades have witnessed a sharp growth in the proportion of elderly populations. Due to the higher vulnerability of elderly individuals to developing non-communicable diseases and lower capacity for self-care, keeping the older population healthy is a top priority for policymakers.<sup>1-3</sup> Apart from the conventional risk factors such as non-communicable diseases, mental health and self-harm issues such as suicide are also a growing concern for older populations. Currently, suicide accounts for approximately 2% of all deaths worldwide, and older men and women show the highest suicide rate in almost all countries.<sup>1</sup>

Given the strong association between suicide thoughts, suicide attempts, and completed suicide,<sup>4</sup> efforts have been made to identify and assess the risk factors of suicide thoughts. Previous studies revealed that suicide

thoughts and (or) suicide attempts involve a large variety of predictors, including clinical, psychological, biological, and even sociological factors.<sup>3,5,6</sup> Subjective instruments such as life satisfaction, self-report health, and quality of life (QoL) are drawing increasing attention for their promising effect on the early detection of suicide risks. However, previous findings are inconsistent or even contradictory. On the one hand, some evidence reveals a significantly negative relationship between suicidal ideation and health-related QoL (HRQoL), self-reported health (SRH), as well as life satisfaction, even after adjusting for other confounding factors<sup>7-14</sup>; on the other hand, recent studies indicate a lack of significant relationship between these subjective measures and suicide,<sup>15-17</sup> and some even suggest a positive relationship between QoL and suicide risks.<sup>18</sup> In other words, the validity and sensitivity of these subjective instruments require further investigation.

The current literature on this topic indicates that almost all the studies are from high-income settings. To the best of our knowledge, no study to date has explored this topic using a cross-national sample of low- and middle-income countries (LMICs). In this regard, the present study aimed to investigate the prevalence of morbid thoughts and suicide attempts and their relationship with perceived health status, QoL, and happiness among community-dwelling adult men and women in six low-middle-income countries, including China (the year 2009.10), Ghana (the year 2007.08), India (the year 2007), Russia (the year 2007.10), and South Africa (the year 2007.08).

## Methods

### The Survey

Data for this study were obtained from SAGE of the WHO Wave 1 conducted in 2007–2010. SAGE is a longitudinal survey conducted in five countries, including China, Ghana, India, the Russian Federation, and South Africa to provide quality data on various aspects of elderly health for the population aged 50 and higher. However, a smaller proportion was below 50 to serve comparative purposes. For the sampling method, SAGE surveys employed a multistage clustered design to assign a non-zero probability of selection for each household and individual. All participants gave informed consent to take part in the survey. A more detailed description of the study and sample design can be observed on the WHO website: <https://apps.who.int/healthinfo/systems/surveydata/index.php/catalog/sage/about>.

### Variables

#### Outcome Variables

Outcome variables were self-reported morbid thoughts and suicide attempts during the last 12 months. Participants were asked:

During the last 12 months, have you had a period lasting several days when you have been feeling your energy decreased or that you were tired all the time? During that period: (1) Did you think of death or wish you were dead? (2) Did you ever try to end your life? The answers were categorized as 1 Yes and 2 No.

#### Explanatory Variables

The explanatory variables of primary interests were perceived health, QoL, and happiness. Participants were asked:

How would you rate your health status? The options to answer this question included very good, good, moderate, bad, very bad, and don't know.

How would you rate your overall QoL? The options to answer this question included very good, good, moderate, bad, very bad, and don't know.

Taking all things together, how would you say you are these days? Are you...? The options to answer this question were very happy, happy, neither happy nor unhappy, unhappy, very unhappy, and don't know.

The responses for these three self-reported measures were categorized as either good (very good and good) or poor (moderate, bad, very bad, and don't know).

### Control Variables

To measure the independent associations, several covariates were used in the model based on their potential correlation with the outcome and explanatory variables. These variables included age groups (40-49/50-59/60-69/70/70+), Gender (male/female), residency (urban/rural), marital status (currently unmarried/currently married), educational attainment (none to less than primary school/ secondary school completed to high school or equivalent/secondary school completed and higher), enough money for a living (completely or mostly moderately or not at all), ever used tobacco (Yes/No), ever used alcohol (Yes/No), perceived depression during the last 30 days (None/mild/moderate/severe/extreme).

