The Prevalence Rate of Sexual Violence in Worldwide Countries: A Trend Analysis

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Abstract

**Background:** The purpose of the present study is to showcase an image of Sexual Violence (SV) temporal trends through exploring differences in the prevalence rates during 1990-2017 across 195 countries and territories.

**Methods:** The SV prevalence data for both sexes reported by the Global Burden of Disease database during 1990-2017 for 195 countries were analyzed via Growth Mixture models (GMM).

**Results:** In worldwide, the SV prevalence rate was higher in women than in men and decreased in both genders over time. The declining trend in male SV prevalence is visible in countries with both high to very high and also moderate to low Human Development Index (HDI), but the prevalence of SV against women in countries with moderate to low HDI has increased. Findings of GMM identified six classes of SV prevalence trajectories. The highest decrease in the prevalence of SV against men was in Bermuda and the highest increase was observed in Equatorial Guinea and Luxembourg. The aforementioned countries had distinct trends from others, while other countries had very slow declining trends. SV against women in China, North Korea, and Taiwan has increased the most among countries in the world. Bermuda, Guyana, Mexico, Nigeria and Saint Lucia have witnessed the largest declines in recent decades and Angola, the Democratic Republic of Congo, and Equatorial Guinea have been ranked next. The observed trend in terms of SV prevalence rate against women in other countries has been mostly decreasing.

**Conclusion:** Given the high economic and social burden that SV has on victims and society, the rate of SV in most countries does not seem to have dropped remarkably and requires special attention from relevant policy makers. In addition, the rate of SV prevalence is highly heterogeneous among world countries which may be due to the definitions used, tools used, and more importantly, the culture, norms.

**Background**

Sexual Violence (SV) is defined as any sexual act or any attempt for the purpose of obtaining a sexual act through violence or coercion, which according to WHO encompasses a variety of situations, namely Rape or marital infidelity, rape by strangers, sexual abuse, sexual or physical abuse of those with disabilities, sexual abuse of children, forced marriage and child marriage, denial of the right to use contraceptive equipment or prevention of sexually transmitted diseases as well as forced abortion (1). Globally, about 35.6% of women have experienced SV, with widely varying prevalence estimates by country (2). Men can also be subjected to SV, but it may be impossible to provide general prevalence rates, as SV is generally under-reported, with an elevated amount of non-reporting in case of violence against men and boys (3). Most studies on SV among men have examined the above index in affected communities and war-torn areas (4).

Numerous studies have examined the prevalence of SV in different parts of the world, on a cross-sectional basis, in specific sub-communities, with their emphasis over women. An example would be studies over SV in children with mental disabilities (13.7% ) (5), and violence in university on campuses.
Prevalence rate for completed sexual assault of undergraduates was 10.3% in women and 3.1% in men, and the prevalence rate for completed rape among undergraduates was 4.1% for women and 0.8% for men (6). This rate against people with disabilities, such as mental disability was 5.5% (7), against older people was 14.1 (8), and among refugees around the world was largely variable (0–99.8%) (9).

As seen in a few examples in the previous paragraph, various articles have studied the prevalence of SV in specific sub-communities. In addition, according to our literature review, all studies conducted on SV prevalence rates are mainly descriptive or cross-sectional and there are few studies for clustering countries by prevalence rates during the time. Hence, this study has a comprehensive look at the changes in the prevalence of age-standardized SV in all regions of the world, including 195 countries and geographical areas, from 1990 to 2017. In order to obtain complete information over the prevalence of SV in all regions of the world, the information provided in the Institute for Health Metrics and Evaluation (IHME) was used. This study is performed separately on different continents, between men and women. Countries with high and low human development indicators are also compared in this regard. Moreover, countries around the world are examined and categorized based on the rate of change in the prevalence of SV over the years. This way, the areas where the prevalence of SV have witnessed significant increase or decrease are identified and the similarity of the trend of SV rate changes in countries are determined.

