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一般民眾自殺預防守門人自我效能，助人信心，

與助人意圖：臺灣全國電話調查研究

Suicide prevention gatekeeper self-efficacy and  
helping confidence and intentions in the general population:  
a national telephone survey in Taiwan

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本論文係沈治祖君 (R11850013) 在國立臺灣大學健康  
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口試委員：

陳映明

張齡尹

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不論是透過雪球檢索法、或是無意中搜尋到這篇碩論的讀者, 有幸與您分享這段日子整理的拙見, 希望能為您目前所考慮、或尚未有定論的方向, 提供所需的靈感及資訊。謝謝您, 讓這篇碩論得以脫離原有的限制與維度。

自殺的成因是複雜、多面向的。若試圖拼湊完整的畫面, 不難發現, 單憑一人的力量是困難的。文獻中、媒體中、人們的記憶中。一顆顆安靜的、好似不曾存在塵世間的休止符, 承載著什麼樣的故事或緣由, 我們永遠不得而知。

對未知會感到恐懼, 對沒把握的事會抗拒, 對多數人而言, 是本能。我希望我能克服這樣的本能。我也希望透過這樣的整理, 讓更多人知道, 有人願意為了接住另一個人, 正在學習如何拿捏打開這一扇「門」的力道。以及, 在接住的過程中, 有什麼樣的資源能幫助助人者, 不至於自顧不暇。

「一個人跑得快, 一群人走得遠。」在這漫長的人生中, 我肯定曾經、也將持續接受更多人的幫助及支持。能順利完成這篇論文, 除了鞭策自己不放棄的意志力, 以及張弛有度的習慣, 也要感謝接住我的人們。

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願我們都能被溫柔以待。

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Dear readers, I am delighted to share my findings with you, whether you are snowballing or running into the title randomly. I hope this study holds significance in your personal journey. Gatekeeping is not a fairy tale. It's an evidence-based selective approach with the goal of gently and effectively reaching out to people in need.

Suicide is complicated and multifactorial, yet it is preventable by harnessing the collective power of everyone. Talking about suicide is not easy, and we may feel discomfort and stressed. When you're ready, I hope you know there are plenty of resources available to help you and many others.

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## 摘要

**研究背景：**過往針對一般民眾的自殺防治守門人自我效能 (SE) 之研究有限。

**研究目的：**本研究旨在探索臺灣一般成年民眾中文版的守門人自我效能量表 (GKSES) 之因素結構，此量表共有 9 則子題；同時，本研究亦對守門人自我效能與助人信心及意圖之間的關係。

**研究方法：**本研究使用之資料來自 2022 年一項臺灣全國代表性電話調查，有效問卷共 997 份。研究首先以探索性因素分析 (exploratory factor analysis) 測量中文版 GKSES 的潛在因素，然後運用羅吉斯迴歸 (logistic regression) 分析自我效能與助人信心及意圖之間的關係。

**研究發現：**根據初步的因素分析萃取得出的二因子架構，據此將中文版 GKSES 分成 SE-skill 以及 SE-knowledge 兩個次量表。SE-skill (技巧) 由五項與自殺風險偵測及因應技巧有關的題目所構成，SE-knowledge (知識) 由四項與憂鬱、自殺及高自殺風險者可使用之資源的知識題目所構成。控制共變項及 SE 子量表後，SE-skill 與助人信心及所有助人意圖 (包括三項被建議的助人行動以及兩項不被建議的助人行動) 呈正相關；SE-knowledge 與助人信心及意圖採取一項被建議的助人行動 (會幫助對方找專業人員，例如心理師、身心科醫師) 呈正相關。

**研究結論：**自殺防治守門人培訓及訓練課程需著重加強一般民眾運用直接問句詢問自殺風險，以及清楚傳達「不建議這樣做」的訊息，例如：不應試圖說服對方自殺是不對的、或告訴對方自殺會令家人和朋友傷心。

**關鍵字：**自殺防治、守門人自我效能、助人信心、助人意圖、探索性因素分析



## Abstract

**Background:** There were limited previous investigations of the gatekeeper self-efficacy (SE) in the general population.

**Aims:** This study aimed to explore the factor structure of the Mandarin version of the nine-item Gatekeeper Self-Efficacy Scale (GKSES), and their associations with helping confidence and intentions in the Taiwanese adult population.

**Methods:** Data was extracted from a nationally representative computer-assisted telephone survey conducted in 2022 (n=997). Exploratory factor analysis was conducted to examine the factor structure of the Mandarin version of the GKSES. Logistic regression analysis was performed to assess the associations between gatekeeper SE and helping confidence and intentions.

**Results:** The EFA yielded a two-factor structure, and accordingly, the GKSES was divided into two components, SE-skill and SE- knowledge. SE-skill comprised five items related to the skills in detecting and managing suicide risk. SE-knowledge included four items associated with knowledge about depression, suicide and resources available for at-risk individuals. After adjusting for covariates and SE components, SE-skill was associated with helping confidence and the intentions to adopt all five helping actions (including three recommended actions and two unrecommended actions), while SE-knowledge was associated with helping confidence and intention to take only one

recommended helping action (i.e., to help make an appointment with a professional).

**Conclusions:** Suicide prevention gatekeeper training and educational activities should focus on encouraging people to ask direct questions about suicide risk and providing them with clear messages about “what not to do” (e.g., persuading the person that suicide is wrong or that suicide would hurt their friends and family).

**Keywords:** suicide prevention, gatekeeper self-efficacy, helping confidence, helping intention, exploratory factor analysis.



## Table of Contents

口試委員會審定書 .....	i
致謝 .....	ii
Acknowledgement .....	iii
摘要 .....	iv
Abstract.....	v
Chapter 1 Introduction.....	1
1.1 Global status and Taiwan context of suicide .....	1
1.2 Gatekeeper as a suicide prevention strategy.....	1
1.3 Gatekeeper training model.....	3
1.4 Gatekeeper self-efficacy .....	4
1.5 Helping confidence and intentions towards suicidal individuals .....	5
1.6 Knowledge gaps .....	6
1.7 Study aims .....	7
Chapter 2 Method .....	8
2.1 Data.....	8
2.2 Measures.....	9
2.2.1 Helping confidence.....	9
2.2.2 Specific helping intentions .....	10
2.2.3 Gatekeeper Self-Efficacy Scale (GKSES).....	10
2.3 Statistical Analysis.....	11
Chapter 3 Results.....	14
3.1 Exploratory factor analysis (EFA).....	14
3.2 Internal consistency .....	15
3.3 Demographic characteristics.....	15
3.4 Logistic regression analyses .....	16





