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The effectiveness of suicide prevention programmes: urban and gender disparity in age-specific suicide rates in a Taiwanese population

F.-W. Lung ^{a,b,c,d}, S.-C. Liao ^{b,e,f}, C.-Y. Wu ^{b,g}, M.-B. Lee ^{b,f,h,e,*}^a Calo Psychiatric Center, Pingtung County, Taiwan^b Taiwanese Society of Suicidology (TSOS), Taipei, Taiwan^c Graduate Institute of Medical Science, National Defense Medical Center, Taipei, Taiwan^d Department of Neurology, Kaohsiung Medical University, Kaohsiung, Taiwan^e Division of Psychosomatic Medicine, Department of Psychiatry, National Taiwan University Hospital, Taipei, Taiwan^f National Suicide Prevention Center, Taiwanese Society of Suicidology in contract with Ministry of Health and Welfare, Executive Yuan, Taiwan^g Department of Nursing, National Taiwan University, Tainan, Taiwan^h Department of Psychiatry, National Taiwan University College of Medicine, Taipei, Taiwan

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ABSTRACT

Objective: The effectiveness of suicide prevention programmes is an important issue worldwide today. The impact of urbanization and gender is controversial in suicide rates. Hence, this study adjusted on potential risk factors and secular changes for suicide rates in gender and rural/urban areas.

Study design: Observational study.

Methods: A Suicide Prevention Center was established by the Executive Yuan in Taiwan in 2005 and tried to carry out suicidal intervention in the community in every city and town. There were two phases, including the first phase of the programme from 2005 to 2008, and the second phase of the programme from 2009 to 2013. The crude suicide rates data from the period of 1991–2013, which recruited nine urban and 14 rural areas in Taiwan, were extracted from the Taiwanese national mortality data file. The suicide rates in two areas of Taiwan (Taipei city and Yilan County) were further used to compare the differences between urban and rural areas.

Results: The results show that unemployment increased the suicide rate in men aged 45–64 years and in women older than 65 years of age in Taiwan. High divorce and unemployment rates resulted in increased suicide rates in men in the city, whereas emotional distress was

* Corresponding author. Division of Psychosomatic Medicine, Department of Psychiatry, National Taiwan University Hospital, No. 7, Chung Shan South Road, 10002, Taipei, Taiwan. Tel.: +886 2 23711859; fax: +886 2 2389 6716.

E-mail addresses: forwey@seed.net.tw (F.-W. Lung), sciao@ntu.edu.tw (S.-C. Liao), jennycyw@ntu.edu.tw (C.-Y. Wu), mingbeen@ntu.edu.tw (M.-B. Lee).

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the main cause of suicides in men in rural areas. The main method of suicide was jumping from a high building for both sexes in the city, whereas drowning was the most common method of suicide for men in rural areas.

Conclusion: Following the intervention programme, suicide behaviour began to decrease in all urban and rural areas of Taiwan. This study showed the cumulative effect of the intervention programme in decreasing the suicide rate in Taiwan. Moreover, the gender-specific suicidal rate and disparity in suicidal methods in urban and rural areas should be considered in further preventive strategies in Taiwan.

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Introduction

Suicide is an important and serious public health issue worldwide. In Taiwan, the suicide death rates were 7.4 per 100,000 in 1990 and rose to 15.3 per 100,000 in 2013 (Taiwanese national mortality data file). Suicidal behaviour is attributed to the harmful interaction of multiple factors, which include gender, age, religion, cultural, socioeconomic, geographic and political characteristics.^{1,2} Many epidemiological studies reported that there are differences in suicide rates between Eastern and Western countries.^{3–6} In addition, rates of suicide are often higher in males than females in urban than rural regions of Western countries,^{7–9} whereas females in rural regions have higher rates of suicide than males in urban regions in Asian countries.^{4–6,10,11} In fact, the past studies found that the suicide patterns in the Chinese population were virtually opposite to those in the West.¹² A previous study found that rates of suicide were higher among young men than women and occurred more often in rural than in urban areas in a Chinese population.¹³ Hence, the cultural influence seems to play a secondary role in suicidal behaviours.¹³

In Asian countries, rural adolescents, older adults, and females are the contributing risk factors of suicide.^{5,10,11} However, there is limited literature available to understand the differences in the intra-country variations in suicide rates.¹⁴ Chang et al.¹⁴ reported that the geographic distribution of suicide is similar in males and females, but suicide rates in young people are higher in East Taiwan, a mostly mountainous rural area, compared with rates in older people which are high in West Taiwan.¹⁴ The highest male suicide ratios in the world are seen in some countries where the majority of the population is Chinese, including urban and rural China, Hong Kong, and Singapore. The worst female suicide ratios were found in Singapore, urban China and Hong Kong.¹² The highest suicide ratio among females was in rural China, where we also have the highest suicide ratios among older people. In addition, the related risk factors on suicide were also seen here, namely high levels of poverty, unemployment, low educational achievement and lower occupational social class.¹⁵ There are numerous aspects of potential risk factors, such as cultural ideals, geographic and interpersonal isolation, and economic and sociopolitical distress that may be related to the increased rates of suicide.^{14,16} Moreover, Chang

et al.¹⁴ indicated that method-specific suicide rates varied markedly, with solids/liquids poisonings showing the greatest geographic variation and hangings the least.

In spite of numerous risk factors being explored and reviewed, and previous literature highlighting that socio-cultural factors are vitally important and must be addressed in suicide prevention programmes,¹² there has been a lack of intervention effectiveness. In 2005, a Suicide Prevention Center was established by the Executive Yuan in Taiwan and tried to carry out the suicidal intervention in the community in every city and town in Taiwan. There were two phases, the first phase of the programme was from 2005 to 2008, and the second phase of the programme was from 2009 to 2013. In most studies, estimating the rate of decline is measured by using a piece-wise constant model in the line-spline regression estimation approach.^{17–19} That is, the observation period was divided into different periods, and then, a constant rate of decline was measured within each period. However, this approach could contribute to the inaccuracies in the estimated rate of decline overtime (e.g. while there is a large difference between the decline rate from one period to the next, or while the decline rate kept unchanging during a long period). Hence, this study used an alternative method to estimate the intervention effectiveness from 2005 to 2013, which allows the decline rate to change continuously over time. A structural equation model is used to measure the model parameters for each period with fitting the effects and controlling the confounders in this study.

In the present study, three gender-specific populations (Taiwan male and female population, Taipei city male and female, Yilan male and female county population) were recruited to compare the socioeconomic characteristics and methods of suicide by using crude suicide rates data. Moreover, the effectiveness of the suicide prevention programme during 2005–2013 was also investigated in this study.

Methods

Taiwan Suicide Prevention Center

In 2005, the Executive Yuan established the Taiwan Suicide Prevention Center for reducing suicide mortality. This centre is a national integrated platform for suicide prevention and

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