Method

GBD Database

Data for prevalence of SV (rates in 100000 persons) in 195 country and regions were derived from Global Burden of Diseases (GBD) study, related to IHME. More information about the GBD database can be reached in the following reference (10). The extracted information includes prevalence rates of SV for men and women, from 1990 to 2017. At first, six regions were considered, including: Asia, Africa, North American, South America, Europe and Australia & Oceania. These regions include all the countries designated by GBD Study. The trend of prevalence rates of SV in each mentioned region were estimated separately for men and women. Then, all countries were categorized into a development status according to HUMAN DEVELOPMENT REPORT of 2019 (11). The Human Development Index (HDI) is a summary measure of achievements in three key dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living (11). The trend of prevalence rates of SV among countries with very high and high HDI (≥ 0.7) and also among countries with median and low HDI (< 0.7) were explored separately for men and women. Finally, all countries were explored in terms of their trends of SV over the years.

Statistical Method

In the descriptive statistics section, the prevalence of SV in each region and year was reported with mean and standard deviation. Latent Growth model (LGM) has been used to examine the trend of changes in
the prevalence of SV in different continents, separately for men and women, as well as in developed and developing countries. For LGM analysis in this study, the continuous response variable is the prevalence of SV in each country from 1993 to 2017. The coefficients of this models are interoperated as the average rate of outcome change over time. Given that each country has a different trend over time, the Growth Mixture modeling (GMM) analysis method was used. The Growth Mixture modeling (GMM) method, generalized of LGM was used to categorize the countries of the world in terms of how their prevalence of SV has changed over time. In this way, it can be specified which countries have had similar trend. Determining the similarity of the trend of SV rate changes in this statistical modeling is not only based on their similarity of the trend over time, but also the onset of the SV prevalence at the beginning of the study period.

The interpretation of the results in this model is similar to the LGM. Statistical analysis was done using M-plus software, version 6.12 (www.statmodel.com).

Results

The descriptive statistics including mean (SD) of SV rate as well as estimates from the LGM are shown in Table 1, separately for region and gender. In the last column of Table 1, both the estimated intercepts and slopes can help us know more about trends of SV prevalence in these regions. The intercepts represent the estimated overall mean level of the initial SV rate and the slopes show the average rate of change in SV rate over time within each region. A positive and negative slope reveal that the rate had an incremental and decremental trend over the period of time, respectively.

For instance, the estimates for men in Asia (Intercept = 1117.8, Slope=-1.6) state that the initial SV prevalence rate in this region was 1117.8 in 100000 persons in 1993 and the prevalence rate has a decremental trend with a slope of 1.6 during 1993 to 2017 in every 6 years period. As the results in the table show, at the beginning of the study period, the highest prevalence rate of SV belongs to women in Australia, which was (rate of 4386.8). African women (rate of 3345) and North American women (rate of 3175.5) are next in the rank. Moreover, at the beginning of the study, the lowest prevalence of SV was among men in Europe (rate of 927.5), South America (rate of 999.4) and North America (rate of 1062.8), respectively. With the exception of African men, SV has declined across all continents and in both sexes. The biggest decline is in the prevalence of SV among North American women (rate of 90.1), followed by women in South America (rate of 32.12). In addition, the lowest decline was in the prevalence of SV among Australian men (rate of 0.02). Finally, in whole of world, at the beginning of the study period as well as over time, the prevalence rate was higher in women than in men and decreased in both genders (rate of 2.1 in women and 1.6 in men).

Subsequently, countries were classified according to the HDI, and those with a score of 0.7 and above were considered as countries with high and very high human development (11). The results of the trend of SV change based on the HDI are presented in Table 2. The prevalence of SV in 1993 was higher in women in both high- and low-income countries than in men. The declining trend in male SV is visible in
both high and low HDI countries, but the prevalence of SV against women in countries with moderate to low HDI has not only not decreased, but has also increased (rate of 5.1).

Finally, using GMM, countries around the world were categorized according to the trend of SV rate changes and the results are presented in the form of zoning maps in Fig. 1. The map is our own result and is not taken from another source. In this figure, countries with similar colors on the map have had similar trends in terms of changes in the prevalence of SV. As shown in the geographical map of SV against men, the highest decrease in the prevalence of SV was in Bermuda (rate of 107.64). The highest increase in the prevalence of male SV was also observed in Equatorial Guinea and Luxembourg (rate of 72.39). The aforementioned countries had distinct trends from others, while other countries had very slow declining trends (rate of 1.2).