### Data Analysis

Data were analyzed by SPSS version 24 for windows. Datasets were first cleaned and then checked for outliers and multicollinearity issues. Prevalence rates of morbid thoughts and suicidal attempts were calculated across the sociodemographic variables. Chi-square bivariate tests were used to examine the bivariate relationship between the outcome and explanatory variables. Gender-stratified prevalence rates were measured for poor perceived health, QoL, and happiness and were exhibited as bar charts. Following that, the adjusted association between morbid thoughts and suicidal attempts with each of the three explanatory variables was analyzed with binary logistic regression methods. Variables that were not significant ( $P < 0.25$ ) in the bivariate tests were excluded from the regression models. Results of regression analyses were presented as odds ratios (ORs) with 95% confidence intervals (CIs) separately for men and women, and the level of significance for the regression analyses was set at 5%.

### Results

The socio-demographic characteristics were presented in Table 1. In total, 3373 men and women aged 40 years and above were included in this study from China (830), Ghana (438), India (1602), Russia (328), and South Africa (175). The mean  $\pm$  standard deviation of the age was  $61.48 \pm 12.34$  years among men and  $59.49 \pm 13.31$  years among women ( $P < 0.001$ ).

The prevalence of both morbid thoughts and suicide attempts was highest in India (79.5% and 75.4%, respectively) and lowest in Ghana (1.9% and 2.5%, respectively). The prevalence was also higher among the youngest age group of 40-49 years (58.4% and 68.3%, respectively), females (71.2% and 60.1%, respectively), rural residents (59.5% and 72.5%, respectively), currently married (70.5% and 70.5% and 68.2% respectively), have no/lower educational level (51.5% and 43%, respectively),

**Table 1.** Sample Characteristics - SAGE Wave-1 (2007-2010)

	<b>N = 3373 (%)</b>	<b>Morbid Thoughts 32.6% (28.1-37.3)</b>	<b>P</b>	<b>Suicidal Attempts 7.5% (5.4-10.4)</b>	<b>P</b>
<b>Country</b>					
China	830, 24.6	5.1 (2.4-10.6)	<0.001	12.0 (4.7-27.6)	<0.001
Ghana	438, 13	1.9 (1.3-2.7)		2.5 (1.1-5.5)	
India	1602, 47.5	79.5 (73.4-84.5)		75.4 (61.0-85.7)	
Russia	328, 9.7	10.4 (6.9-15.3)		3.1 (1.0-9.3)	
South Africa	175, 5.2	3.1 (1.6-5.9)		7.0 (3.2-14.6)	
<b>Age (y)</b>					
40-49	524, 15.5	58.4 (52.7-64.0)	<0.001	68.3 (56.1-78.4)	<0.001
50-59	814, 24.1	18.8 (14.8-23.6)		12.2 (7.4-19.2)	
60-69	1350, 40	12.0 (9.5-15.1)		8.8 (5.3-14.4)	
70/70+	685, 20.3	10.7 (8.7-13.1)		10.7 (6.5-17.3)	
<b>Gender</b>					
Male	993, 29.4	28.8 (22.7-35.9)	<0.001	39.9 (24.0-58.2)	<0.001
Female	2380, 70.6	71.2 (64.1-77.3)		60.1 (41.8-76.0)	
<b>Residency</b>					
Urban	1665, 49.4	40.5 (33.8-47.6)	<0.001	27.5 (15.5-44.0)	<0.001
Rural	1708, 50.6	59.5 (52.4-66.2)		72.5 (56.0-84.5)	
<b>Marital status</b>					
Currently unmarried	1000, 29.6	29.5 (24.1-35.7)	<0.001	31.8 (19.9-46.8)	<0.001
Currently married	2373, 70.4	70.5 (64.3-75.9)		68.2 (53.2-80.1)	
<b>Educational attainment</b>					
None/less than primary school	1593, 47.2	51.5 (44.7-58.3)	<0.001	43.0 (28.6-58.7)	<0.001
Secondary school completed	1295, 38.4	30.9 (24.6-38.1)		44.8 (28.7-62.0)	
High school (or equivalent) completed/higher	485, 14.4	17.5 (12.6-23.9)	<0.001	12.2 (6.3-22.3)	0.001
<b>Enough money</b>					
Completely/mostly	1804, 53.5	84.2 (79.0-88.4)	0.308	91.1 (83.2-95.5)	0.128
Moderately/not at all	1568, 46.5	15.8 (11.6-21.0)		8.9 (4.5-16.8)	
<b>Ever used tobacco</b>					
Yes	1499, 44.4	40.7 (34.6-47.1)	<0.001	44.3 (31.2-58.2)	<0.001
No	1874, 55.6	59.3 (52.9-65.4)		55.7 (41.8-68.8)	
<b>Ever used alcohol</b>					
Yes	3018, 89.5	16.9 (12.9-21.8)	<0.001	20.2 (11.3-33.4)	<0.001
No	355, 10.5	83.1 (78.2-87.1)		79.8 (66.6-88.7)	
<b>Depression</b>					
None	540, 16	15.0 (10.7-20.6)	<0.001	12.3 (6.3-22.8)	<0.001
Mild	1458, 43.7	28.0 (22.4-34.4)		20.1 (11.1-33.5)	
Moderate	764, 33.2	24.0 (19.1-29.7)		21.4 (11.4-36.6)	
Severe-extreme	611, 18.1	33.1 (27.0-39.7)		46.2 (30.3-63.0)	
<b>Perceived health</b>					
Good	1224, 36.3	22.3 (17.4-28.0)	<0.001	24.2 (14.8-37.1)	<0.001
Not-good	2149, 63.7	77.7 (72.0-82.6)		75.8 (62.9-85.2)	
<b>Perceived QoL</b>					
Good	1939, 57.5	41.2 (35.1-47.7)	<0.001	25.6 (14.8-40.5)	<0.001
Not-good	1434, 42.5	58.8 (52.3-64.9)		74.4 (59.5-85.2)	
<b>Perceived happiness</b>					
Happy	1657, 49.1	24.8 (20.0-30.4)	<0.001	17.0 (9.8-27.8)	<0.001
Not-happy	1716, 50.9	75.2 (69.6-80.0)		83.0 (72.2-90.2)	

