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Research paper

An evaluation of suicide prevention hotline results in Taiwan: Caller profiles and the effect on emotional distress and suicide risk

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ABSTRACT

Background: Hotlines are among commonly available and recommended suicide prevention strategies in many countries, but only a few empirical studies have focused on people who used this service and the proximal outcomes of calls made to the hotlines. This study is designed to investigate the demographic characteristics of the Taiwan National Suicide Prevention Hotline (NSPH) callers and whether the NSPH service helps to alleviate the callers' emotional distress and suicide risk.

Methods: Descriptive statistics were used to describe the gender, age and county/city distribution of the 63,696 callers from 2009 to 2011. Three hundred telephone records of 100 acute suicidal callers, 100 suicidal callers, and 100 non-suicidal callers were then randomly selected for further investigation of the proximal changes in the callers' emotional disturbance and suicidality.

Results: Notwithstanding the suicide status of the callers, significant decreases in their emotional distress and suicidality could be detected during the course of the telephone session. Men, the elderly, and people living outside northern Taiwan, however, were less likely to call the NSPH. An unexpected yet significant finding is that people with an ongoing suicide attempt were less emotionally distressed than those with only suicidal thoughts.

Conclusions: The hotline is a useful suicide preventive and crisis intervention service. However, further creative and consistent work is needed to make the service more appealing to the hard-to-reach population.

1. Introduction

Suicide continues to be recognized as a major health concern in Taiwan. The suicide rate has risen from 6.69 suicides per 100,000 people in 1992 to 16.00 in 2016 (Ministry of Health and Welfare, 2017a). Suicide is the second leading cause of death among young people 15 to 24 years of age, the third among those 25 to 44 years of age, and the 12th in the general population (Ministry of Health and Welfare, 2017a). It is not only a leading cause of premature mortality, but it also impacts on other people and the community. Lukas and Seiden (2007) argued that a suicide may directly affect seven to ten people germane to each death. These affected people frequently experience psychological and physical disturbances, including depression, posttraumatic stress, social stigma, physical disorders, and heightened suicide risk (Jeglic et al., 2005; Swanson & Colman, 2013). Hence, there is no doubt that suicide prevention is important.

Due to its convenience and anonymity, the hotline has become one of the most popular suicide preventive and crisis interventions in the world (Bale, 2001; Krysinska & De Leo, 2007). The Taipei Lifeline Association (TLA) has been undertaking the An Hsin Hotline—Taiwan National Suicide Prevention Hotline (NSPH) from the Department of Health (reformed to the Ministry of Health and Welfare in 2013) since 2009. The NSPH offers telephone counseling and crisis intervention services with toll-free lines operating 24 hours a day, seven days a week. More than two hundred trained volunteers work for the NSPH. All volunteers receive training in psychology, suicide theories, risk assessments, telephone counseling skills, and practicums. Once they pass the training and evaluations, they receive continuous training and supervision from mental health professionals. Many people are willing to contact the NSPH for help. The total number of telephone calls per year rose from 61,284 in 2009 to 68,303 in 2011, and then to 67,773 in 2016; the total number of telephone calls with suicide ideation, plans, and attempts rose from 6012 in 2009 to 11,875 in 2011, and then to 11,079 in 2016; and moreover, the total number of intervened suicide attempts rose from 143 in 2009 to 475 in 2011, and then to 295 in 2016 (Chiang, 2013; Su, 2017).