In terms of mapping data on SV against women, countries with a distinct trend are as follows: SV against women in China, North Korea, and Taiwan has increased the most among countries in the world (approximately at the rate of 196.7). Bermuda, Guyana, Mexico, Nigeria and Saint Lucia have witnessed the largest declines in the prevalence of women SV in recent decades (at an approximate rate of 145 per 100,000). Angola, the Democratic Republic of Congo, and Equatorial Guinea have been ranked next in recent decades (rate of 44.7). The observed trend in terms of changes in the prevalence rate of SV against women in other countries has been mostly decreasing (rate of 44.7).
Table 1
Prevalence rates (per 100,000) of sexual violence as mean (SD) and estimates from the LGM by the regions for trend analysis. The intercepts represent the estimated overall mean level of the initial sexual violence rate and the slopes show the average rate of change in sexual violence rate over time within each region.

| Region         | Gender | Years    | 1993     | 1999     | 2005     | 2011     | 2017     | LGM estimates          |
|----------------|--------|----------|----------|----------|----------|----------|----------|-------------------------|
|                |        |          |          |          |          |          |          | Intercept:              |
|                |        |          |          |          |          |          |          | Slope:                  |
| Asia           | Male   |          | 1122.7(393.8) | 1116.9(385.3) | 1116.2(389.2) | 1110.6(372.5) | 1109.9(365.1) | 1117.89                |
|                |        |          |          |          |          |          |          | -1.66                   |
|                | Female |          | 2442.8(2269)  | 2426.5(2245.3) | 2445(2294.8)   | 2402.2(2169.9) | 2424.3(2217.4) | 2449.1                 |
|                |        |          |          |          |          |          |          | -5.6                    |
| Africa         | Male   |          | 1421.8(412.3) | 1397.8(379.5)  | 1431.8(432.2)   | 1431.2(423.2)   | 1415.3(383.4) | 1421.93                |
|                |        |          |          |          |          |          |          | 3.07                    |
|                | Female |          | 3350.1(1653.7) | 3342.9(1598.7) | 3343.4(1637.9) | 3410.7(1810)   | 3402.2(1762.2) | 3344.9                 |
|                |        |          |          |          |          |          |          | -1.4                    |
| Europe         | Male   |          | 981(27.93)   | 935.7(24.3)    | 921.3(207.8)    | 913.5(199.4)    | 908.7(183.5)    | 927.57                 |
|                |        |          |          |          |          |          |          | -3.65                   |
|                | Female |          | 1837.4(548.7) | 1764(433.8)    | 1805.8(505.8)   | 1742.4(402.1)   | 1737.8(410.4)   | 1709.3                 |
|                |        |          |          |          |          |          |          | -4.99                   |
| North America  | Male   |          | 1065.8(471.7) | 1047.4(460.1)  | 1026.4(407.4)   | 1009.4(343.6)   | 1002.1(316.6)   | 1062.82                |
|                |        |          |          |          |          |          |          | -16.97                  |
|                | Female |          | 3117.8(1156.1) | 3004.3(1124.5) | 3094(1158.2)    | 2822.8(876.3)   | 2821.4(811.2)   | 3175.5                 |
|                |        |          |          |          |          |          |          | -90.1                   |
| South America  | Male   |          | 1008.3(253.3) | 971.3(235.2)   | 925.4(208.2)    | 910(190.5)      | 930.4(72.1)     | 999.47                 |
|                |        |          |          |          |          |          |          | -30.2                   |
|                | Female |          | 2635.8(731)  | 2499.3(694.7)  | 2617.9(729.1)   | 2364.6(675.4)   | 2349.7(670.7)   | 2531.6                 |
|                |        |          |          |          |          |          |          | -32.12                  |
| Australia & Oceania | Male |          | 1475.7(383.7) | 1471.8(383.5)  | 1468.1(381.1)   | 1471.5(375.8)   | 1478.4(371.1)   | 1471.65                |
|                |        |          |          |          |          |          |          | -0.02                   |
|                | Female |          | 4410.3(1165.3) | 4380(1257.4)   | 4404.3(1187.5)  | 4371.5(1245.5)  | 4357.5(1260.5)  | 4386.8                 |
|                |        |          |          |          |          |          |          | -5.2                    |
Global  