Chapter 4 Discussion.....	18
4.1 Main findings.....	18
4.2 Comparison with previous findings.....	18
4.3 Strengths and limitations .....	23
Chapter 5 Implications .....	25
Chapter 6 Conclusion .....	26
References .....	27
Tables and Figure.....	33
Table 1. Measurement of the general helping confidence and intention to take five specific helping actions. ....	33
Table 2. Distribution of the responses for the nine-item Gatekeeper Self-efficacy Scale (GKSES) in 5-point rating scales.....	35
Table 3. Nine-item Gatekeeper Self-efficacy Scale (GKSES) item mean scores, and factor loadings. ....	37
Table 4. Suicide gatekeeper self-efficacy (SE) components (SE-skill and SE-knowledge) by characteristic amongst 997 respondents. ....	38
Table 5. Logistic regression analysis of the association of gatekeeper self-efficacy (SE)-skill with helping confidence and intentions to take five specific actions.....	40
Table 6. Logistic regression analysis of the association of gatekeeper self-efficacy (SE)-knowledge with helping confidence and intentions to take five specific actions.....	41
Figure 1. Scree plot.....	42
Appendix Table 1. Comparison of the distributions of age group, sex, and region between the study sample and Taiwan’s population in 2021. ....	43




# Chapter 1 Introduction

## 1.1 Global status and Taiwan context of suicide

More than 700,000 people die by suicide annually around the world (World Health Organization, 2023). In Taiwan, 3,787 people die by suicide in 2022 and the age standardized suicide rate per 100,000 persons is 12.3 (Ministry of Health and Welfare, 2023b). Suicide is the second leading cause of death of 25-44-year-olds, preceded by cancer (Ministry of Health and Welfare, 2023a). According to the annual suicide statistics in Taiwan (Ministry of Health and Welfare, 2023b), the analytics of suicide trend in recent 30 years shows no prominent reduction in overall suicide rate after 2011, implying room for improvement in Taiwan's suicide prevention.

## 1.2 Gatekeeper as a suicide prevention strategy

Individuals at risk of suicide do not actively seek help (Hwang, Gao, et al., 2023; Montiel & Mishara, 2023b). Community members and others close to at-risk individuals, whether they are professionals or non-professionals, can play a significant role as gatekeepers in preventing suicide by taking specific helpful actions (Montiel & Mishara, 2023a; Nicholas et al., 2022). Gatekeeping is a promising intervention in suicide prevention and gatekeeper training could be a crucial component in national suicide prevention strategy according to the World Health Organization (World Health



Organization, 2014). A gatekeeper refers to an individual “who have face-to-face contact with large numbers of community members as part of their usual routine” (Burnette et al., 2015). In general, gatekeepers can be categorized into designated group (i.e., those readily trained as helping professionals specializing in the fields of medicine, social work, nursing, and psychology) and emergent group (i.e., those who regularly interact with someone at risk of suicide due to their vocational role, for instance, military personnel, teachers, and counsellors) (Burnette et al., 2015; Montiel & Mishara, 2023b). The goal of gatekeeper training programs is to train gatekeepers in the aspects of knowledge, attitudes and skills for identifying and supporting individuals at risk of suicide, and facilitating referral to appropriate treatment or resources when necessary (Nicholas et al., 2022; World Health Organization, 2014).

Access to suicide prevention resources and gatekeeper training programs in Taiwan is frequently restricted to specific groups, such as teachers, college students, social workers and hotline workers. The gatekeeper training programs can range from one hour to several months, and may be delivered through e-learning sessions or in-person lectures (Chen & Lai, 2023; Hwang, Shaw, et al., 2023; Wu et al., 2023). A recent longitudinal study that investigated the effectiveness of 16-week gatekeeper training course participated by 159 undergraduate students from a single university reported the improvement of knowledge toward suicide after training. The course included pre-reading


materials, lecture delivery, role-play, group discussion facilitated by teaching assistant, and microfilm making as final term group assignment.



### **1.3 Gatekeeper training model**

Burnette et al. (2015) proposed a gatekeeper training model that describes the four key components which affect the efficacy of gatekeeper training programs, namely knowledge about suicide, beliefs and attitudes about prevention, reluctance to intervene or stigma of mental illness, as well as self-efficacy to intervene. The gatekeeper training model adheres to Bandura's social cognitive theory, which highlights the dynamic interaction between their behaviors (intervention behavior), personal factors (e.g. sex, age, education, occupation and previous training experience), and environmental factors (gatekeeper training) (Bandura, 2001).

Various tools were developed and standardized to examine the outcome from gatekeeper training programs but their multidimensional nature gave rise to difficulties and complexities in assessing the outcome (Hawgood et al., 2022). Hawgood et al. (2022) proposed standardized minimum competencies for gatekeepers to ensure consistency in training content and the quality of participants. Knowledge and attitudes about suicide prevention as well as skills and self-efficacy to intervene are the principal qualities and ultimate goals of suicide prevention gatekeeper training programs (Burnette et al., 2015;



Hawgood et al., 2022). Knowledge about suicide is associated with increased level of self-efficacy to intervene. Skills involve different competencies such as recognizing suicide risks, initiating crisis intervention and facilitating referral. Positive attitudes to suicide prevention are more likely to be associated with intervention behavior whilst negative attitudes may cause underestimation of suicide risk (Hawgood et al., 2022). Self-efficacy to intervene reflects the level of confidence of an individual to identify and help someone at risk of suicide (Burnette et al., 2015).

#### **1.4 Gatekeeper self-efficacy**

Self-efficacy is a core construct of Bandura's social cognitive theory, which directly affects behavior and goals (Bandura, 2004). Self-efficacy to intervene, or gatekeeper self-efficacy, refers to the level of confidence of an individual to identify, support someone at risk of suicide and refer them to appropriate resources when necessary, which can be enhanced by effective gatekeeper training programs (Burnette et al., 2015).

However, the general public may possess insufficient competency to help at-risk individuals, and fear of rejection could prevent them from taking action (Owens et al., 2019). For instance, they think that they are not capable of helping the individuals at risk of suicide and may lack confidence to intervene during crisis. Generally, people tend to choose high self-efficacy tasks instead of low self-efficacy tasks (Kelder et al., 2015), and



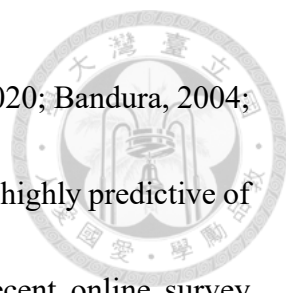
those with greater self-efficacy is more likely to act than those with lower self-efficacy who “quickly give up” (Bandura, 2004). Existing literature reported that gatekeeper self-efficacy can be enhanced by effective gatekeeper training programs (Burnette et al., 2015).

Validated assessment and consistent monitoring of gatekeeper self-efficacy are essential to ensure the efficacy of gatekeeper training programs (World Health Organization, 2014).

