

INTER-REGIONAL VARIATIONS IN SUICIDE RATES

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SUMMARY

Suicidal behaviour is a significant public health problem. Suicide alone represents the 10th leading cause of death worldwide. Suicide is a complex phenomenon and may be the result of an interaction of biological, psychological and socioeconomic factors. Although there are many differences in suicide rates between different countries in the world, some studies reported huge differences of suicide rates between different regions within the same country as well. The studies that investigated the regional differences in suicide rates were gathered in the present article. The studies revealed that depression frequently remained unidentified and thus untreated and could contribute to high regional suicide rates. It could be speculated that access to services, which increases the possibility of diagnosis and treatment of mental disorders, could have an impact on regional suicide rates. Thus the availability of services may be relevant in explaining geographical variations in suicide incidence. Many studies reported that suicide was a major public health issue of particular concern among rural populations, which experienced a consistently higher suicide rate than urban areas considering the availability of psychiatric services, was typically less available in rural regions. As suggested in some studies, it seems that socioeconomic factors outweighed climatic factors in explaining regional differences in the suicide rate but further research is needed.

Key words: regions - suicide rate - regional differences – depression - mental health services

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INTRODUCTION

Suicidal behaviour is a significant public health problem. Suicide alone represents the 10th leading cause of death worldwide (Levi et al. 2003). Approximately 1 million people are estimated to die because of suicide each year in the world (Yoshimasu et al. 2008). The World Health Organization defines suicide as an act deliberately initiated and performed by a person in the full knowledge or expectation of its fatal outcome (World Health Organization). Suicide is a complex phenomenon and may be the end-point of the number of different contributing factors. Suicidal acts are generally accepted as the results of an interaction of biological, psychological and socioeconomic factors (Ganz et al. 2010).

REGIONAL VARIATION IN SUICIDE MORTALITY

There is marked geographic variability in suicide rates, with the highest rates being found in Eastern Europe and the lowest in Muslim and Latin American countries (World Health Organization). Although there are many differences in suicide rates between different countries in the world, some studies reported huge differences of suicide rates between different regions within the same country as well (Sedic et al. 2003, Voracek et al. 2007, Pregelj & Zihelr 2010, Crosby et

al. 2011). It was reported that in USA, rates of suicide varied by geographic region and have consistently been higher in the western states than in the eastern states (Centres for Disease Control and Prevention 1997, Crosby et al. 2011). Importantly, even after the adjustment of certain demographic variables such as sex, age and certain racial/ ethnic groups, regional differences in suicide rates persisted (Centres for Disease Control and Prevention 1997). Further on, some studies investigated the role of environmental factors accounting for regional variations in suicide rates within the same country. Shirira examined whether suicides in a region were associated to characteristics of the resident living there or to some enduring feature of the selected region in United States. They focused on states with the highest and the lowest suicide rates and for each region they considered three groups of decedents: residents who died inside the region, residents who died outside the region and visitors to the region. Overall, the results suggested that both the availability of suicide means and the contextual features of the regions contributed to suicide rates in the selected region (Shirira & Christenfeld 2010).

Multiple lines of evidence indicate also specific genetic contributions to suicidal behavior (Yoshimasu et al. 2008). Specifically, within Europe the nations with high suicide rates constitute a contiguous J-shaped belt and geographic studies pointed to genetic differences between populations that might partially account for

geographic patterns of suicide prevalence (Voracek et al. 2007). In this belt suicide rate in Slovenia is among the highest in Europe (WHO suicide prevention) and the distribution pattern of regional suicide rates for Slovenia shows some similarity to that of the rest of Europe, especially in terms of the substantial variation of suicide density within the country (Marusic 1998, Pregelj & Zihelr 2010). Also Croatia showed significant regional differences in suicide rate. With its south Mediterranean part, Croatia shared the same low rate with Mediterranean Italy, while its west-north continental part with high suicide rate was similar to its neighbors Slovenia and Hungary (Sedic et al. 2003). Voracek also reported that regional differences in suicide rates within Austria corresponded to the genetic structure of the population (Voracek & Sonneck 2007).

Further on, the variability of socioeconomic factors might contribute to inter-regional differences in suicide rates (Yoshimasu et al. 2008, Ganz et al. 2010). Fukuda emphasized the importance of socioeconomic inequality in regional variation in suicide rate in Japan (Fukuda et al. 2005). Agbayewa and coworkers investigated regional differences in suicide rates among elderly population and the factors that influenced them. For both elderly males and females, regional suicide rates appeared to be influenced by social factors (Agbayewa et al. 1998). Cheong and coworkers identified the characteristics related to the regional suicide rates in Korea. They concluded that the influence of characteristics of regions on suicide rate varied by age- group, gender and urbanicity. Therefore, in order to lower suicide rate and reduce the gap between regions, various approaches might be adopted by taking account the socioeconomic characteristics of the regions (Cheong et al. 2012).