Abbreviations: SAGE, Study on global AGEing and adult health; N, Number; QoL, Quality of life; CI, Confidence interval.

Note: Numbers in parenthesis represent 95% CIs.

having better financial status (84.2% and 91.1%, respectively), never used tobacco (59.3% and 55.7%, respectively), and never used alcohol (83.1% and 79.8%, respectively). The prevalence ratios were also higher among those reporting depression, poor health status, poor QoL, and a lack of happiness.

Figure 1 depicts that the prevalence of both morbid thoughts and suicide attempts was highest in India. In general, women had a slightly higher prevalence of morbid thoughts and suicidal attempts, especially in India, Russia, and South Africa, while men had a higher prevalence of morbid thoughts and suicidal in Ghana.

Figure 2 illustrates the comparative prevalence of morbid thoughts and suicide attempts among participants according to SRH status. In China and South Africa, participants who reported poor SRH had a higher prevalence of morbid thoughts and suicide attempts, while the corresponding figures were comparatively lower in India and Russia.

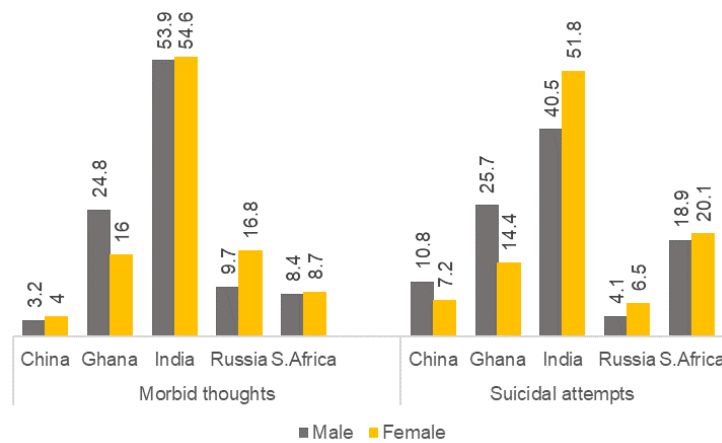
Figure 3 depicts the prevalence of participants with

morbid thoughts and suicide attempts according to satisfaction with QoL. Similar to those who reported poor health status, the prevalence of morbid thoughts and suicidal attempts was higher among those reporting (except for women in Ghana) poor QoL in China, Ghana, and South Africa.