| Gender | Years | LGM Estimates |
|--------|-------|---------------|
|        | 1993  | 1999          | 2005          | 2011          | 2017          |
| Male   | 1130(366.5) | 1114.9(369.8) | 1107.6(375.1) | 1102.2(367.7) | 1097.8(341.5) |
| Female | 2678.6(1693.7) | 2634.9(1690) | 2665.9(1707.3) | 2612.1(1722.8) | 2602.1(1709.6) |
| Female | 2973.2(1699.2) | 2933.8(1663.4) | 2963.8(1695.3) | 2900.3(1661.9) | 2915.1(1670.4) |

Female  

| Gender | Years | LGM Estimates |
|--------|-------|---------------|
|        | 1993  | 1999          | 2005          | 2011          | 2017          |
| Male   | 1258.7(461.7) | 1243.9(454.8) | 1236(440.4) | 1226.6(419.9) | 1221.2(405.7) |
| Female | 2745(1709.6) | 2744(1703.3) | 2803.8(1709.8) | 2769.6(1698.3) | 2816.1(1704.5) |
| Female | 2745(1699.6) | 2744(1703.3) | 2803.8(1709.8) | 2769.6(1698.3) | 2816.1(1704.5) |

Table 2  

Prevalence rates (per 100,000) of sexual violence as mean (SD) and estimates from the LGM by the HDI for trend analysis. The intercepts represent the estimated overall mean level of the initial sexual violence rate and the slopes show the average rate of change in sexual violence rate over time within each region.

Discussion  

Sexual violence is a pertinent health challenge, which has increased the risk of various sexual and reproductive health problems and also has an impact on physical and mental health (1). According to our literature review, all studies conducted on SV prevalence rates are mainly descriptive or cross-sectional in sub-population and changes in the prevalence of SV over time are not well documented. Hence, the present study assessed the trends of SV prevalence rates in world countries in a period of 25 years from 1993 to the 2017 to make comparisons across populations.
As the results of this study show, compared to men, the prevalence rate of SV against women are at least twice as many, across all continents. SV against women, influenced by cultural factors and values, is often a result of unequal power equations between men and women (12). By contrast, SV against men is less understood or acknowledged, but it is. Although in general it seems that because men are stronger sex, they have a lower rate of SV than women, based on gender norms combined with cultural and religious taboos and scarce services, it may be very difficult for males to disclose that they are survivors of SV. In addition, the service providers may not recognize the male experience of SV. Therefore, in such societies with gender norms combined with cultural and religious taboos, the prevalence rate of SV in men may be underestimated (3).

The results of the present study also manifested that the decremental trend of prevalence of SV in Europe and the United States is outstanding than in others. This is particularly prominent in the Americas, where there has been a decline in the prevalence of SV in both sexes, with the largest decrease in the prevalence of SV against women. In Asia, as well as in Australia, this declining trend has occurred, albeit to a lesser extent, compared to the aforementioned continents. It is vital to point that in African countries, although the prevalence rate of SV against African women has decreased to some extent, it has increased against men. Of course, it should be kept in mind that the rate of low SV against women in some societies might be related to victimized women being unlikely to report an attack due to fear of discrimination, feeling shame, and not being able to identify (13).