Takahashi et al. (2021) confirmed the usability and the validity of the Gatekeeper Self-Efficacy Scale (GKSES) to assess the effect of gatekeeper training program on gatekeeper self-efficacy in the general population in Japan. The study demonstrated the application of the scale in assessing the efficacy of gatekeeper training programs in general population by comparing pre- and post training ratings of the GKSES. The findings revealed that training led to improved level of gatekeeper self-efficacy, regardless of contact history with people at risk of suicide and training experiences. Additionally, the GKSES was a nine-item scale with one-factor structure, i.e., higher scores indicated more appropriate and less inadequate knowledge about suicide prevention. Furthermore, behavioral outcomes were not assessed and the association between gatekeeper self-efficacy and helping behavior remained unclear.

### **1.5 Helping confidence and intentions towards suicidal individuals**

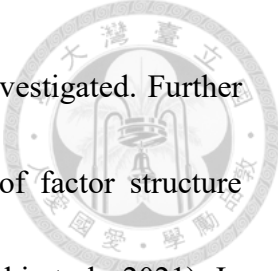
Intentions, one of the constructs in the theory of reasoned action, are essentially



proximal goals as in the social cognitive theory (Ajzen & Schmidt, 2020; Bandura, 2004; Luszczynska & Schwarzer, 2020), indicating that helping intention is highly predictive of helping behavior (Deane et al., 2006; Rossetto et al., 2016). A recent online survey implied that inappropriate responses following disclosure of suicide intention, plan or history could hinder help-seeking behaviors of the individuals at risk of suicide, for example, telling them that their family and friends would be hurt if they killed themselves (Nicholas et al., 2022). The findings from an Australian nationally representative telephone survey revealed that few people are willing to or have taken some recommended actions, such as directly asking about suicide thoughts, towards at-risk individuals. Moreover, men were more inclined to adopt non-recommended actions and less likely to take recommended actions than women (Nicholas et al., 2019; Nicholas et al., 2020). It is therefore critical that gatekeeper training programs address these challenges to improve the general public's competency in suicide prevention.

## **1.6 Knowledge gaps**

Currently, there is limited studies investigating the gatekeeper self-efficacy in the general population. Standardized evaluation are necessary for comprehensive measurement of gatekeeper training outcomes and a better understanding of the impact of training on suicide prevention (Burnette et al., 2015). Nevertheless, the underlying



components of gatekeeper self-efficacy have not been thoroughly investigated. Further studies are warranted to test the GKSES across cultures in case of factor structure differences due to potential lingual and cultural differences (Takahashi et al., 2021). In addition, it is unknown whether gatekeeper self-efficacy is associated with helping confidence and the intention to take helping actions.

### **1.7 Study aims**

This study aimed to explore the factor structure of the Mandarin version of the nine-item GKSES and the associations of gatekeeper self-efficacy components with helping confidence and intentions to adopt specific helping actions, both recommended and non-recommended, in the Taiwanese general population. The findings would facilitate the development and implementation of suicide prevention gatekeeper training programs across different cultures and populations by providing insights to ensure these programs are pertinent to the specific needs and contexts.



## Chapter 2 Method




### 2.1 Data

Data were extracted from a nationally representative computer-assisted telephone survey in 2022 using a dual frame design that included landlines and mobile phones. The project was supported by Taipei Medical University Research Grants for Newly Recruited Faculty (grant number: TMU108-AE1-B57; Principal Investigator: Chia-Yueh Hsu). Between April and May 2022, 1,100 adults aged 20-64 years were recruited and the distributions of their personal characteristics (age, sex, and place of residence) were similar to those in the general population in Taiwan in 2021 (Dept. of Household Registration, 2023). Before commencing the interviews, verbal consent was obtained from all respondents at the start of each telephone call by the interviewers.

Information on the following characteristics were collected: age, sex, education level, marital status, employment status, place of residence (city/county), exposure to suicide (i.e., whether they had knowledge of someone who had disclosed suicidal thoughts or plans or had a history of suicide attempts), professional experience in suicide prevention (i.e., whether their current or previous occupation involved caring for or interacting with someone with suicidal intention), and past experience receiving suicide prevention gatekeeper training. A total of 997 respondents were included in the analysis after excluding 103 records with missing values (i.e., unknown or refused to answer) on any

of the variables used in the study.



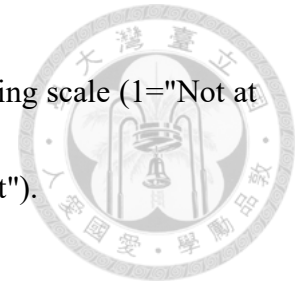
The respondents were randomly presented with one of two vignettes of a person contemplating suicide following a string of challenging life events. The vignettes varied only by name (Jia-Hao/Shu-Fen, which are the average names for males and females in Taiwan, similar to John/Jenny) and were adapted from an Australian telephone survey, which investigated helping confidence and specific helping intentions towards individuals at risk of suicide among the general population (Nicholas et al., 2019; Nicholas et al., 2020). The vignette was read out in Mandarin by the interviewers and the English translation of the narration is as follows: “Imagine you have a friend named Jia-Hao/Shu-Fen. He/she has been looking sad and talking less than before for the last few weeks. He/she is having trouble sleeping nearly every night. He/she said he/she and his/her partner have separated, and he/she is in debt and feels he/she will never be happy again. He/she believes his/her family and friends would be better off without him/her. Jia-Hao/Shu-Fen said he/she feels desperate and has been thinking of ways to end his/her life.”

## **2.2 Measures**

### *2.2.1 Helping confidence*

The respondents were asked to rate their level of confidence (i.e., general helping

confidence) to help the person in the vignette based on a 4-point rating scale (1="Not at all confident", 2="Not confident", 3="Confident", 4="Very confident").




### *2.2.2 Specific helping intentions*

The respondents were subsequently asked to rate their inclination towards engaging in five specific actions in response to suicide risk (i.e., specific helping intentions) characterized by the vignette based on a 4-point rating scale (1=" Very unlikely ", 2=" Unlikely ", 3="Likely", 4="Very likely"). The five actions included three recommended helping actions (i.e., to ask about how the person is feeling; to help make an appointment with a professional, such as a psychologist or psychiatrist; and to ask if the person had been thinking about suicide) and two non-recommended ones (i.e., to try to make the person understand that suicide is wrong; and to tell the person how much it would hurt their friends and family if they were to kill themselves). The original and translated wordings are provided in Table 1.

