



# Suicide rate in relation to the Human Development Index and other health related factors: A global ecological study from 91 countries



Salman Khazaei<sup>a</sup>, Vajihe Armanmehr<sup>b</sup>, Shahrzad Nematollahi<sup>c</sup>, Shahab Rezaeian<sup>d,\*</sup>, Somayeh Khazaei<sup>a</sup>

<sup>a</sup> Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran

<sup>b</sup> Social Determinants of Health Research Center, Gonabad University of Medical Science, Gonabad, Iran

<sup>c</sup> Department of Epidemiology and Biostatistics, Tehran University of Medical Sciences, Tehran, Iran

<sup>d</sup> Research Center for Environmental Determinants of Health (RCEDH), Kermanshah University of Medical Sciences, Kermanshah, Iran

## ARTICLE INFO

### Article history:

Received 10 March 2016  
Received in revised form 5 November 2016  
Accepted 15 December 2016  
Available online 7 February 2017

### Keywords:

Ecological study  
Human Development Index  
Suicide

## ABSTRACT

There has been no worldwide ecological study on suicide as a global major public health problem. This study aimed to identify the variations in suicide specific rates using the Human Development Index (HDI) and some health related variables among countries around the world. In this ecological study, we obtained the data from the World Bank Report 2013. The analysis was restricted to 91 countries for which both the epidemiologic data from the suicide rates and HDI were available. Overall, the global prevalence of suicide rate was 10.5 (95% confidence intervals: 8.8, 12.2) per 100,000 individuals, which significantly varied according to gender (16.3 in males vs. 4.6 in females,  $p < 0.001$ ) and different levels of human development (11.64/100,000 individuals in very high development countries, 7.93/100,000 individuals in medium development countries, and 13.94/100,000 individuals in high development countries,  $p = 0.004$ ). In conclusion, the suicide rate varies greatly between countries with different development levels. Our findings also suggest that male gender and HDI components are associated with an increased risk of suicide behaviors. Hence, detecting population subgroups with a high suicide risk and reducing the inequality of socioeconomic determinants are necessary to prevent this disorder around the world.

© 2017 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Suicide is a major public health problem with considerable variation within and between countries [1]. It accounted for 0.5–1.4% of all deaths worldwide [2]. By contrast, in 2013, suicide resulted in 842,000 deaths [3]. Globally, suicide is the 15th leading cause of death in all ages [4] and the fourth in ages of 15–44 years [5]. In addition, for each successful suicide attempt, there are 10–40 failed suicide attempts as well [6]. Reports of the World Health Organization (WHO) showed that 85% of the world's suicide rates occur in low- and middle-income countries [7], while this is increasing especially in developing countries.

Many studies have shown that several factors such as hopelessness, mental disorders, alcoholism, or drug abuse, as well as stressful events such as financial problems and interpersonal communication difficulties are associated with suicide behavior [5,8,7,9]. In addition, some socioeconomic conditions such as

unemployment, poverty, and homelessness may increase the risk of suicide [10,11].

In high-income countries, social factors such as socioeconomic position (SEP) have an important role in suicide risk [12]. Knowledge of effective SEP factors on the risk of suicide and suicide attempt is important to improve public health policy notifications and plan for effective prevention programs. By contrast, inequality in the socioeconomic determinants can reflect regional imbalances in human development [13]. However, there has been no ecological study on the matter across the world. Unequal distribution of the Human Development Index (HDI) as a proxy for SEP in the countries has not been investigated yet and there have been widely conflicting findings regarding the direction of association between socioeconomic status and suicide rates. This study aimed to identify the variations in suicide specific rates by HDI and some health-related variables among different countries around the world.

Peer review under responsibility of Ministry of Health, Saudi Arabia.

\* Corresponding author.

E-mail address: [shahab.rezayan@gmail.com](mailto:shahab.rezayan@gmail.com) (S. Rezaeian).

<http://dx.doi.org/10.1016/j.jegh.2016.12.002>

2210-6006/© 2017 Ministry of Health, Saudi Arabia. Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 2. Materials and methods

### 2.1. Study design

This ecological study was performed on the relationship of suicide rate with the HDI and other health-related variables in 2015. We obtained the data from the World Bank Report 2013 [14] including: the HDI, urbanization (% of population), total fertility rate (births per woman), unemployment rate (% aged  $\geq 15$  years), age-standardized obesity rate among adults, and also suicide rate within different countries. Suicide rate was considered as the main outcome.

### 2.2. Measures

HDI has several main components that include: life expectancy at birth, mean years of schooling, expected years of schooling, and gross national income (GNI) per capita (20011 US dollars at purchasing power parity – 2011 PPP\$).

The analysis was restricted to countries for which both the epidemiologic data from the suicide rate and HDI were available (91 countries). Because data about suicide rate for low HDI countries were not available, we categorized countries into three predefined categories: medium ( $0.5 \leq \text{HDI} < 0.8$ ), high ( $0.8 \leq \text{HDI} < 0.9$ ), and very high ( $\text{HDI} \geq 0.9$ ). Therefore, the categorization resulted in very high human development (10), high human development (33), and medium human development (48) countries.

