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Research paper

Exploring the use of telephone helpline pertaining to older adult suicide prevention: A Hong Kong experience

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ABSTRACT

Background: Older adults usually have a higher suicide rate than the general population. There are helpline services provided to older adults but limited studies have examined the suicidal risks among the users, and how those services could be used as a platform to engage older adults in suicide prevention.
Methods: In regard to elderly suicide prevention, this study explored the potential usefulness and relevance of a telephone helpline service in Hong Kong, which had 106,583 users during 2012–2015. An estimation on the suicide rates of the users was made and compared with the general older adult population in Hong Kong. The users' suicide risks and their associated factors were assessed by survival analyses and an estimation system on the users' suicide mortality likelihood was also tested.
Results: The suicide rates of both male and female users were more than two times higher than the general older adult population in Hong Kong. The users' risks of suicides were greater at the early period of using the service; men, living alone, and having a history of mental illnesses were also associated with increased risks. Based on the identified factors, an estimation system was developed with a sensitivity of 0.73 and specificity of 0.54.
Limitations: A secondary data analysis.
Conclusions: By identifying a suicide risk profile and distinct telephone calling pattern among the users, early detection and a warning system should be implemented to allow timely intervention to reduce the number of older adult suicides in the community.

1. Introduction

In many countries, the suicide rates of older adults are far greater than the younger population (World Health Organization, 2014), and, as many societies are facing the rapid ageing issue, interventions that reduce suicides among the elderlies are imperative. Conventional suicide prevention strategies tend to focus on psychiatric treatments for suicidal persons, but given the high medical cost and the rarity of suicides, this approach - attending a small group of high-risk individuals in the health care system - however is likely to have limited impact on reducing suicides at the population level (Lapierre et al., 2011; Lewis et al., 1997; Yip et al., 2014). Innovative community-based interventions reaching a large group of population that needs emotional support can be more useful and cost-effective (Conwell et al., 2011; Mann et al., 2005).

Community-based telephone counselling has been recommended as one of the crucial strategies for suicide prevention (Krysinska and De Leo, 2007; Lapierre et al., 2011). Reviews on the existing prevention programs are broadly summarized into two types. The first is the crisis hotlines (Coveney et al., 2012; Doki et al., 2016; Gould et al., 2007; King et al., 2014). Callers of these services are usually experiencing emotional difficulties (e.g., life-stressors) and often require emergency support; their counsellors are trained to screen suicidal tendencies and some do provide follow-up services (Gould et al., 2013; Mishara et al., 2007; Rek and Dinger, 2016). The second type is a general support helpline offering personal care, support and connection for vulnerable older adults (e.g., provides greetings services to the elderlies in festive seasons and responding calls to users around the clock). This service is different from the crisis hotlines in that the users may not exhibit any emotional distress at the first contact with the service (i.e., at enrollment). However, previous studies have shown that users of the helpline services were more likely to be socially disconnected and suffered from physical ailments, representing a group of community-dwelling individuals with increased psychological vulnerabilities (De Leo et al., 2002; De Leo et al., 1995). Although helpline services usually do not have specific intervention programs for suicide prevention, nevertheless, they have been suggested as a useful tool for such purpose, as they offer regular and helpful interpersonal support to the elderlies to

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combat social isolation (Lapierre et al., 2011; Chen and Yip, 2015). However, existing empirical investigations are rare, and, to the best of the authors' knowledge, the only study existed was the Italian's *Tele-Help-TeleCheck* program, which was an evaluation study showing the suicide rates among the users (aged 65 or above) of that helpline was significantly lower than the general senior population resided within the same neighbourhood (De Leo et al., 2002).

In this study, whether a general telephone helpline in Hong Kong can be a useful platform for older adult suicide prevention was explored. The particular question posed was whether users of the helpline were a group of community-dwelling seniors who had an increased risk of suicides (i.e., exhibiting at-risk characteristics associated with older adult suicides), and given the service, has yet had a specific intervention program for suicide prevention, and in addition, whether the suicide rates of the helpline users would be greater than the Hong Kong general older-adult population. Next, strategies that may enhance the helpline's suicide prevention were further identified. In particular, at what points in time the users were as a group, and which sub-groups of the users were at greater risks of suicides were examined. Then, an estimation system to assess the users' likelihood of suicides was also developed. Knowing 'when' and 'who' the focuses are, would help to inform the management of the helpline as to 'how' to develop a cost-effective suicide prevention intervention.

2. Methods

2.1. Data

The helpline service evaluated was the Care and Call Service ("CCS") operated by the Senior Citizen Home Safety Association ("SCHSA") in Hong Kong. It is one of the largest telephone helpline services available in the city (SCHSA, 2015). According to the operator, since its establishment in 1996 and until the end of 2015, 187,616 individuals have used the helpline, and the majority of them were older adults. Like the *TeleHelp-TeleCheck* program, the CCS provides a device for the users to remotely connect to a pre-established response network 24 hours around the clock for help and assistance. The service, administered by either trained staff or volunteers, would initiate calls to users providing emotional support. Currently, when the users express emotional distress, the helpline will offer brief telephone-administered counselling by trained staff (e.g., social workers). Follow-ups (e.g., referrals to medical professionals) will also be made when necessary.