### *2.2.3 Gatekeeper Self-Efficacy Scale (GKSES)*


Following the questions abovementioned, the Mandarin version of the nine-item GKSES was used to assess gatekeeper self-efficacy of the respondents (Takahashi et al., 2021). The respondents were asked nine questions to rate their level of confidence (i.e.,



gatekeeper self-efficacy) to approach and support a person with suicidal tendency based on a 5-point rating scale (1="Not at all confident", 2="Not confident", 3="Neutral", 4="Confident", 5="Very confident"). The English version of GKSES was translated into Mandarin and back translated into English. The back translation procedures followed the guidelines by Guillemin et al. (1993) and Wild et al. (2005) to minimize deviation from the conceptual basis of the measure and to ensure the comprehensibility of the translated wordings. One expert in suicide prevention first translated the questions from English to Mandarin and then reviewed the back translation assisted by two bilingual speakers with a major in psychology. The original (English) and translated (Mandarin) wordings of the items are provided in Table 2.

### **2.3 Statistical Analysis**


To explore the factor structure of the Mandarin version of GKSES, exploratory factor analysis (EFA) was performed using Principal Axis Factoring (PAF) with a Promax rotation (Field, 2013). Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy were used to assess the factorability of the scale items (Cerny & Kaiser, 1977). The number of factors to be retained was determined by parallel analysis (i.e., to compare the scree plot of the eigenvalues from the study data with that of the eigenvalues randomly generated) (Cattell, 1966; Horn, 1965; O'Connor, 2000; Reise et



al., 2000) and the Kaiser–Guttman criteria (i.e., eigenvalues greater than 1) (Kaiser, 1960). Items with factor loadings below 0.3 were suppressed (Burton & Mazerolle, 2011; Comrey & Lee, 2013; Field, 2013) and communalities below 0.2 were removed (Child, 2006). Cronbach’s  $\alpha$  coefficient and item-total correlations were calculated to measure internal consistency.

Descriptive analyses were conducted for the following covariates: age group (20-29, 30-39, 40-49, 50-59, or 60-64), sex (male/ female), marital status (married, single, or others), educational level (junior high school and below, senior high school, associate degree, undergraduate, or graduate), employment status (employed or unemployed), place of residence (whether they lived in six special municipalities or not), exposure to suicide, professional experience in suicide prevention, and past experience receiving suicide prevention gatekeeper training. The six special municipalities are: New Taipei, Taichung, Kaohsiung, Taipei, Taoyuan and Tainan cities.

Mean item scores of the GKSES or its emerging suicide prevention gatekeeper self-efficacy (SE) component(s) were computed and compared by covariates between groups using *t* test and ANOVA. Logistic regression analysis was performed to investigate the association of the mean items scores of the GKSES or the SE component(s) with the helping confidence and intentions to adopt five specific helping actions in response to suicide risk. To proceed with logistic regression analysis, the binary outcome variables



were created using the cut-off value used by Nicholas et al. (2020) by grouping the ratings of general helping confidence and intention to take specific helping actions into “confident” (Confident/Very confident) vs “not confident” (Not confident/Not at all confident), and “likely” (Likely/Very likely) vs “unlikely” (Unlikely/Very unlikely). Odds ratios (ORs) and their 95% confidence intervals (95% CI), before and after adjusting for covariates and SE component(s), were estimated.

The data were weighted according to age, sex, and place of residence (city/county) to represent the Taiwanese adult population in 2021 (Appendix Table 1). All of the statistical analyses were executed using IBM SPSS Statistics 22 for Windows (SPSS, 2013).



## Chapter 3 Results

### 3.1 Exploratory factor analysis (EFA)

The distribution of the responses for the GKSES in 5-point rating scales was presented in Table 2. The Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy was found to be satisfactory (KMO = 0.882), and Bartlett’s Test of Sphericity generated a significant result ( $\chi^2 = 3,131$ ,  $df = 36$ ,  $p < .001$ ), indicating that the nine items of GKSES were suitable for factor analysis (Hair Jr et al., 2011; Netemeyer et al., 2003).

Parallel analysis indicated that two factors should be retained, and this was further supported by the visual inspection of the scree plot (Figure 1). The PAF results indicated two factors with eigenvalues greater than 1, and the proportion of the total variance explained by the retained factors was 60.52%. The descriptive statistics of the GKSES items, including mean scores and their standard deviations (SD), full factor loadings and  $h^2$  values, were presented in Table 3.

Therefore, the retaining items of suicide prevention gatekeeper self-efficacy (SE) were grouped into two components, namely SE-skill and SE-knowledge. SE-skill comprised five items related to the skills of detecting and managing suicide risk (items 1, 2, 3, 4 and 8) whereas SE-knowledge consisted of four items associated with knowledge about depression, suicide, and resources available to at-risk individuals (items 5, 6, 7 and 9).



### 3.2 Internal consistency

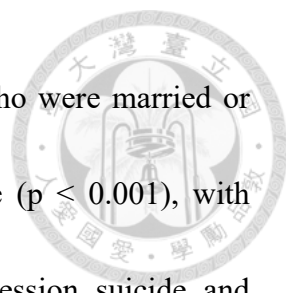
Cronbach's  $\alpha$  coefficient was 0.858 and item-total correlations demonstrated satisfactory scores ranging from  $r = .50$  to  $.65$ , indicating that the internal consistency for the GKSES was good.

### 3.3 Demographic characteristics

Among the 997 respondents, the mean age was 43.7 (SD = 12.8) and 49.5% were males (Appendix Table 1). Weighted data showed that the mean age was 42.2 (SD = 12.5) years; 49.8% were males; 40.9% were married; 53.6% held an undergraduate degree; 69.9% were employed; and 70.7% lived in the six special municipalities. Regarding exposure to suicide and suicide prevention, 34.3% reported knowing someone who had ever attempted suicide; 1.3% had professional experience in suicide prevention; and 1.7% had received suicide prevention gatekeeper training (Table 4).

The mean scores for SE-skill and SE-knowledge by covariates are presented in Table 4. The youngest respondents (20-29 years) were more confident in their skills to detect and manage suicide risk compared to other age groups ( $p = 0.004$ ). The difference of SE-skill mean score was also found with respect to marital status ( $p = 0.003$ ). The respondents who were cohabiting, divorced, separated, or widowed were found to be more confident






in their suicide risk detection and management skills than those who were married or single. Sex difference was observed in SE-knowledge mean score ( $p < 0.001$ ), with females exhibiting greater confidence in their knowledge about depression, suicide, and resources available to at-risk individuals than males. The respondents who were not living in the six special municipalities, those had exposure to suicide, professional experience in suicide prevention, and prior suicide prevention gatekeeper training showed higher SE-skill and SE-knowledge mean scores. No differences were found in educational level and employment status for both SE-skill and SE-knowledge mean scores.