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There has been some solid evidence to prove the efficacy of the crisis hotlines. Consistent with the nature of the crisis interventions that highlights immediate interactions rather than long-term influences (Meichenbaum, 2005), contemporary efficacy studies tend to focus on the proximal effects of the crisis hotlines. After analyzing 617 suicidal calls to two Canadian suicide prevention centers, Mishara and Daigle (1997) indicated that from the beginning to the end of those calls, 14% of the callers decreased their depressive mood, and 27% lowered their suicidal urgency. King et al. (2003) evaluated 100 calls to the Kids Help Line of Australia and revealed that there were significant improvements in the callers' mental state, suicidal ideation, and suicide risk during the course of the telephone session. Kalafat, Gould, and their colleagues (Gould et al., 2007; Kalafat et al., 2007) assessed 1617 calls to eight United States crisis centers and concluded that from the beginning to the end of the calls, the callers' confusion, depression, anger, anxiety, helplessness, overwhelms, and hopelessness were significantly subsided. After analyzing the data from 87 callers to the Rethink Mental Illness helpline, Tyson et al. (2016) proved the service to be effective in reducing suicidal and self-harming thoughts in the callers. All of the above show immediate positive effects of the crisis hotlines.

The efficacy of Taiwan NSPH, however, remains unknown for lack of any empirical evaluations. The purposes of this study are to understand two simple yet important questions: Who does the NSPH serve? Is the NSPH effective at alleviating the callers' emotional distress and suicidality?

2. Methods

2.1. Analytical data

With corporate support and sponsorship, the TLA has implemented a computerized information system called eSOS to manage incoming telephone calls and track counseling records. The system records all incoming numbers and conversations. Volunteer helpers have to identify the caller's suicide status on each call and to mark it down as non-suicidal (those who give a negative answer on the question of suicide ideation), suicidal (those who give affirmative answers on the questions of suicide ideation or suicide plan, yet have no suicide attempt in progress), or acute suicidal (those who give an affirmative answer on the question of a suicide attempt in progress, such as wrist-cutting, burning charcoal in a closed room, standing on the edge of a tall building). The volunteers also document the callers' personal information (e.g. their gender, age, major issues of each call) if mentioned in the conversations. All callers are notified of the recording at the beginning of the calls and have given their consent to the recordings. The Central Regional Research Ethnics Center, Taichung, Taiwan approved this study to waive the requirement for obtaining informed consent from the callers.

According to the 2009 to 2011 archival data drawn from the eSOS database, the NSPH received 201,368 calls. To be more precise, there were 61,284 calls in 2009, 71,781 in 2010, and 68,303 in 2011. A group of TLA interns helped to match the two hundred thousand odd calls by telephone numbers and caller names (if recorded), and then identified 63,696 different callers. On average each person made 3.16 telephone calls, whereas 51.47% (n = 32,786) made only one telephone call during the study period. Considering that the repeat callers result in higher levels of frustration and burnout among the hotline volunteers than their one-time counterparts do (Kinzel & Nanson, 2000), the study excluded the repeat ones and was restricted to the one-time callers. Among those one-time callers, 36.57% (n = 11,990) of the recorded conversations lasted more than 10 minutes, affording enough information for analysis. Without outside funding, only a total of 300 telephone records, including 100 acute suicidal callers, 100 suicidal callers, and 100 non-suicidal callers, were randomly selected from the 11,990 one-time callers using the Statistical Program for the Social Sciences for further investigations.

2.2. Measures

2.2.1. Modified mental state rating scale

The modified mental state rating scale (MSRS) is an observational checklist measuring the caller's level of emotional disturbance based on the works of Kalafat et al. (2007), King et al. (2003), and Mishara et al. (2007). The feasibility of practical use in the context of a crisis hotline was also taken into consideration based on input from the TLA senior workers and volunteers. The MSRS consisted of six checklist items, including feelings of confused/ambivalent, overwhelmed/tired, angry/irritable, sad/tearful, helpless, and guilty/shameful. The items were each rated on a five-point scale: not at all, a little, moderately, quite a bit, extremely. Higher scores indicated heightened emotional distress. Cronbach's alpha coefficient was 0.88 in this study, indicating high internal consistency among the six items.