### 2.3. Data analysis

Comparison of suicide rates by gender and HDI components between various HDI categories (very high, high, and medium) were done using a one-way analysis of variance. Also, we used the Pearson correlation coefficient for assessment of the correlation between the suicide rate among men and women and some health-related variables. All analyses were conducted at 95% significant level using Stata software version 12 (StataCorp, College Station, TX, USA).

## 3. Results

Overall, the global prevalence of suicide rate was 10.5 (95% confidence intervals: 8.8, 12.2) per 100,000 individuals, while it significantly varied according to gender (16.3 in males vs. 4.6 in females,  $p < 0.001$ ) and different categories of human development ( $p = 0.004$ ). Additional information about suicide rates is shown in Table 1.

Table 2 and Fig. 1 show the correlations between female and male suicide rates and health-related variables. There was a negative significant correlation between total suicide rate with total fertility rate ( $r = -0.462$ ,  $p < 0.001$ ) and age-standardized obesity rate among adults ( $r = -0.240$ ,  $p = 0.024$ ). After stratifying by sex, there was a positive correlation between female suicide rate and urbanization ( $r = 0.23$ ,  $p = 0.030$ ), GNI ( $r = 0.31$ ,  $p = 0.003$ ), and life

expectancy at birth ( $r = 0.21$ ,  $p = 0.040$ ), while a negative significant correlation was shown with total fertility rate ( $r = -0.42$ ,  $p < 0.001$ ), unemployment rate ( $r = -0.23$ ,  $p = 0.030$ ), and age-standardized obesity rate among adults ( $r = -0.41$ ,  $p < 0.001$ ). More specifically, the male suicide rate was inversely correlated with total fertility rate ( $r = -0.46$ ,  $p < 0.001$ ).

## 4. Discussion

This study was conducted to determine the association between HDI levels and the incidence of suicide in different countries. The results of this study showed that suicide rates increased with increasing levels of HDI, and were higher in men compared to women. There was a direct and significant correlation between incidence of suicide with percentages of urbanization of countries, GNI, and life expectancy in women. There was also a significant inverse correlation between suicide and total fertility rate (both in men and women), unemployment rate, and the rate of obesity in adults only in women.

Our results demonstrated that suicide was higher in men compared to women. Other studies have reported similar results [15,16]. One explanation for the higher rate of successful suicide attempts in men could be attributed to the fact that men usually use more lethal methods for taking their lives. Furthermore, women are less likely to become alcoholic and they also tend to have stronger religious orientations. More resilience, social support, and better compliance for mental disorder treatments among women are regarded as the explanations for more failed suicide attempts [12]. In contrast, men have more responsibility for financing the family and are more likely to develop psychological stress [17].

Our results showed a significant direct correlation between HDI levels of countries and the incidence of suicide. Results of similar studies are contradictory. While some studies have shown an inverse relationship between income levels (as a component of HDI) and suicide rate [18–21], other studies have reported otherwise [22]. This paradox may be due to the effect of other confounding factors such as religion and race in different societies. The use of different scales to measure socioeconomic status, type of study design, and population size could also partly explain this contradiction.

Unemployment and the presence of women in the home are associated with lower suicide rates. Working populations usually have more access to the means for suicide attempts. Thus, the highest suicide rate has been shown in professional vocations such as veterinarians, physicians, and farmers who have easy access to drugs and toxins [23]. Job-related stress can provide an incentive to commit suicide as well [24], although a systematic review revealed that unemployment was associated with suicidal behaviors [25]. One reason could explain our result; the secondary aggregated data which were used in the study may cause the Simpson's paradox issue [26].

The results of this study showed that increases in life expectancy were associated with increasing suicide rates. Typically, suicide rates increase with age. The elderly usually use lethal methods

**Table 1**

Female and male suicide rates and Human Development Index (HDI) component by different HDI regions in 2012.

Region	SR		p	HDI component				Total suicide rate
	Females	Males		LEB	MYS	GNI	EYS	
Very high human development	6.25	16.94	<0.001	81.2	12.25	86,665	17.15	11.65
High human development	6.22	21.52	<0.001	79.1	10.85	32,141	15.87	13.94
Medium human development	3.12	12.66	<0.001	72.3	8.78	11,846	12.92	7.93
p (F-test)	<0.001	0.010	–	<0.001	<0.001	<0.001	<0.001	0.004

EYS = expected years of schooling; GNI = gross national income per capita; LEB = life expectancy at birth; MYS = mean years of schooling; SR = suicide rate (per 100,000 populations).

Download English Version:

<https://daneshyari.com/en/article/5662963>

Download Persian Version:

<https://daneshyari.com/article/5662963>

[Daneshyari.com](https://daneshyari.com)