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An Analysis of WHO Data on Lethal Violence: Relevance of the New Western Millennium

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Abstract

Introduction. Suicide and homicide are considered to be lethal violent acts with a clear difference in their directions, that is, inwardly "killing oneself" or outwardly "killing another," respectively. There are some studies in which these 2 violent acts are considered under the same framework mostly within Western countries. This article for the first time investigates this issue throughout the world. Material and methods. The present study uses data that have been estimated by Global Burden of Disease (GBD) project for 2000 for the 6 different regions of the world proposed by WHO. The suicide/homicide ratio has been calculated by dividing the suicide rate by the sum of the suicide and homicide rates within each age and sex groups. Findings. Three distinct groups have emerged. In the first group, that is, Southeast Asia, Europe, and Western Pacific, lethal violence in both males and females usually directs inward whereas in the second group, that is, Africa, lethal violence in both males and females directs outward. In the third group, that is, America and Eastern Mediterranean, in males lethal violence generally directs outward whereas in females it often directs inward. Conclusion. Under the same framework if a factor causes external blame for the people's failures it will increase the likelihood that the suicide/homicide ratio is expressed as homicide and vice versa. Although this might explain the observed pattern to some extent, more in-depth studies are needed to better understand the causal root of the pattern.

Keywords

suicide, homicide, suicide/homicide ratio, World Health Organization, regions of the world, stream analogy

The World Health Organization (WHO) defines violence as

> The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation.[1]

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There are a number of ways to categorize violence, one of them is based on the direction of violence in which violence splits into 2 wide categories, that is, self-directed violence and interpersonal violence.[2] It would also be possible to categorize violence based on the severity of outcome into lethal and nonlethal violence.[3] For instance, suicide and homicide can be considered as the lethal violence forms of self-directed and interpersonal violence, respectively.

The human costs of both suicide and homicide are devastating and they are critical issues in terms of public health,[4] which seems to be of growing concern in the future.[5] As the statistics show, in the year 2000 suicide was estimated to be the 13th cause, whereas homicide was estimated to be the 22nd cause of death all over the world.[2] For the same year, it was estimated that from 1.6 million people who die globally as a result of violence, almost half of them were because of suicides whereas one third were the victims of homicides.[6]

Evidences suggest that studying suicide and homicide under a uniform framework would increase our knowledge toward violent deaths within human communities.[7] There are some studies in which these 2 violent acts are considered under the same theoretical and practical framework, that is, as 2 alternative options of a single stream, which is referred to as the *stream analogy*. However, most of these studies have been carried out based solely on Western countries[4,8-13] and there are only a few studies that focus on non-Western countries.[14]

Because regions could play an important role on the relation between suicide and homicide,[15] it is very important to have a clear picture of the lethal violence all through the world. Therefore, the present article for the first time investigates this issue within 6 different regions of the world proposed by the World Health Organization (WHO).

Different studies suggest that one way to study suicide and homicide under the same framework is to calculate the suicide/homicide ratio, by dividing the suicide rate by the sum of the suicide and homicide rate.[11] What this ratio measures is the proportion in which lethal violence will be expressed either as homicide or suicide. A lower ratio reflects that lethal violence will be expressed as homicide and a higher ratio reflects that lethal violence will be manifested as suicide.[4,11]

Material and Methods

The present study uses data based on the ICD9 codes E950-E959 (suicides) and E960-E969 (homicides)[16] that have been estimated by the WHO Global Burden of Disease (GBD) project for 2000, version 1[17] and its aggregated results for WHO regions has been published in the *World Report on Violence and Health*.[2] WHO splits countries of the world based on their geopolitical situations into 6 separate regions, namely, Africa, America, Southeast Asia, Europe, Eastern Mediterranean, and Western Pacific. It should also be noted that in the year 2000 each regions consisted of 46, 35, 10, 51, 22, and 27 countries, respectively.

The current study, after obtaining different age and sex groups (5-14, 15-29, 30-44, 45-59, and 60+ years), estimated the standardized rates of suicidal and homicidal deaths. The suicide/homicide ratio variable within each age and sex group has been calculated according to the following formula[4]:

$$[(\text{suicide rate})/(\text{suicide rate} + \text{homicide rate}) \times 100]$$

To have a better picture of this manifestation, all ratios within the regions were calculated for males and females in different age groups separately.