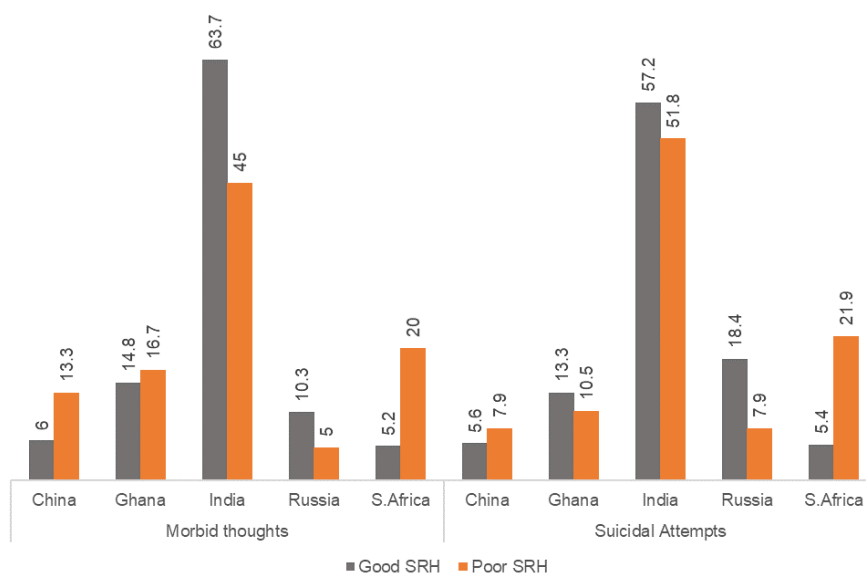
As shown in Figure 4, the prevalence of morbid thoughts and suicidal attempts was generally higher among participants who expressed dissatisfaction with the level of happiness in China, Ghana (suicidal attempts), and South Africa. However, in India and Russia, the prevalence was higher among those who reported satisfaction with the level of happiness.

**Regression Analysis**

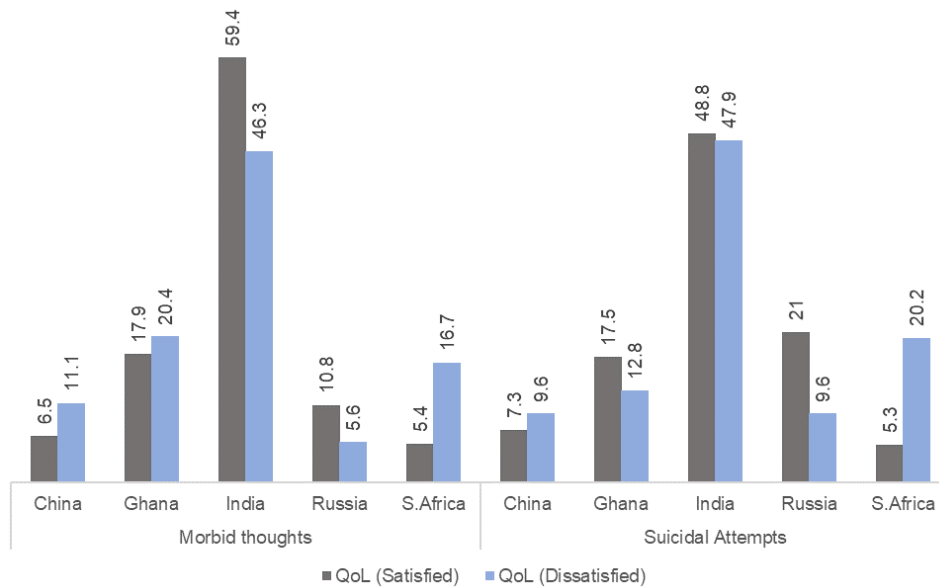
Overall, the results of regression analysis indicated a positive relationship between perceived health, QoL, and happiness with morbid thoughts (Table 2) and suicide attempt (Table 3) among both men and women. For instance, men and women reporting dissatisfaction with