2.2.2. Modified suicide risk scale

The modified suicide risk scale (SRS) is an observational checklist shaped by Gould et al. (2007) study on the proximal changes in suicidality during the course of the telephone session. Gould and colleagues developed three subscales—intent to die, hopelessness, and psychological pain—as the major outcomes based on literature review of the published evidence and input from the telephone crisis workers. Each subscale was assessed by two checklist items. The items were each rated on a five-point scale: not at all, a little, moderately, quite a bit, extremely. Higher scores indicated intensifying suicidal urgency. Cronbach's alpha coefficient was 0.95 in this study, indicating high internal consistency among its six items.

2.3. Analytical procedures

To better understand who were using the NSPH services, the first thing we did was to generate descriptive statistics about the gender, age and administrative unit (i.e. county and city) distribution of the callers, because researches showed significant differences in the geographical and demographical distribution of suicides in Taiwan (Chang et al., 2011; Chuang & Huang, 2007; Lee et al., 2014). Taking the unequal distribution of population into account, we further calculated the county/city caller rates by dividing the caller counts by the residential population drawn from the National Household Registration System (Ministry of the Interior, n.d.). For the purpose of comparison, the gender and age distribution of suicide deaths and the county/city distribution of suicide rates were drawn from the National Suicide Statistics (Ministry of Health and Welfare, 2017b).

To examine if the NSPH was effective in alleviating the callers' emotional distress and suicidality, we evaluated the changes in the MSRS and SRS scores from the beginning to the end of the 300 selected telephone calls. First, twelve independent raters were recruited for training in the use of the MSRS and SRS, and then undergone practice until the inter-rater agreement statistic (i.e. Cohen's kappa) was higher than 0.80. Only after all the training and practice would they be allowed to rate the callers' mental status and suicide risk at the beginning and at the end of the 300 calls. The beginning of a call was referred to as the first 10 min of a telephone conversation, and the end, the last 10 min of a telephone conversation. If a call lasted for less than 20 min, the beginning of the call was considered as the first 5 min of the telephone conversation, and the end, the last 5 min of that telephone conversation. There was a quality control check during the rating process. All raters rated one specific telephone conversation halfway through their tasks to make sure that the inter-rater agreement statistic (i.e. Cohen's kappa) was still higher than 0.80. A repeated measures ANOVA was then conducted to examine if there were significant changes in the emotional distress and suicidal urgency from the beginning to the end of a call on the non-suicidal, suicidal, and acute suicidal callers.

Table 1
The gender and age distribution of the HSPH callers and the national suicide deaths, 2009–2011.

NSPH sample			National suicide deaths		
Gender[a]			**Gender**		
Male	23,203	(41.41%)	Male	7829	(68.32%)
Female	32,852	(58.59%)	Female	3630	(31.68%)
Age[b]			**Age**		
~19	1568	(4.44%)	~14	16	(0.14%)
20–29	6906	(19.56%)	15–24	553	(4.83%)
30–39	10,736	(30.41%)	25–44	4225	(36.87%)
40–49	9412	(26.66%)	45–64	4149	(36.21%)
50–59	5111	(14.48%)			
~60	1572	(4.45%)	~65	2516	(21.96%)

[a] Based on 56,055 callers (88.00% of the total 63,696 callers) with valid gender data.
[b] Based on 35,305 callers (55.43% of the total 63,696 callers) with valid age data.

3. Results

3.1. Gender, age, and county/city distribution of the callers

Demographic characteristics of the 63,696 callers and the 11,459 suicide deaths in the period 2009–2011 are shown in Table 1. In terms of gender, 56,055 callers (88.00%) had recorded data. Among them, there were more female callers (n = 32,852, 58.59%) than males (n = 23,203, 41.41%), even though men were twice more likely to die by suicide than women in the general population. In terms of age, only 35,305 (55.43%) had recorded data. Among the data, the largest age cohort was callers between 30 and 39 years of age (n = 10,736, 30.41%), followed by those between 40 and 49 (n = 9412, 26.66%), then between 20 and 29 (n = 6906, 19.56%), then between 50 and 59 (n = 5111, 14.48%), then above 60 years old (n = 1572, 4.45%), and lastly, those under 19 years old (n = 1568, 4.44%). It should be noted that while the elderly were twice more likely to die by suicide than the general population and contributed to about one-fifth of the suicide deaths, only a small percentage of the callers were above 60 years of age.