Findings

Looking at male suicide rates per 100 000 by age groups and WHO regions highlights that almost in all regions the suicide rates increase with increase in age. Southeast Asia has the highest rates

Table 1. Suicide and Homicide Rates Per 100 000 Male Populations and Suicide/Homicide Ratio by Age Groups and WHO Regions, 2000

	Age Group (Years)					
	5-14	15-29	30-44	45-59	60+	All
Suicide rate/100 000						
All	1.7	15.6	21.5	28.4	44.9	18.9
Africa	1.4	6.4	11.2	18.1	26.6	10.6
America	0.7	13.7	17.1	18.7	26	13.2
Southeast Asia	3.1	16.9	18.5	23.3	26.1	15.7
Europe	1.8	30.2	46.7	52.3	51.3	32.2
Eastern Mediterranean	0.8	7.6	7.6	8.5	10.8	6.3
Western Pacific	1.1	14.7	19	28.7	69.2	21.2
Homicide rate/100 000						
All	2.1	19.4	18.7	14.8	13	13.6
Africa	4	34.1	39.6	39.6	63.3	33.4
America	2.4	68.6	49.1	28.9	16.4	34.7
Southeast Asia	2.2	6	8.8	11.6	16.9	8.1
Europe	0.8	15.1	23.5	18.1	9.3	13
Eastern Mediterranean	2	11.3	11.1	9.8	13.6	9.4
Western Pacific	1.5	7.9	7.4	4.9	3.4	5.1
Suicide/homicide ratio						
All	44.74	44.57	53.48	65.74	77.55	58.15
Africa	25.93	15.80	22.05	31.37	29.59	24.09
America	22.58	16.65	25.83	39.29	61.32	27.56
Southeast Asia	58.49	73.80	67.77	66.76	60.70	65.97
Europe	69.23	66.67	66.52	74.29	84.65	71.24
Eastern Mediterranean	28.57	40.21	40.64	46.45	44.26	40.13
Western Pacific	42.31	65.04	71.97	85.42	95.32	80.61

of suicide (3.1) in the first age group, whereas Europe has the highest rates (30.2) in the second, (46.7) in the third, and (52.3) in the fourth age groups. Western Pacific has the highest rates (69.2) in the fifth age groups. Except the second age group in which Africa has the lowest rate (6.4) in all other age groups Eastern Mediterranean has the lowest rates. Overall, Europe has the highest rate (32.2) whereas Eastern Mediterranean has the lowest rate (6.3; Table 1).

Looking at male homicide rates per 100 000 by age groups and WHO regions highlights that in 2 regions—Africa and Southeast Asia—the homicide rates increase with increase in age. Africa and America have the highest rates of homicide in all age groups. The highest homicide rate (68.6) in all age group belongs to the second age group in America. Except the first and the second age groups in which Europe and South East Asia have the lowest rates, respectively, in all other age groups Western Pacific has the lowest rates. Overall, America has the highest rate (34.7) whereas Western Pacific has the lowest rate (5.1; Table 1).

Looking at female suicide rates per 100 000 by age groups and WHO regions highlights that in 2 regions—Western Pacific and Europe—the suicide rates increase with increase in age. Except for the first age group in which Southeast Asia has the highest rate (4.7), in all other age groups Western Pacific has the highest rates. The pick of suicide rates in the second age group in Southeast Asia (14.5) and Eastern Mediterranean (8.6) is worth mentioning. America and Africa have the lowest rates in almost all age groups except the first age group in which Europe has the lowest rate (0.4). Overall, Western Pacific has the highest rate (20.7) whereas Africa has the lowest rate (3.1; Table 2).

Looking at female homicide rates per 100 000 by age groups and WHO regions highlights that except the first age group in which Eastern Mediterranean has the highest rate (3.6) in all other age

Table 2. Suicide and Homicide Rates Per 100 000 Female Populations and Suicide/Homicide Ratio by Age Groups and WHO Regions, 2000