Further, the results of this study showed that the prevalence rate of SV in countries with high HDI, in recent years, has been declining, with a higher rate in men than women. It should be pointed that in countries with a high HDI, there are effective programs in this field, including the ‘Universities Supporting Victims of Sexual Violence: Training for Sustainable Student Services’, where the project, running across seven European countries, aimed to develop, pilot and evaluate cases to help university staff respond more effectively to disclosures of SV (14). Moreover, countries with a high HDI are usually high income, and the studies show that estimates over SV from high-income countries seem to be lower than those from low and middle-income countries (13). In countries with low to moderate human development, the prevalence rate of SV has been declining against men and increasing against women. Again, it is important to note that in societies where shame is the more prevalent emotion, victims of SV may not open a case about the event and therefore may not be reported. In addition, most countries with a moderate to low HDI are culturally communities where human relationships are at the core and individual identity is subsumed in the family or kinship, causing gender bias and blaming of the victim. This societies, compared with societies where the individual is the main focus and individual independence is more important, such cases are often not reported (15). Hence, the lack of reporting of these cases in such societies may have caused the rate of prevalence of SV in countries with high and low HDI to be reported as close.

The paper went on to examine which countries in the world have experienced similar trend of SV prevalence rate in recent decades. The results manifested that the highest decline in the prevalence of SV against men occurred in Bermuda. Among the countries of the world, SV against women in some African
countries, as well as in some American countries, has been declining, such as Bermuda, Guyana, Mexico, Nigeria and Saint Lucia. The Democratic Republic of Congo, and Equatorial Guinea have been ranked next. Civilians in Africa's conflict zones, both for women and men are often vulnerable to SV and most of the SV in these areas is due to this fact (16). Programs aimed at reducing SV among such communities may have been effective in reducing the rate of SV. Based on available studies, it appears that the greatest activity is in African countries (17).

In addition, the highest increase in prevalence rates of SV against men were in Luxembourg and Equatorial Guinea, and as for women, it was reported in China, North Korea and Taiwan. The high prevalence of SV against women in China has been estimated in resent studies which is in line with the present study’s result and the recent announcement of the Domestic Violence Law represents a first step to raise awareness and prevention of violence against women (18, 19). No study with a direct look at North Korean women was found, but several studies have examined SV between undocumented refugees without basic legal protection, and so they become exposed to human trafficking and a sex trade is built upon their exploitation (20).

It seems that the rate of SV prevalence is highly heterogeneous among world countries; this may be due to the definitions used, tools used, and more importantly, the culture and norms. Therefore, some of the differences between countries may be due to these reasons. In addition, lack of accurate and reliable data for SV prevalence rate in some countries may be considered as a limitation which causes GBD to report the estimated prevalence rate.

Overall, given the high economic and social burden that SV has on victims and society, the rate of SV in most countries does not seem to have dropped remarkably and requires special attention from relevant policy makers. It is emphasized that programs on sexual and gender-based violence, including men as well as women, to provide guidance on how to access survivors, facilitate reporting, provide protection and deliver essential medical, legal and social services. According to the present study findings, there are gaps in understanding who is the victim of SV in different cultural contexts and societies where the notion of dominance of men over women prevails; hence, implementation of national population prevalence surveys is necessary in all countries for establishing SV as a serious social issue globally.

**Abbreviations**

SV
 Sexual Violence

GBD
 Global Burden of Disease

LGM
 Latent Growth Models

GMM
 Growth Mixture models
Declaring

Ethics approval and consent to participate

Owing to the using of IHME database, the requirement for informed consent was waived. This study was approved by Shahid Beheshti University of Medical Sciences.

Consent to publish

We have used the Global Burden of Disease Study database and have cited according to the proposed format of the Institute for Health Metrics and Evaluation.

Availability of data and materials

Data is available from http://ghdx.healthdata.org/gbd-results-tool and is freely download.

Competing Interests

The authors have no conflict of interest to report

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Authors’ Contributions

NB designed this study and participated in data extraction, data analysis, data interpretation and manuscript writing; HA participated in data analysis, data interpretation and manuscript writing; MT, HA participated in manuscript preparation and literature research. NK was responsible for manuscript revising and editing. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work in ensuring the accuracy or integrity of the work.

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Figures

Figure 1

World's cluster map on the basis of sexual violence' outbreak trends within the years 1993 to 2017. This map shows the result of latent growth mixture model in our own study. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.