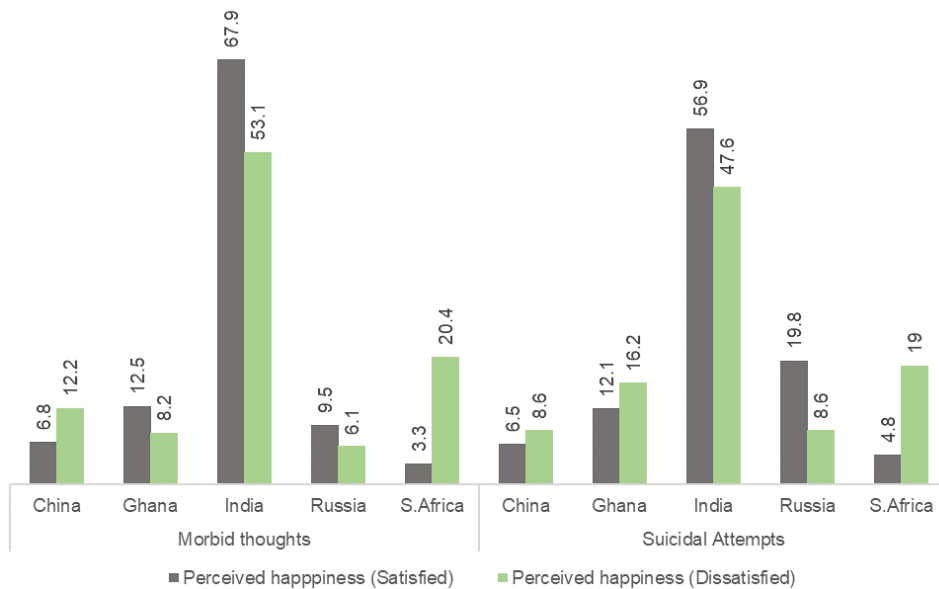
**Figure 1.** Country-wise Sex-stratified Prevalence of Morbid Thoughts and Suicidal Attempts. SAGE 2007-2010. Abbreviation: SAGE, Study on global AGEing and adult health



**Figure 2.** The Prevalence of Morbid Thoughts and Suicidal Attempts Among Participants With Poor Self-rated Health. Abbreviation: SRH, self-reported health



**Figure 3.** The Prevalence of Morbid Thoughts and Suicidal Attempts Among Participants Reporting Low Satisfaction With QoL. Abbreviation: QoL, Quality of life



**Figure 4.** The Prevalence of Morbid Thoughts and Suicidal Attempts Among Those With Low Perceived Happiness

QoL had 1.521 (1.126-2.056) and 1.762 times (1.406-2.209) higher odds for morbid thoughts compared with those who reported satisfaction with QoL (Table 2). Similarly, the odds of suicide attempts were also higher among men (OR: 3.201, 95% CI:1.775-5.771) and women (OR:1.896, 95% CI:1.227-2.931) reporting dissatisfaction with QoL. Regarding the association of morbid thoughts and suicide attempts with perceived health and happiness, the odds were significant among women only.

### Discussion

In this study, we investigated the association between SRH with morbid thoughts and suicidal attempts among the elderly population in five developing and emerging economies. The findings revealed varying patterns in the

prevalence of both morbid thoughts and suicidal attempts across and within countries. Among the emerging economies, China had the lowest prevalence of morbid thoughts and suicidal attempts (<5%), while India had strikingly a high prevalence of both variables with more than three-quarters of men and women reporting having morbid thoughts and suicidal attempts. Notably, although Ghana is the least developed country among all the five countries in terms of the Human Development Index, it had the lowest prevalence of morbid thoughts and suicidal attempts. It is also worth noting that these countries are remarkably dissimilar in terms of geopolitical and economic structure, sociocultural environment, and healthcare services. Although there was not any indicator to observe the extent to which they influence the outcomes,