### **3.4 Logistic regression analyses**

The results of the logistic regression analyses of SE-skill and SE-knowledge are presented in Table 5 and Table 6 respectively. The associations between the gatekeeper self-efficacy components and helping confidence as well as the intentions to adopt five helping actions were consistent in logistic regression analyses before and after adjusting for covariates (Adjusted Model a). Although SE-skill and SE-knowledge were associated with both recommended and non-recommended helping actions, there was a tendency for stronger associations with recommended actions than non-recommended ones. The findings from Adjusted Model a indicated that SE-skill and SE-knowledge were associated with confidence to help the person in the vignette (SE-skill: adjusted odds ratio



[aOR] = 4.90, 95% CI 3.85–6.24; SE-knowledge: aOR = 4.07, 95% CI 3.20–5.18), intention to ask about how the person is feeling (SE-skill: aOR = 2.91, 95% CI 2.32–3.67; SE-knowledge: aOR = 2.36, 95% CI 1.85–3.01), intention to help make an appointment with a professional (SE-skill: aOR = 2.66, 95% CI 2.14–3.31; SE-knowledge: aOR = 3.89, 95% CI 2.99–5.07), and intention to ask if the person had been thinking about suicide (SE-skill: aOR = 1.98, 95% CI 1.62–2.41; SE-knowledge: aOR = 1.65, 95% CI 1.35–2.03). Notably, SE-skill showed a somewhat stronger association with intentions to take non-recommended helping actions as compared to SE-knowledge. For instance, the aOR of the intention to persuade the person that suicide is wrong was 1.79 (95% CI 1.49–2.16) for SE-skill and 1.64 (95% CI 1.33–2.02) for SE-knowledge. Additionally, the aOR of the intention to tell the person that suicide hurts friends and family was 2.05 (95% CI 1.49–2.16) for SE-skill and 1.37 (95% CI 1.08–1.74) for SE-knowledge.

In Adjusted Model b (adjusting for covariates and SE components), SE-skill remained associated with helping confidence and the intentions to adopt all recommended and non-recommended helping actions, which was similar to the results from Adjusted Model a (Table 5). By contrast, SE-knowledge was found to be associated with helping confidence and the intention to adopt one recommended helping actions (i.e., to help make an appointment with a professional) but no longer with the intentions to adopt other helping actions (Table 6).




## **Chapter 4 Discussion**

### **4.1 Main findings**

Our national survey data revealed a two-factor structure of the suicide prevention gatekeeper self-efficacy measured using the GKSES; one component corresponded to the skills of suicide risk detection and management (i.e., SE-skill), and the other corresponded to knowledge about depression, suicide and resources available for at-risk individuals (i.e., SE-knowledge). Younger individuals had a higher level of self-reported SE-skill than older people, while females had a higher level of SE-knowledge than males, while they were both positively associated with professional experience in suicide prevention and past gatekeeper training. In the fully adjusted analysis, both SE-skill and SE-knowledge were associated with helping confidence; however, SE-skill was associated with intentions to adopt both recommended and non-recommended helping actions, while SE-knowledge was only associated with the intention to take one recommended helping action (i.e., to help make an appointment with a professional).

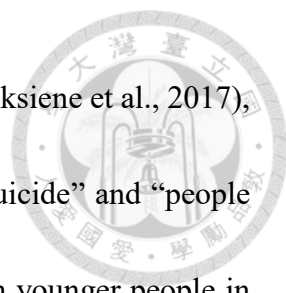
### **4.2 Comparison with previous findings**

The present study identified and confirmed a two-factor structure of the Mandarin version of the GKSES, in contrast to the one-factor structure found in a Japanese sample (Takahashi et al., 2021). However, our findings were broadly consistent with the



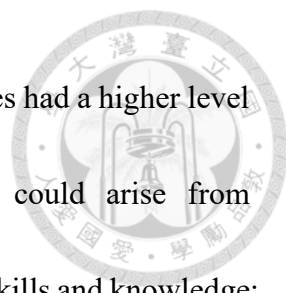
framework based on four essential gatekeeper skills used by the Japanese researchers when developing the original GKSES to assess gatekeeper self-efficacy (Takahashi et al., 2021). The four sets of skills included: (a) to attain basic knowledge about suicide (items 1, 2, 6); (b) to assess suicide risk (item 9); (c) to listen closely and counsel a suicidal person (items 3, 4, 8); and (d) to connect a suicidal person with social support resources (items 5, 7). The items 1 and 2 in skill set (a) and the entire skill set (c) corresponded to SE knowledge, whereas the item 6 in skill set (a), skill sets (b) and (d) aligned with SE-skill found in our study. Items 1 and 2 were distinguished from item 6 in skill set (a), which could be resulted from the interpretation of the wordings. Items 1 (“You could understand the state of mind of a person who intends to die by suicide.”) and 2 (“You know the appropriate attitudes when approaching a suicidal person.”) corresponded to skills of suicide risk detection and management, while item 6 (“You have basic knowledge about depression.”) emphasized knowledge about depression.

Younger individuals had a higher level of self-reported SE-skill than older people. The study by Takahashi et al. (2021) targeting the general public found that participants in their 30s had higher pre-training self-efficacy ratings. In another cross-sectional study by Huang et al. (2023) that recruited nurses from a medical center in southern Taiwan, participants aged 25 years or younger showed better knowledge of and greater self-efficacy in suicide prevention. Although younger individuals appear to be more




empathetic and more open-minded towards suicide (Lygnugaryte-Griksiene et al., 2017), myths of suicide, such as “talking about suicide would encourage suicide” and “people who talk about suicide do not mean to do it”, were more common in younger people in Taiwan (Wang et al., 2022). Therefore, it is vital to address and emphasize the knowledge about depression, suicide, and resources available to at-risk individuals within gatekeeper training programs.

Females had a higher level of SE-knowledge than males, which aligned with the previous study by Takahashi et al. (2021). However, the study by Huang et al. (2023) conducted in a medical center did not address sex distribution or sex difference since the study recruited only female nurses. Existing literature also indicated that females appeared to be more knowledgeable and are more likely to intervene than males, whether they have ever received suicide prevention gatekeeper training or not (Aseltine & DeMartino, 2004; Aseltine et al., 2007; Clark et al., 2010; Overholser et al., 1989; Spirito et al., 1988). In contrast to the previous findings, Kerr et al. (2018) showed inverted sex difference that greater increase of self-efficacy was observed in males from pre- to post training despite relatively small sample size. This could be explained by the societal expectation of gender roles that women were assumed to possess communal attributes (e.g., caring and nurturant) as in the social role theory (Kaur et al., 2022), which could also be a result of socialization process (Brewer, 2001).