There were 46,266 callers (72.64%) with identified residential telephone numbers or recorded address. The county/city distribution of the callers, caller rates, and suicide rates are shown in Table 2. Taipei City, Taipei County, and Taoyuan County, all located in northern Taiwan, together contributed to more than half of the callers (n = 24,667, 53.32%). The top three administrative areas with the highest caller rates, i.e. Taipei City, Taoyuan County, Keelung City, are also located in northern Taiwan. Moreover, six out of the seven northern administrative areas are on the top 10 highest caller rates list. There appears to be no relationship between the caller rates and suicide rates. Take, for example, Keelung City and Hualien County. The two areas had the highest and the second-highest suicide rates, but differed very much in the caller rates. However, those with low caller rates but high suicide rates (i.e. Chiayi County, Pingtung County, Taitung County, Nantou County, Miaoli County, Hualien County) are mostly rural counties and have lower than average household incomes (Directorate-General of Budget, Accounting and Statistics, 2012).

3.2. Proximal outcomes of the caller's emotional distress and suicidality

The MSRS and SRS scores at the beginning and at the end of the calls on the non-suicidal, suicidal, and acute suicidal callers are shown in Table 3. Results of the repeated measures ANOVA on the MSRS indicate a statistically significant effect of time, $F(1, 297) = 230.23$, $p < .001$, $\eta p^2 = 0.44$, as well as a statistically significant effect of time-by-group interaction, $F(2, 297) = 4.47$, $p = .012$. The post hoc Tukey's HSD test was conducted to assess further differences among the three groups. All groups are statistically significantly different from each other at the 0.001 level. That is to say, the suicidal callers had the highest scores on the MSRS, followed by the acute suicidal and then the non-suicidal callers. Moreover, the MSRS scores plummeted significantly over time (i.e. from the beginning to the end of the calls), and time alone accounted for 44% of the variance of change in the MSRS scores. The interaction of time and group from the repeated measures ANOVA is significant, suggesting that the groups may be changing over time in different ways (see Fig. 1).

We also achieved a result of $F(1, 297) = 230.40$, $p < .001$, $\eta p^2 = 0.44$, on main time effect, and a result of $F(2, 297) = 16.72$,

Table 2
The county/city distribution of the HSPH callers, caller rates and the national suicide rates, 2009–2011.

	Caller counts		Caller rates and rankings		Suicide rates and rankings	
Northern Taiwan						
Keelung City	1027	(2.22%)	266.31	(3)	24.87	(1)
Taipei County	7793	(16.84%)	200.75	(6)	16.33	(15)
Taipei City	11,074	(23.94%)	422.50	(1)	12.40	(23)
Yilan County	851	(1.84%)	184.72	(8)	19.63	(7)
Taoyuan County	5800	(12.54%)	291.61	(2)	15.50	(18)
Hsinchu County	763	(1.65%)	149.18	(13)	16.87	(13)
Hsinchu City	965	(2.09%)	233.54	(4)	14.47	(21)
Central Taiwan						
Miaoli County	676	(1.46%)	120.43	(18)	18.90	(9)
Taichung County	1672	(3.61%)	160.56	(12)	15.40	(19)
Taichung City	2322	(5.02%)	145.00	(14)	13.93	(22)
Changhua County	1631	(3.53%)	124.58	(17)	14.70	(20)
Nantou County	629	(1.36%)	119.08	(19)	20.23	(5)
Yunlin County	725	(1.57%)	100.74	(22)	16.80	(14)
Southern Taiwan						
Chiayi County	521	(1.13%)	95.64	(23)	20.77	(4)
Chiayi City	574	(1.24%)	210.28	(5)	15.63	(17)
Tainan County	1327	(2.87%)	180.35	(9)	21.15	(3)
Tainan City	1842	(3.98%)	161.73	(11)	16.33	(15)
Kaohsiung County	1494	(3.23%)	180.26	(10)	18.40	(10)
Kaohsiung City	2773	(5.99%)	142.70	(15)	17.90	(11)
Pingtung County	922	(1.99%)	105.14	(21)	19.43	(8)
Eastern Taiwan						
Hualien County	476	(1.03%)	140.15	(16)	21.67	(2)
Taitung County	253	(0.55%)	109.49	(20)	20.17	(6)
Outer Islands						
Penghu County	90	(0.19%)	93.63	(24)	17.03	(12)
Kinmen County	47	(0.10%)	49.41	(25)	9.17	(24)
Lienchiang County	19	(0.04%)	191.32	(7)	6.77	(25)