**Table 2.** Odds Ratios of Morbid Thoughts Among Men and Women with Poor Perceived Health, QoL, and Happiness

	Poor Perceived Health		Dissatisfaction with Perceived QoL		Dissatisfaction with Perceived Happiness	
	Men	Women	Men	Women	Men	Women
China	1.043 (0.926- 1.730)	1.149 (0.637- 2.074)	2.146 (1.292- 3.564)	1.32 (1.024- 1.672)	1.210 (1.034- 1.415)	1.447 (1.113- 1.881)
India	1.181 (0.995-1.401)	1.539 (1.102- 2.149)	1.328 (0.723- 2.438)	1.317 (1.041- 1.667)	1.151 (0.860- 1.541)	1.060 (0.520- 2.159)
Ghana	1.295 (1.179- 1.423)	1.607 (0.610- 4.237)	2.146 (1.292- 3.564)	1.295 (1.179- 1.423)	1.891 (1.173- 3.048)	1.242 (0.845- 1.825)
Russia	1.170 (0.964-1.419)	1.343 (0.763- 2.361)	1.580 (1.119- 2.233)	1.170 (0.964- 1.419)	1.087 (0.870- 1.359)	1.159 (0.513- 2.617)
South Africa	1.317 (1.041-1.667)	1.095 (0.392- 3.059)	1.050 (0.292- 3.775)	1.337 (0.882- 2.025)	1.261 (0.667- 2.384)	1.288 (0.749- 2.217)
Pooled	1.390 (0.967-1.999)	3.046 (2.343-3.961)	1.521 (1.126-2.056)	1.762(1.406-2.209)	1.004 (0.729-1.384)	2.219(1.748-2.816)

Abbreviation: QoL, Quality of life;

Note: Numbers in parenthesis represent 95% CIs.

**Table 3.** Odds Ratios of Suicide Ideation among Men and Women With Poor Perceived Health, QoL, and Happiness

	Perceived Health		Perceived QoL		Perceived Happiness	
	Men	Women	Men	Women	Men	Women
China	1.149 (0.637- 2.074)	2.146 (1.292- 3.564)	1.426 (0.679- 2.995)	2.629 (2.017-3.427)	2.045 (0.358- 11.686)	1.293 (0.611- 2.736)
India	1.539 (1.102- 2.149)	1.328 (0.723- 2.438)	1.514 (0.521- 4.402)	2.629 (2.017-3.427)	1.421 (0.757- 2.666)	1.784 (1.175- 2.710)
Ghana	1.607 (0.610- 4.237)	2.146 (1.292- 3.564)	1.974 (1.199- 3.249)	1.371 (1.273-1.476)	1.122 (0.814- 1.547)	1.158 (0.973- 1.378)
Russia	1.343 (0.763- 2.361)	1.580 (1.119- 2.233)	1.573 (0.669- 3.699)	1.162 (0.995-1.356)	1.743 (1.259- 2.413)	1.353 (0.987- 1.855)
South Africa	1.623 (1.032- 2.553)	1.228 (1.134- 1.329)	1.379 (1.118- 1.701)	1.113 (0.622- 1.992)	1.639 (1.304- 2.060)	1.483 (1.121- 1.960)
Pooled	0.976 (0.515-1.850)	1.610 (0.955-2.716)	3.201 (1.775-5.771)	1.896 (1.227-2.931)	0.642 (0.366-1.128)	2.286 (1.404-3.721)

Abbreviation: QoL, Quality of life;

Note: Numbers in parenthesis represent 95% CIs.

the findings provide interesting insights that need to be clarified and reaffirmed by further research.

We also observed important sociodemographic differences in the prevalence of morbid thoughts and suicidal attempts. Contrary to expectation, men and women in the lowest age group were more likely to report having morbid thoughts and suicidal attempts than those in the higher age groups. This might be due to the fact that younger people are more aware of their psychological state and do not perceive it as a result of progressing age. Moreover, the prevalence of morbid thoughts and suicidal attempts was higher among women, rural residents, and currently married ones, which is also counterintuitive, as men and urban residents in general have higher rates of committing suicide.<sup>11,19,20</sup> However, the current statistics is most based on studies from high-income countries and may not be consistent with the situation in the LMICs. In developing countries, residents living in rural areas tend to have lower socioeconomic status,<sup>21</sup> which is one of the risk factors for suicidality.<sup>22</sup> The gender difference is consistent with the previous literature related to Eastern areas.<sup>21</sup> Regarding marital status, inconsistent findings were observed from previous studies. Some studies indicated no significant association between marital status and suicidal behaviors,<sup>23</sup> whereas a statistically significant negative association has been documented in some other studies.<sup>24</sup> These interesting findings, once again, remind us that the risk factors and patterns of suicidality vary significantly from east to west and from one culture to another one.