	Age Group (Years)					
	5-14	15-29	30-44	45-59	60+	All
Suicide rate/100 000						
All	2.0	12.2	12.4	12.6	22.1	10.6
Africa	0.7	1.7	4.8	4.1	7.5	3.1
America	0.6	4.0	4.3	5.0	4.4	3.3
Southeast Asia	4.7	14.5	9.9	5.7	7.2	8.3
Europe	0.4	5.8	8.1	11.4	15.7	6.8
Eastern Mediterranean	2.0	8.6	6.2	4.4	7.0	5.4
Western Pacific	1.1	22.6	23.3	25.1	51.7	20.7
Homicide rate/100 000						
All	2.0	4.4	4.3	4.5	4.5	4.0
Africa	2.9	14.1	13.8	14.6	11.8	11.8
America	1.2	6.4	5.7	3.3	2.6	4.0
Southeast Asia	2.6	1.6	2.5	5.7	7.3	3.5
Europe	0.7	4.0	5.7	5.6	5.3	3.9
Eastern Mediterranean	3.6	5.4	4.3	3.8	5.9	4.8
Western Pacific	1.0	1.9	2.0	1.4	1.6	1.7
Suicide/homicide ratio						
All	50.00	73.49	74.25	73.68	83.08	72.60
Africa	19.44	10.76	25.81	21.93	38.86	20.81
America	33.33	38.46	43.00	60.24	62.86	45.21
Southeast Asia	64.38	90.06	79.84	50.00	49.66	70.34
Europe	36.36	59.18	58.70	67.06	74.76	63.55
Eastern Mediterranean	35.71	61.43	59.05	53.66	54.26	52.94
Western Pacific	52.38	92.24	92.09	94.72	97.00	92.41

groups Africa has the highest rates. Furthermore, except in the first and the second age groups in which Europe and South East Asia have the lowest rates, respectively, in all other age groups, Western Pacific has the lowest rates. Overall, Africa has the highest rate (11.8) whereas Western Pacific has the lowest rate (1.7; Table 2).

Investigating suicide homicide ratio in males by age groups and WHO regions reveals that within 3 regions of the world—Southeast Asia, Western Pacific, and Europe—and in all age groups except 5 to 14 years in Western Pacific the ratio is more than 50%. On the contrary, within 3 regions of the world, namely, America, Eastern Mediterranean, and Africa and in all age groups except 60 years and older in America the ratio is less than 50% (Table 1).

Investigating suicide homicide ratio in females by age groups and WHO regions reveals that there is only one region, Africa, in which the ratio for all age groups are less than 50%. The ratio for other regions and in all age groups are equal to or higher than 50% (except 5-14 years in America, Europe, and Eastern Mediterranean; 15-29 and 30-44 years in America; and 60 and older in Southeast Asia; Table 2).

Discussion

The results of the present study highlight that at the very beginning of the new millennium and under the stream analogy the 6 regions of the world can be categorized into 3 distinct groups:

1. The first group, which includes Southeast Asia, Europe, and Western Pacific, is the group in which lethal violence in both males and females directs inward in the form of

suicide (except males in the age group of 5-14 years in Western Pacific, females 5-14 years in Europe, and 60 years and older in Southeast Asia).

2. The second group, which includes only Africa, is the group in which lethal violence in both males and females directs outward in the form of homicide.
3. Finally, the third group, which includes America and Eastern Mediterranean, is rather a mix group. In both regions and in males (except 60 years and older in America) lethal violence directs outward in the form of homicide whereas in females it directs inward in the form of suicide (except age group of 5-14 years in America, Europe, and Eastern Mediterranean; 15-29 and 30-44 years in America).

The important question which is raised by this finding is to know what factors could possibly created this pattern. When one studies suicide and homicide under one stream, one usually comes across 2 important issues. The first issue, which is called forces of production, seeks social and cultural factors that determine the extent of the total lethal violence. The second issue, which is called forces of direction, seeks structural and cultural factors that determine the proportion of the total lethal violence, manifested either as suicide or as homicide.[4,9]

However, it should be noted that the distinction between these 2 forces somehow is not very clear.[4] Take divorce rate for instance. Batton,[8] in her study on a nationwide longitudinal data sample, shows that the rate of divorce could act as a force of direction, which increased homicide over suicide. However, He et al,[9] on a cross-national data sample reveal that the rate of divorce could act as a force of production, which increased both suicide and homicide.

Generally speaking, under the stream analogy if a factor causes external blame for people's failures it will increase the likelihood that the suicide/homicide ratio expressed as homicide and vice versa.[18] Research carried out based on this theory has highlighted that if the quality of life (especially the psychological welfare, eg, education, health, demography, and welfare effort) is better, suicide becomes more common and homicide less common.[19-23]

This might explain to some extent the observed pattern especially within the first and second groups, where more prosperous countries, for example, European countries show higher suicide rates whereas less prosperous countries, for example, African countries show higher homicide rates. However, there are also other interrelated factors that could possibly have a great impact on the observed pattern especially within the third group.