Note: Based on 46,266 callers (72.64% of the total 63,696 callers) with recorded data in administrative unit.

Table 3
Emotional distress and suicidality at the beginning and at the end of the 300 calls.

		Beginning of the call		End of the call	
Scale	Suicide status	*M*	SD	*M*	SD
MSRS	Nonsuicidal	13.72	2.75	11.33	2.80
	Suicidal	18.57	3.39	14.82	3.30
	Acute suicidal	16.57	5.29	12.77	5.36
SRS	Nonsuicidal	10.93	3.25	8.88	2.52
	Suicidal	19.87	5.07	15.49	4.52
	Acute suicidal	22.36	6.11	16.53	7.75

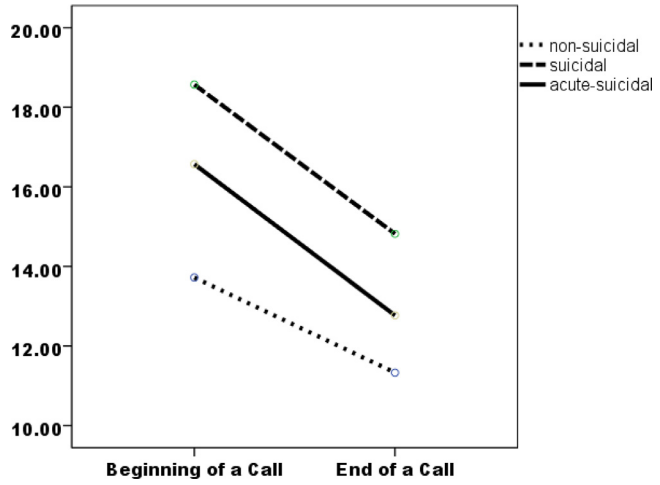

Fig. 1. Callers' emotional distress from the beginning to the end of their calls.

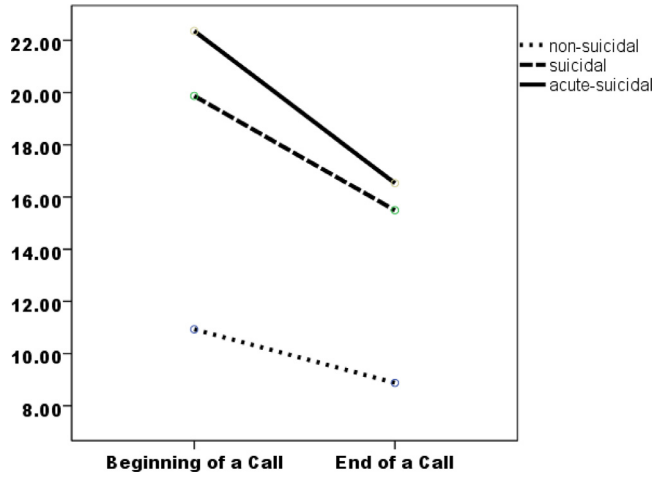

Fig. 2. Callers' suicidality from the beginning to the end of their calls.