Individuals who have used the CCS helpline between 1st January 2012 and 31st December 2015 and aged 65 or above when first came into contact with the service, were included in this study. Upon registration with the service, the users' demographic information (sex, date of birth, education background, marital status, whether a social welfare recipient), self-reported medical records (brain and nervous system diseases, cardiovascular diseases, digestive diseases, endocrine system diseases, ear-nose-and-throat diseases, eye diseases, gynecological diseases, mental illnesses, respiratory diseases, skeletal system diseases, skin diseases, urinary system diseases, and others), and few other information (e.g., whether attendance to specialists, medication history, etc.) were collected. All this information was extracted from the service's computerized system.

To ascertain the users' suicide mortality status, this study made use of the data from the Coroner's Court, which holds the official suicide statistics of Hong Kong. Specifically, each user's record was matched against the known suicide deaths by a unique personal identification number (the Hong Kong Identity Card Number). To calculate suicide rates, mid-year population statistics of the older adults (aged 65 or above) in Hong Kong were obtained from the Census and Statistics Department ("C&SD"). Also, ethical approval was obtained from the University of Hong Kong's Ethics Committee (EA1606019).

2.2. Statistical analyses

Descriptive statistics were presented to outline the helpline users' demographic and medical profiles, enquiring into whether they represented a group of community-dwelling seniors who were at risk of suicides. In addition, suicidal rates of this helpline community were calculated and compared with the general older adult population in Hong Kong. The comparison was based on incident rate ratios ("IRR"s), using a person-year approach (i.e., duration of subscribing to the CCS).

To identify the information that would be conducive for the development of a suicide prevention intervention, the timing of the users as a group and sub-group that exhibited a greater suicidal risk was assessed. For the former part, changes in suicide risks within the helpline community across the time-point during their use of the service were explored. The estimation was based on the changes in the users' survival rates in suicides against their length of service used (counting the difference in days between the users' date of first contact with the service and the date of death). The results were then displayed on the Kaplan–Meier curves. For the latter, a Cox proportional hazards regression model was built to investigate what users' baseline demographic profiles and self-reported history of medical illnesses were associated with their suicide mortality status. Based on the identified factors, a score system was further constructed to estimate the users' likelihood of suicide mortality. Procedures of this risk estimation were referenced with respect to previous studies (Hung et al., 2015; Yang et al., 2011; Yuen et al., 2009) in which a suicide likelihood coefficient was assigned to each identified factor (based on its significance reflected from the Cox model), and the score for each user was essentially a sum of the relevant coefficients corresponding to his/her demographic and medical profiles. A higher score would indicate a higher likelihood of suicide. Evaluation metrics were then employed including the area under the receiver operating characteristic curve (AUROC), sensitivity, and specificity, to evaluate the performance of the score system (Zweig and Campbell, 1993).

3. Results

Between 1st January 2012 and 31st December 2015, there were 106,583 older adults aged 65 or above who have used the helpline service. The total number of person-years included were 563,346 years [174,012 years for male users and 389,334 for female users, respectively]. Table 1 summarizes the profile of the users. Among all senior users, approximately two-thirds were female (65.6%, n = 69,957) and almost half of the users enrolled with the service at the age between 75–84 (49.9%, n = 53,186; mean age of connecting with the service was 77 years old). Not surprisingly, a substantial proportion of the users lived alone (40.8%, n = 43,468); this group may likely to be more socially disconnected than their counterparts who were still living with someone. The most common self-reported physical condition among the users was cardiovascular diseases (73.6%, n = 78,400), followed by eye diseases (39.2%) and skeletal system diseases (26.9%). On average, the users reported to have at least two types of diseases (mean = 2.1, SD = 1.3). Only a small fraction of the users self-reported to have mental illnesses (2.5%, n = 2,632).

According to the statistics from the Coroner's Court, between 2012 and 2015, there were in total 1,006 known older adult suicides in Hong Kong (died at the age of 65 or above). Among them, 14.4% (n = 145) were users of the helpline (stratified by sex, the corresponding proportions were 11.3% and 19.8% for the male and female population, respectively). In addition, it is noted that the suicide rate of the senior helpline users was far higher than the general Hong Kong older adult population. The estimation in this study showed that the suicide rates of male and female users of the helpline were both 2.6 times greater than the corresponding older population in Hong Kong (suicide rates of the male elders: helpline vs. general population: 86.3 vs 32.6 per 100,000, IRR: 2.6; suicide rates of the female elders: helpline vs. general