On the individual level suicidal behavior has multiple causes divided into proximal stressors or triggers and predisposition (Mann 2002, Yoshimasu et al. 2008, Ganz et al. 2010). Psychiatric disorder is a major contributing factor, and more than 90% of suicides have a psychiatric disorder at the time of suicide (Mann et al. 2005). Importantly, studies revealed that the most common psychiatric disorder in suicide was untreated major depression (Arsenault-Lapierre et al. 2004, Bernal et al. 2007, Nock et al. 2010). Furthermore, depression and comorbid alcohol related disorders frequently remain unidentified and thus untreated (McGlynn et al. 2003). Cheung pointed to regional and socio-economic differences in examining the rates of suicidality and depression in Canadian adolescents (Cheung & Dewa 2006). Rihner examined regional variations in suicide rate and rate of treated depression across Hungary and suggested that the underdiagnosis of depression might contribute to the regional high suicide rate (Rihmer et al. 1993). It could be also speculated that access to services, which increases the possibility of diagnosis and treatment of mental disorders, could have an impact on regional suicide rates (Kapusta et al. 2010). Indeed, it is known

that on average, 55% of suicide victims have no contact with mental health or primary care providers in the month prior to suicide (Luoma et al. 2002). Thus the availability of services may be relevant in the observed geographical variations in suicide incidence (Kapusta et al. 2010). It has also been reported that the availability of mental health services may vary substantially between and within countries (Madianos et al. 1999, Salvador-Carulla et al. 2005, Diaz-Granados et al. 2010, Fleury et al. 2010). Kelleher examined variations in suicide rates within the Republic of Ireland and reported marked variation between the included areas with a threefold difference between the counties with the highest and the lowest rates. A need for improved services in rural Ireland was suggested to deliver these in areas of low population density and high suicide rate (Kelleher et al. 1997).

Many studies reported that suicide is a major public health issue of particular concern among rural populations, which experienced a consistently higher suicide rate than urban areas (Hirsch 2006, Handley et al. 2011, Chang et al. 2012) despite higher social support in rural areas (Tirupati et al. 2010). On the contrary the availability of psychiatric services is typically less available in rural regions in comparison to urban regions (Freeman-Cook & Hoas 2007, Mohamed 2009). In Australia, rural communities have witnessed a continued increase in deaths by suicide particularly for young men (Handley et al. 2011). Quine reported rural-urban differences in health concerns in Australian adolescents and rural areas reported disadvantage in obtaining access to healthcare. The study pointed out that rural-urban differences were striking in the almost exclusive reporting of youth suicide and teenage pregnancy by rural adolescents (Quine et al. 2003). Goto examined the regional differences in suicide mortality and its correlation with socioeconomic factors in Japan. The results also pointed out that suicide mortality was higher in rural districts than in urban districts (Goto et al. 1994).

The uneven regional as well as seasonal distribution of suicides has been of interest of some studies (Papadopoulos et al. 2005, Heerlein et al. 2006, Nicholls et al. 2006, Rocchi et al. 2007, Ajdacic- Gross et al. 2007). More specifically, some studies attributed variations in the regional suicide rate to climatic factors (Haws et al. 2009, Tsai 2010). Haws and co-workers investigated the possible effect of altitude on regional variations in suicide rates in the United States. They hypothesised that decreased oxygen saturation at high altitude might exacerbate the bioenergetic dysfunction associated with affective illnesses (Haws et al. 2009). Climatic factors have not been universally implicated in the occurrence of suicide and, moreover, could only partially explain suicide within certain social contexts (Agerbo et al. 2007, Lorant et al. 2005). Therefore, the estimated meteorological parameters could be confounded by the socioeconomic factors. Tsai explored both socioeconomic and climatic factors separately to

obtain a more comprehensive view of the asymmetric regional suicide death rate in Taiwan and concluded that socioeconomic factors (sex ratio, no spouse, aged, unemployment and low income) outweighed climatic factors (temperature, rainfall and sunshine) in explaining regional differences in the suicide death rate (Tsai 2010).

CONCLUSIONS

We reviewed the studies that investigated the regional differences in suicide rates. Some studies investigated the role of environmental factors and socioeconomic inequality in accounting for regional variations in suicide rates within the same country. Other studies reported that regional differences in suicide rates corresponded to the genetic structure of the populations. Importantly, studies revealed that 80-95% of suicide victims had a psychiatric illness and the most common psychiatric disorder in suicide was untreated major depression. Further on, the studies revealed that depression frequently remained unidentified and thus untreated and could contribute to high regional suicide rates. It could be speculated that access to services, which increases the possibility of diagnosis and treatment of mental disorders, could have an impact on regional suicide rates. Thus the availability of services may be relevant in explaining geographical variations in suicide incidence. Many studies reported that suicide was a major public health issue of a particular concern among rural populations, which experienced a consistently higher suicide rate than urban areas considering that the availability of psychiatric services was typically less available in rural regions. Higher rural suicide rate might be connected with less favourable socioeconomic variables in rural districts as well. The uneven regional as well as seasonal distribution of suicides has been of interest in some previous studies, too. Some studies attributed variations in the regional suicide rate to climatic factors. Climatic factors have not been universally implicated in the occurrence of suicide and, moreover, could only partially explain suicide within certain social contexts. As suggested in some studies, it seems that socioeconomic factors outweighed climatic factors in explaining regional differences in the suicide rate but further research is needed.

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