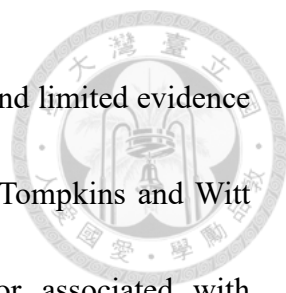
Unexpectedly, respondents not living in six special municipalities had a higher level of both SE-skill and SE-knowledge. The unexpected findings could arise from overconfidence as the GKSES items did not specify the gatekeeping skills and knowledge; instead, they provided a general statement. Another explanation could be that respondents not living in six special municipalities had greater exposure to suicide given the higher suicide rate in non-urban areas, particularly suicide by solids/liquids poisoning which is associated with easy access to toxic pesticides (Chang et al., 2011). In an Australian national household study that explored the urban-rural difference of the mental health literacy, rural participants exhibited better skills in identifying signs of depression and knowledge regarding national depression health promotion campaign as compared to urban participants (Griffiths et al., 2009). Conversely, another cross-sectional survey in Malaysia revealed that greater educational levels and higher self-reported levels of knowledge about depression were found among urban participants (Loo & Furnham, 2012). It is of note that the present study found no difference of SE-skill and SE-knowledge in terms of educational levels which is generally associated with urbanization, i.e., greater proportion of higher education attainment were found among respondents living in six special municipalities (Department of Household Registration).

Respondents with exposure to suicide, professional experience in suicide prevention, and prior suicide prevention gatekeeper training showed higher level of SE-skill and SE-



knowledge. The findings were in consistent with previous studies as self-efficacy is associated with exposure to suicide and training experience (Clark et al., 2010; Cross et al., 2007; King & Smith, 2000; Shim & Compton, 2010; Sylvara & Mandracchia, 2019; Takahashi et al., 2021; Tompkins & Witt, 2009; Wyman et al., 2008). This could be explained by the gain of confidence and reduction of reluctance (Sandford et al., 2023) that their role in suicide prevention was legitimized through suicide prevention gatekeeper training (Montiel & Mishara, 2023b). Therefore, it is important for the general population to feel comfortable to help at-risk individuals (Burnette et al., 2015).

Both SE-skill and SE-knowledge were associated with helping confidence; however, SE-skill was associated with intentions to adopt both recommended and non-recommended helping actions, while SE-knowledge was only associated with the intention to take one recommended helping action (i.e., to help make an appointment with a professional). These findings resonated with a recent study which investigated attitudes of psychologists towards suicide, that overestimated confidence in suicide management skills may lead to undesirable actions (Gagnon & Hasking, 2020). Moreover, SE-knowledge is associated with decreased odds of the intentions to take non-recommended helping actions although the fully adjusted analysis yielded no statistically significant difference. A longitudinal study in Australia by Rossetto et al. (2016) found that respondents with greater intention to intervene with suicide crisis were five times more



likely to perform helping actions in real life. There has been mixed and limited evidence of effect of gatekeeper training program on gatekeeping behavior. Tompkins and Witt (2009) found no apparent improvement of gatekeeping behavior associated with gatekeeper training. On the other hand, behavioral changes were found among those already interacting regularly with individuals at risk (e.g., teachers vs other school staff) (Burnette et al., 2015), which aligns with findings from the present study that exposure to suicide is associated with greater gatekeeper self-efficacy in both aspects of skill and knowledge.

#### **4.3 Strengths and limitations**

The present study is the first population-based study to assess the associations between suicide prevention gatekeeper self-efficacy and helping confidence and intentions to adopt specific helping actions. Adding the narration of short stories [i.e., the vignettes adapted from the Australian telephone survey by Nicholas et al. (2020)] into the telephone survey could be helpful to better engage the respondents by providing a more surreal and vivid scenario before asking them to give their ratings. Furthermore, the study not only assessed two distinct aspects of gatekeeper self-efficacy but also the intentions to take both recommended and non-recommended helping actions, which yielded information about the patterns of the constructs of interest, hence providing insights into



gatekeeper training programs design and implementation targeting the general public (Bandura, 2006).



There are some limitations of this study. Due to the cross-sectional nature of the present study, the causality regarding the relationship between gatekeeper self-efficacy and the covariates cannot be deduced. Secondly, self-reported measures were used to assess gatekeeper self-efficacy, helping confidence and intentions to adopt specific helping actions. Although the study results may be affected by social desirability and hence overestimated, sampling bias could be minimized as the respondents of the study are representative of the Taiwanese general population after weighting, and were not limited to those who showed strong interest or had professional experience in suicide prevention.

## Chapter 5 Implications



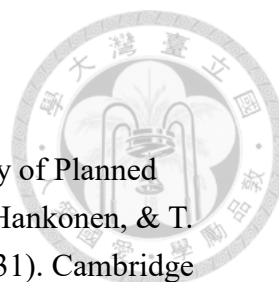
Further research is warranted to investigate the relationship between personal and contextual factors and the behavioral changes of the general population. The degree of gatekeeper self-efficacy does not guarantee the appropriateness of the action that might be adopted despite a tendency for stronger associations with recommended actions than non-recommended ones. Therefore, the recommended and non-recommended helping actions should be addressed when designing and implementing the gatekeeper training programs, with a particular emphasis on reinforcing the recommended helping actions.

Future research should be particularly focused on understanding the effect of gatekeeper training programs on both recommended and non-recommended helping actions. When monitoring the efficacy of the gatekeeper training programs, it is essential to incorporate the evaluation of helping intentions and actual helping behavior alongside the assessment of gatekeeper self-efficacy.

## Chapter 6 Conclusion

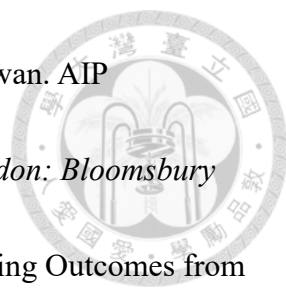
The Mandarin version of the GKSES comprises two factors and can be divided into two components, SE-skill and SE-knowledge. Suicide prevention gatekeeper training and educational activities should focus on encouraging people to ask direct questions about suicide risk, and providing them with messages about “what not to do” (e.g., to persuade the person that suicide is wrong, and suicide hurts their friends and family).





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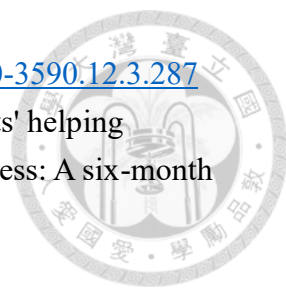
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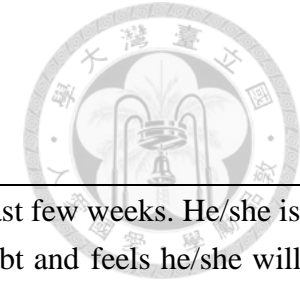
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## Tables and Figure

**Table 1. Measurement of the general helping confidence and intention to take five specific helping actions.**

“Imagine you have a friend named Jia-Hao/Shu-Fen. He/she has been looking sad and talking less than before for the last few weeks. He/she is having trouble sleeping nearly every night. He/she said he/she and his/her partner have separated, and he/she is in debt and feels he/she will never be happy again. He/she believes his/her family and friends would be better off without him/her. Jia-Hao/Shu-Fen said he/she feels desperate and has been thinking of ways to end his/her life.”