In general, participants reporting depression, poor

health status, poor QoL, and a lack of happiness had a higher prevalence of morbid thoughts and suicidal attempts. These findings were substantiated by multivariate analysis though the associations were not consistent across gender and countries. The literature wisely documented negative associations between suicidality and depression as well as poor health status in the elderly population.<sup>6,8,25</sup> However, the relationships between suicidality and QoL or life satisfaction are less clear, especially when depression, another risk factor, is controlled. For instance, findings from Dong et al’s study indicated a statistically significant negative association between overall health status, QoL, and perceived happiness.<sup>26</sup> Fairweather-Schmidt et al<sup>27</sup> and Andrade-Machado et al<sup>28</sup> observed that only mental HRQoL is negatively related to suicidal ideation but not physical HRQoL, whereas no significant difference was observed in QoL between those with and without suicidal behavior in Kao et al’s<sup>29</sup> or Carbajal et al’s studies.<sup>16</sup> The difference may be due to the difference in the selection of the sample population. In other words, studies that reported a statistically significant negative association between QoL and suicidality tend to be those related to the general population with fewer psychiatric or psychological disorders, whereas the studies that did not report significant association are often carried out on patients with mental disorders. Amongst the persons who suffer from mental disorders, depressive disorders may be the direct influencing factor on suicidality. The present study reaffirms that amongst the general population, self-rated QoL may be a sensitive indicator to predict suicidality.

Regarding perceived happiness, the findings indicated a weaker association between morbid thoughts and suicidal attempts than that between QoL and SRH. Moreover, no statistically significant association was observed between perceived happiness and suicidal ideation in India, Russia, or South Africa; likewise, no statistically significant association was found between perceived happiness and suicidal attempts in China or Ghana. This result is not entirely in line with the findings extracted from Western cultures. For instance, Koivumaa-Honkanen et al revealed a dose-response relationship between life dissatisfaction and risks of suicide and long-term predictability of life satisfaction in their 20-year follow-up study.<sup>10</sup> This may be attributed to cultural or socio-economic differences. For example, Siegmann et al<sup>30</sup> explored the association between life satisfaction and suicidal ideation among both German students and Chinese students, and after controlling depression, they only observed a statistically significant negative association in German students. Under such circumstances, the underlying reasons for the differences across populations and cultures await further investigation.

### Strengths and Limitations

As far as we are concerned, this study is the first to investigate the association between morbid thoughts and suicide ideation with perceived health, QoL, and happiness. However, the findings need to be interpreted with caution. Surveys were conducted during 2007-2010 and may not represent the latest scenarios in these countries. Further, the data were gathered from several countries to understand the pattern of the association across different sociocultural environments. Nonetheless, the sample was not representative of the individual countries; hence, the findings may not be generalizable for the entire population. The surveys were cross-sectional; thus, the findings did not indicate the causality or directionality of the associations. Health, QoL, and happiness were self-reported and not measured objectively, which can be regarded both as a strength and a limitation. However, self-reported data are generally subject to reporting bias and/or recall error and cannot substitute the systematic measurement.

### Conclusion

Based on an analysis of secondary cross-sectional data from SAGE, the findings of this study conclude that perceived health, QoL, and happiness can serve as important indicators of morbid thoughts and suicide attempts, especially among women. In previous studies, SRH has been shown to be a strong determinant of morbidity and mortality. The findings of the present study further imply the relevance of perceived health and QoL in the prevention and intervention of psychological morbidity among the general population. Therefore, it is suggested that mental health practitioners in LMICs take into account patients' subjective health reports in

assessing and designing the course of treatment.

### Acknowledgements

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### Competing Interests

The authors declare that they have no competing interests.

### Ethical Approval

DHS surveys are approved by independent review boards in the host country, and by ICF international. All participants gave prior informed consent to take part in the survey. Additional approval was not necessary as the data were anonymized and collected from the public domain.

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