Let us first focus on the other factors that are documented to have an impact on the whole rate of homicide within the United States. Batton, in her study on a nationwide longitudinal data sample, shows that the rates of alcohol consumption, immigration, and divorce increase homicide by attributing blame externally.[8] Moreover, it has also been documented that those counties, which have higher non-white residents, higher unemployment rates, higher degree of income inequality, and higher degree of racial segregation tend to express lethal violence in the form of homicide.[4]

Similar to these studies, can we possibly consider these factors as the contributing factors throughout the world? What we can be sure of is that in many developing countries, especially within Africa and Eastern Mediterranean region, the cultural backgrounds of the people are rapidly and inevitably changing. This has resulted in migration from rural areas to suburban slums especially around large cities, which by itself caused unemployment, poverty, and behavior problems such as alcohol drinking especially among males in younger age groups.[24]

Race might also be considered as another interrelated contributing factor. For instance, in both the United States and South Africa, homicide rates are higher among blacks.[20] To what extent these and/or other factors could explain manifestation of higher homicide rates among males remains to be investigated.

What about factors that could possibly lead to increase suicide especially among females? It has been shown that one of the strongest risk factors for suicide tends to be mental disorders,[25,26] especially depression.[27] Recent estimations have also shown that both the incidence and prevalence of major depressive episodes in the year 2000 for all WHO regions were higher in females compared with males.[28] Furthermore, it has also been determined that within the United States, southern counties, which have higher percentage of college-educated residents, tend to express lethal violence in the form of suicide.[4]

There are also other factors such as natural disasters and religion, which might play an important role on the pattern of the violent deaths.[29] The relation between being exposed to natural disaster and being a victim of violence, especially self-directed ones, namely suicide, are coming to light with recent studies.[30] Furthermore, consider Islam, for instance, which is the religion of about 90% of the people who are living within the countries of the Eastern Mediterranean.[24] There are verses in Koran that specifically condemn suicide and homicide acts.[31] According to the results of the present study and also other studies,[32-34] such deaths, especially suicide, in the region have been less in comparison with the other regions.

Similarly, the role of Islamic beliefs in decreasing other violent acts and misbehaviors is also documented. For instance, the strong Islamic beliefs throughout much of the Eastern Mediterranean has led to quite low alcohol consumption within region.[35] However, as it has been shown in the present study and according to the results of other studies, in some countries within the region, young females experience higher rates of suicide, which needs to be investigated.[36-39] This issue is equally important for the Southeast Asia region.

Limitations of the Study

In the present study, the suicide and homicide data for just 1 year were analyzed. Although we do not expect the observed patterns to change very rapidly, any attempt to explain the reasons beyond the observed patterns should be considered with caution.

Similarly, within the present study only the aggregated data for the whole regions were examined and therefore, it was impossible to analyze the data by each country. As we have seen, there might be some differences between the countries of a single region or even within a country. For instance, evidences suggest that in Fiji there is a steady pattern of lower suicide rates for the indigenous Fijian population compared with the Indian population.[40]

The simple analyses that were carried out within this study need to be supported by more sophisticated analyses. However, to carry out such analyses one might need access to extra data (eg, poverty, unemployment, migration, religious involvement, alcohol consumption, marriage, etc.) at the regional level.

It should also be emphasized that the WHO Global Burden of Disease project for 2000 has been based on an extensive analysis of epidemiological studies of mortality data, statistical modeling, and systematic reviews of health service data within different countries of the world.[17] However, because for recording a death as a suicide or homicide a number of people (eg, family members, police, doctors and coroners) are involved, and it is possible that these people for different reasons (ie, social, cultural and religious) are reluctant to report the death as a suicide or homicide. Therefore, the possibility of underestimation of true suicide and homicide rates should be considered in any estimation such as this.[2]

On a related matter to the previous point, it should be noted that the validity and reliability of cross-country data are very difficult to evaluate in this study. Surely, developed countries have better and more reliable health service data compared with developing countries. Therefore, the validity and reliability of their data are higher than data from developing countries. Based on the results of a survey that was carried out in Thailand to verify the causes of death, the overall agreement between the causes of death in the survey versus that reported on the official death certificate was only 29%.[41] Therefore, further studies should consider this important issue in their analyses.

Concluding Remarks

Stream analogy provides a unique environment in which the manifestation of lethal violence can be investigated within human communities. It might also help researchers to hypothesize about why people within different communities express their anger inwardly or outwardly. However, more studies are needed to confirm the extent of the usefulness of this analogy.

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