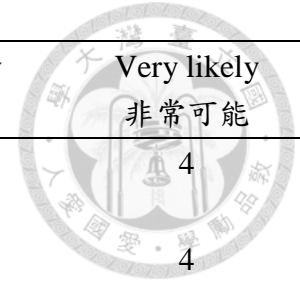
「假設您有一位朋友叫家豪/淑芬，他/她最近幾個禮拜看起來心情很差（台語：心情鬱卒），變得很少說話，幾乎每晚都睡不好。他/她說他/她和另一半分居了，而且欠債，覺得再也開心不起來（台語：歡喜不起來），家人和朋友如果沒有他/她會更好（台語：沒伊卡好）。家豪說他/她很絕望，在想結束生命的方法（台語：想按怎結束自己的性命）。」

	Not at all confident 非常沒有信心	Not confident 沒有信心	Confident 有信心	Very confident 非常有信心
1. How confident would you feel to help Jia-Hao/Shu-Fen? <sup>a</sup> 如果「家豪/淑芬」是您認識的人，您有信心能夠幫助到他嗎？ <sup>a</sup>	1	2	3	4

Respondents were subsequently asked to assess their inclination towards engaging in five distinct helping behaviors.

「下列有五種方式，您有多大的可能會這樣做呢？」

	Very unlikely 非常不可能	Unlikely 不可能	Likely 可能	Very likely 非常可能
2. Would you ask about how are they feeling? <sup>b</sup> 您會問「家豪/淑芬」的感受嗎？ <sup>b</sup>	1	2	3	4
3. Would you help them to make an appointment with a professional, such as a psychologist or psychiatrist? <sup>b</sup> 您會幫助他找專業人員，例如心理師、身心科嗎？ <sup>b</sup>	1	2	3	4



	Very unlikely 非常不可能	Unlikely 不可能	Likely 可能	Very likely 非常可能
4. Would you ask if they had been thinking about suicide? <sup>b</sup> 您會問他是不是想要自殺嗎? <sup>b</sup>	1	2	3	4
5. Would you try to make them understand that suicide is wrong? <sup>c</sup> 您會說服他自殺是不對的（台語：勸伊自殺是不對的）嗎? <sup>c</sup>	1	2	3	4
6. Would you tell them how much it would hurt their friends and family if they were to kill themselves? <sup>c</sup> 您會告訴他如果自殺，家人和朋友會傷心嗎? <sup>c</sup>	1	2	3	4

<sup>a</sup> The general helping confidence.

<sup>b</sup> The three recommended actions.

<sup>c</sup> The two non-recommended actions.



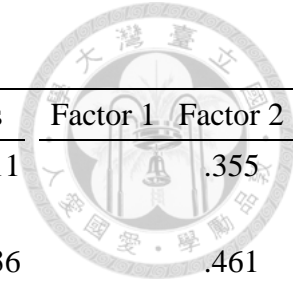
**Table 2. Distribution of the responses for the nine-item Gatekeeper Self-efficacy Scale (GKSES) in 5-point rating scales.**

Respondents were asked about the following questions to rate their level of confidence (i.e. gatekeeper self-efficacy) when approaching and supporting suicidal individuals based on a 5-point rating scale.

「當您遇到有自殺傾向（台語：想麥自殺）的人，您有沒有信心做到下列事情？1分是完全沒有信心，3分是普通，5分是完全有信心，請回答1到5分。」

	1="Not at all confident"		2="Not confident"		3="Neutral"		4="Confident"		5="Very confident"	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
1. You could understand the state of mind of a person who intends to die by suicide. 您能了解想自殺的人的心理狀態。	91	9.2	102	10.4	466	47.4	215	21.9	110	11.1
2. You know the appropriate attitudes when approaching a suicidal person. 您知道用適當的態度來面對有自殺傾向的人。	46	4.7	97	9.8	365	37.1	277	28.2	199	20.2
3. You could listen closely to a suicidal person. 您能仔細地聽他說話。	14	1.4	23	2.3	131	13.3	288	29.3	527	53.6
4. You could calmly ask a person about their suicidal ideation and plan. 您能冷靜地問他自殺的想法與計畫。	84	8.5	94	9.5	252	25.6	259	26.3	295	30.0
5. You know what are the resources available for a suicidal person. 您知道他可以利用的資源。	97	9.9	133	13.5	399	40.6	231	23.5	123	12.5
6. You have basic knowledge about depression. 您有關於憂鬱症的基本知識。	79	8.0	129	13.1	401	40.8	257	26.1	117	11.9

	1="Not at all confident"		2="Not confident"		3="Neutral"		4="Confident"		5="Very confident"	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
7. You could connect a suicidal person with necessary resources. 您能夠轉介（台語：介紹）他必要的資源。	79	8.0	113	11.5	342	34.8	266	27.0	183	18.6
8. You could calmly guide and give advice to a suicidal person. 您能夠冷靜地輔導他。	69	7.0	105	10.6	352	35.8	286	29.1	171	17.4
9. You recognize signs of suicide and depression. 您能夠辨認（台語：看出）自殺與憂鬱的跡象（台語：症頭）。	139	14.1	210	21.4	389	39.5	170	17.3	76	7.7



**Table 3. Nine-item Gatekeeper Self-efficacy Scale (GKSES) item mean scores, and factor loadings.**

	mean	SD	Skewness	Kurtosis	Factor 1	Factor 2	h <sup>2</sup>
1. You could understand the state of mind of a person who intends to die by suicide. 您能了解想自殺的人的心理狀態。	3.15	0.03	-0.21	-0.11		.355	0.34
2. You know the appropriate attitudes when approaching a suicidal person. 您知道用適當的態度來面對有自殺傾向的人。	3.49	0.03	-0.31	-0.36		.461	0.43
3. You could listen closely to a suicidal person. 您能仔細地聽他說話。	4.31	0.03	-1.34	1.62		.739	0.45
4. You could calmly ask a person about their suicidal ideation and plan. 您能冷靜地問他自殺的想法與計畫。	3.60	0.04	-0.57	-0.60		.699	0.42
5. You know what are the resources available for a suicidal person. 您知道他可以利用的資源。	3.15	0.04	-0.19	-0.45	.668		0.53
6. You have basic knowledge about depression. 您有關於憂鬱症的基本知識。	3.21	0.03	-0.23	-0.32	.856		0.54
7. You could connect a suicidal person with necessary resources. 您能夠轉介（台語：介紹）他必要的資源。	3.37	0.04	-0.33	-0.52	.681		0.56
8. You could calmly guide and give advice to a suicidal person. 您能夠冷靜地輔導他。	3.39	0.04	-0.36	-0.37		.656	0.56
9. You recognize signs of suicide and depression. 您能夠辨認（台語：看出）自殺與憂鬱的跡象（台語：症頭）。	2.83	0.04	0.05	-0.54	.625		0.48