$p < .001$, on time-by-group interaction for the repeated measures ANOVA on the SRS. Results of the post hoc Tukey' HSD test further reveal statistically significant differences among all groups of the callers at the 0.001 level. In other words, the acute suicidal callers had the highest scores on the SRS, followed by the suicidal, and then the non-suicidal callers. In addition, the SRS scores decreased significantly from the beginning to the end of the calls, and 44% of the variance of change in the SRS scores was accounted for by time alone. The interaction of time and group from the repeated measures ANOVA is significant, suggesting that the groups may be changing over time in different ways (see Fig. 2).

4. Discussion

This study represents the first-ever examination of the proximal effectiveness and the caller profiles of the suicide prevention hotline in Taiwan. Two key findings emerged from our data. First and foremost, like other evaluation results, the telephone crisis services prove to have an immediate positive impact on the callers' emotional distress and suicidality. The significant outcomes are not undermined by the suicide risk status of the callers, that is, disregarding whether the callers are suicidal or not, the hotline services are able to help them feel less disturbed and lower their suicidal urgency in just one telephone call.

The second key finding is that learning from the gender, age, and spatial distribution of the callers, the service has its limitation in reaching certain populations. Men, the elderly, and people living outside northern Taiwan are less likely to utilize the service. The higher proportion of female callers may reflect the fact that even though men are two-times more likely to die by suicide than women, women do report more suicide attempts than men (Ministry of Health and Welfare, 2017b). It is also consistent with the literature that men are less likely than women to seek help from the telephone helpers or the mental health specialists (Mackenzie et al., 2006; Ohtaki et al., 2017; Rickwood et al., 2007). Rickwood and colleagues further argued that men show even greater unwillingness to seek help when experiencing suicidal thoughts. Men's underutilization of mental health services may be a result of the traditional concept of masculinity. For men to admit that they need help and to openly express their feelings and emotions are in contravention of the traditional ideal of how men are supposed to behave. We also found that only a small percentage of the callers are above 60 years of age. Even though the elderly have the highest suicide rates of all age groups in Taiwan as well as in many other countries, a study showed that only a small proportion of them with suicidal thoughts or behaviors would actually seek help (Mackenzie et al., 2006). We have similar concerns about another finding of the present study that people outside the more developed and densely populated northern Taiwan are less likely to call the suicide prevention hotline, especially for those living in several rural counties with high suicide rates. It may be due to differences in the help-seeking attitudes that elderly and nonurban residents express greater stigma of help-seeking behaviors than their younger and urban counterparts (Judd et al., 2006).

In addition, our data reveal an unexpected finding that the callers with an ongoing suicide attempt are less emotionally distressed than those with only suicidal thoughts. This phenomenon verifies a rare finding in the literature (Reisch et al., 2010) as well as many practitioners' observations that sometimes individuals feel relieved after deciding to attempt suicide or after attempting suicide. The former (i.e. feeling relieved after deciding to attempt suicide) may be a result of the frontal lobe mechanisms of mood regulation. Rudorf and Hare (2014) found that the dorsolateral and ventromedial sectors of the prefrontal cortex show increased activity during decision-making. Considering the critical role of the two sectors in affect regulation (Koenigs & Grafman, 2009), it is plausible that people do feel less disturbed after they make the decision to attempt suicide. The latter (i.e. feeling relieved after attempting suicide) may be explained by the gate control theory of pain (Melzack, 1999). The theory states the role of the spinal pathways and the brain in the processing of pain. Specifically, brain centers could close the gating mechanisms in response to the physical pain caused by the ongoing suicide attempts and thus decrease the psychological pain.

There are some limitations that are important to mention and demonstrate the need to view our results with some degree of caution. The first and most important limitation is that only a small proportion of the telephone records were selected for the proximal outcome evaluation because of a lack of funding. The small sample size may undermine the reliability of our research findings. Another limitation is that we did not take blind assignment for the MSRS and SRS ratings. Since the raters listened and rated both the beginning and the end of the same telephone session, they might expect some kind of improvements, which could be a threat to the internal validity. Lastly, we were unable to differentiate between the suicidal callers engaging in varying levels of self-harm and suicidal behavior. Further evaluation is needed to determine if the telephone crisis services are equally effective for both people engaging in non-suicidal self-injury and people attempting suicide.

5. Conclusion/recommendation

Our results have meaningful clinical implications. The significant decreases in the emotional distress and suicidality found during the course of the telephone session provide empirical evidence that the

hotline is a useful suicide preventive and crisis intervention service. In light of the positive proximal outcomes, the disproportionate distribution of the callers suggests that greater efforts are needed to make the telephone crisis services more agreeable to men, the elderly, and people living outside northern Taiwan. The unexpected finding that people with an ongoing suicide attempt are less emotionally distressed than those with only suicidal thoughts should help practitioners to better understand the function of suicidal behavior. Just as Henry A. Murray asked Edwin S. Shneidman, "What is suicide but an effort to stop the unbearable flow of negative affects" (Shneidman, 1998, p. 245).

Ethics approval

This study has received approval from the Central Regional Research Ethnics Center, Taichung, Taiwan (cRREC-101-075).

Conflict of interest

The authors declare that there is no conflict of financial interest or benefit.

Submission declaration

It has not been published and is not under consideration for publication elsewhere.

Contributors

F.F.-T. Shaw and W.H. Chiang designed and directed the project together. F.F.-T. Shaw performed the comparison of the demographic characteristics of the hotline callers and general population. W.H. Chiang performed the rater training and the efficacy analysis. F.F.-T. Shaw wrote the manuscript.

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Supplementary material

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References

Bale, C., 2001. Befriending in cyberspace: challenges and opportunities. Crisis 22, 10–11.
Chang, S., Sterne, J.A.C., Wheeler, B.W., Lu, T., Lin, J., Gunnell, D., 2011. Geography of suicide in Taiwan: spatial patterns and socioeconomic correlates. Health Place, 17, 641–650.
Chiang, W., 2013. 2011 An Hsin Hotline annual report. 2011 Taipei Lifeline Association Annual Report. . Retrieved from http://www.lifeline.org.tw/uploads/files/annual_report/101_annual_report.pdf.
Chuang, H., Huang, W., 2007. A re-examination of the suicide rates in Taiwan. Social Indic. Res. 83, 465–485.
Directorate-General of Budget, Accounting and Statistics, 2012. Year 2011 average family income and expenditure per household by areas. Retrieved from. . http://win.dgbas.gov.tw/fies/214.asp.
Gould, M.S., Kalafat, J., Munfakh, J.L.H., Kleinman, M., 2007. An evaluation of crisis hotline outcomes. Part 2: suicidal callers. Suicide Life-Threatening Behav. 37, 338–352.
Jeglic, E.L., Sharp, I.R., Chapman, J.E., Brown, G.K., Beck, A.T., 2005. History of family suicide behavior and negative problem solving in multiple suicide attempters. Arch. Suicide Res. 9, 135–146.
Judd, F., Cooper, A., Fraser, C., Davis, J., 2006. Rural suicide—people of place effects. Aust. N.Z. J. Psychiatry 40, 208–216.
Kalafat, J., Gould, M.S., Munfakh, J.L.H., Kleinman, M., 2007. An evaluation of crisis hotline outcomes. Part 1: nonsuicidal crisis callers. Suicide Life-Threatening Behav. 37, 322–337.
King, R., Nurcombe, B., Bickman, L., Hides, L., Reid, W., 2003. Telephone counseling for adolescent suicide prevention: changes in suicidal and mental state from beginning to end of a counseling session. Suicide Life-Threatening Behav. 33, 400–411.
Kinzel, A., Nanson, J., 2000. Education and debriefing: strategies for preventing crises in crisis-line volunteers. Crisis 21, 126–134.
Koenigs, M., Grafman, J., 2009. The functional neuroanatomy of depression: distinct roles for ventromedial and dorsolateral prefrontal cortex. Behav. Brain Res. 201, 239–243.
Krysinska, K.E., De Leo, D., 2007. Telecommunication and suicide prevention: hopes and challenges for the new century. J. Death Dying 55, 237–253.
Lee, C., Wu, Y., Chen, C., Wang, L., 2014. The rate of fatality and demographic characteristics associated with various suicide methods: a community-based study in northern Taiwan. Crisis 35, 245–252.
Lukas, C., Seiden, H.M., 2007. Silent Grief: Living in the Wake of Suicide, rev. ed. England: Jessica Kingsley Publishers.
Mackenzie, C.S., Gekoski, W.L., Knox, V.J., 2006. Age, gender, and the underutilization of mental health services: the influence of help-seeking attitudes. Aging Mental Health 10, 574–582.
Meichenbaum, D., 2005. 35 years of working with suicidal patients: lessons learned. Can. Psychol. 46, 64–72.
Melzack, R., 1999. From the gate to the neuromatrix. Pain 82, S121–S126.
Ministry of Health and Welfare, 2017. Leading causes of death (2016). Retrieved from. . http://www.mohw.gov.tw/dl-33686-f713f1fb-bd64-4c0d-a810-cefabef4cb2e.html.
Ministry of Health and Welfare, 2017. National suicide statistics. Retrieved from. . https://www.mohw.gov.tw/dl-40567-9a30a6f1-0e6f-4e7c-90b0-cf0503e89c58.html.
Ministry of the Interior. (n.d.) Household registration data statistics. Retrieved from https://www.ris.gov.tw/346.
Mishara, B.L., Chagnon, F., Diagle, M., Balan, B., Raymond, S., Marcoux, I., Bardon, C., Campbell, J.K., Berman, A., 2007. Which helper behaviors and intervention styles are related to better short-term outcomes in telephone crisis intervention? Results from a silent monitoring study of calls to the U.S. 1-800-suicide network. Suicide Life-Threatening Behav. 37, 308–321.
Mishara, B.L., Daigle, M.S., 1997. Effects of different telephone intervention styles with suicidal callers at two suicide prevention centers: an empirical investigation. Am. J. Community Psychol. 25, 861–885.
Ohtaki, Y., Oi, Y., Doki, S., Kaneko, H., Usami, K., Sasahara, S., Matsuzaki, I., 2017. Characteristics of telephone crisis hotline callers with suicidal ideation in Japan. Suicide Life-Threatening Behav. 47, 54–66.
Reisch, T., Seifritz, E., Esposito, F., Wiest, R., Valach, L., Michel, K., 2010. An FMRI study on mental pain and suicidal behavior. J. Affect. Disord. 126, 321–325.
Rickwood, D.J., Deane, F.P., Wilson, C.J., 2007. When and how do young people seek professional help for mental health problems. Med. J. Aust. 187, 35–39.
Rudorf, S., Hare, T.A., 2014. Interactions between dorsolateral and ventromedial prefrontal cortex underlie context-dependent stimulus valuation in goal-directed choice. J. Neurosci. 34, 15988–15996.
Su, D., 2017. 2016 An Hsin Hotline annual report. 2016 Taipei Lifeline Association Annual Report. . Retrieved from http://www.lifeline.org.tw/uploads/files/106nianbao.pdf.
Shneidman, E.S., 1998. Further reflections on suicide and psychache. Suicide Life-Threatening Behav. 28, 245–250.
Swanson, S.A., Colman, I., 2013. Association between exposure to suicide and suicidality outcomes in youth. *Can.* Med. Assoc. J. 185, 870–877.
Tyson, P., Law, C., Reed, S., Johnsey, E., Aruna, O., Hall, S., 2016. Evaluating the efficacy of a helpline from a service user and helpline worker perspective. Crisis 37, 353–360.