**Table 4. Suicide gatekeeper self-efficacy (SE) components (SE-skill and SE-knowledge) by characteristic amongst 997 respondents.**

Characteristics	Unweighted		Weighted	SE-skill				SE-knowledge			
	n	%	%	mean	SD	F or t	p value	mean	SD	F or t	p value
Age group						3.94 <sup>d</sup>	0.004			1.55 <sup>d</sup>	0.19
20-29	181	18.2	19.2	3.79	0.73			2.58	0.61		
30-39	184	18.5	21.9	3.57	0.70			2.49	0.66		
40-49	231	23.2	24.6	3.55	0.81			2.45	0.70		
50-59	259	26.0	23.5	3.52	0.81			2.57	0.77		
60-64	142	14.2	10.8	3.53	0.87			2.46	0.85		
Sex						0.18 <sup>e</sup>	0.86			4.08 <sup>e</sup>	<0.001
Female	503	50.5	50.2	3.59	0.76			2.60	0.68		
Male	494	49.5	49.8	3.59	0.81			2.42	0.73		
Marital status						6.00 <sup>d</sup>	0.003			1.48 <sup>d</sup>	0.23
Married	374	37.5	40.9	3.60	0.77			2.51	0.68		
Single	564	56.6	53.2	3.55	0.79			2.49	0.72		
Others <sup>a</sup>	59	5.9	5.9	3.92	0.79			2.69	0.85		
Educational level						1.65 <sup>d</sup>	0.16			0.71 <sup>d</sup>	0.58
Junior high school and below	67	6.7	5.5	3.43	0.83			2.46	0.80		
Senior high school	261	26.2	24.6	3.62	0.84			2.51	0.76		
Associate degree	164	16.4	16.2	3.49	0.74			2.44	0.75		
Undergraduate	386	38.7	40.9	3.63	0.76			2.54	0.67		
Graduate	119	11.9	12.7	3.60	0.78			2.54	0.68		

Characteristics	Unweighted		Weighted	SE-skill				SE-knowledge			
	n	%	%	mean	SD	F or t	p value	mean	SD	F or t	p value
Employment status						0.51 <sup>e</sup>	0.61			0.08 <sup>e</sup>	0.93
Employed	697	69.9	70.6	3.58	0.78			2.51	0.69		
Non-employed <sup>b</sup>	300	30.1	29.4	3.61	0.81			2.51	0.77		
Living in six special municipalities <sup>c</sup>						2.73 <sup>e</sup>	0.006			2.14 <sup>e</sup>	0.033
No	404	40.5	29.3	3.70	0.79			2.59	0.69		
Yes	593	59.5	70.7	3.55	0.78			2.48	0.72		
Exposure to suicide						2.52 <sup>e</sup>	0.012			2.99 <sup>e</sup>	0.003
No	655	65.7	64.4	3.54	0.78			2.46	0.69		
Yes	342	34.3	35.6	3.67	0.80			2.60	0.74		
Professional experience in suicide prevention						2.56 <sup>e</sup>	0.011			4.79 <sup>e</sup>	<0.001
No	980	98.3	98.7	3.58	0.78			2.50	0.70		
Yes	17	1.7	1.3	4.14	0.77			3.44	0.53		
Past experience receiving suicide prevention gatekeeper training						2.84 <sup>e</sup>	0.005			3.63 <sup>e</sup>	<0.001
No	978	98.1	98.3	3.58	0.78			2.50	0.71		
Yes	19	1.9	1.7	4.13	0.73			3.13	0.63		

<sup>a</sup> Cohabited, divorced, separated, or widowed.

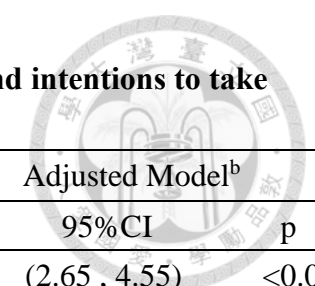
<sup>b</sup> Students, homemakers, unemployed, or retired.

<sup>c</sup> New Taipei, Taichung, Kaohsiung, Taipei, Taoyuan and Tainan cities.

<sup>d</sup> ANOVA.

<sup>e</sup> T-test.



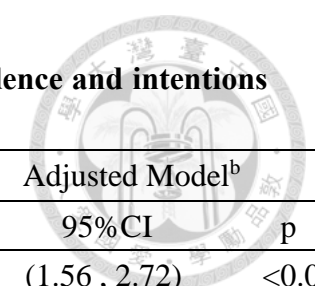


**Table 5. Logistic regression analysis of the association of gatekeeper self-efficacy (SE)-skill with helping confidence and intentions to take five specific actions.**

Variables	Unadjusted Model			Adjusted Model <sup>a</sup>			Adjusted Model <sup>b</sup>		
	OR	95%CI	p	OR	95%CI	p	OR	95%CI	p
Helping confidence	4.47	(3.56 , 5.60)	<0.001	4.90	(3.85 , 6.24)	<0.001	3.47	(2.65 , 4.55)	<0.001
Recommended actions									
Intention to ask feeling	2.83	(2.27 , 3.52)	<0.001	2.91	(2.32 , 3.67)	<0.001	2.56	(1.93 , 3.39)	<0.001
Intention to make appointment	2.65	(2.15 , 3.26)	<0.001	2.66	(2.14 , 3.31)	<0.001	1.57	(1.20 , 2.04)	<0.001
Intention to ask suicide	2.05	(1.70 , 2.48)	<0.001	1.98	(1.62 , 2.41)	<0.001	1.87	(1.47 , 2.38)	<0.001
Non-recommended actions									
Intention to tell suicide is wrong	1.71	(1.43 , 2.05)	<0.001	1.79	(1.49 , 2.16)	<0.001	1.65	(1.30 , 2.08)	<0.001
Intention to tell suicide hurts family	1.89	(1.54 , 2.31)	<0.001	2.05	(1.65 , 2.55)	<0.001	2.39	(1.81 , 3.15)	<0.001

<sup>a</sup> Adjusted for age, sex, marital status, education, living areas, previous exposure to suicidal individuals, gatekeeper training experience and professional experience in suicide prevention.

<sup>b</sup> Adjusted for age, sex, marital status, education, living areas, previous exposure to suicidal individuals, gatekeeper training experience, professional experience and SE-knowledge.



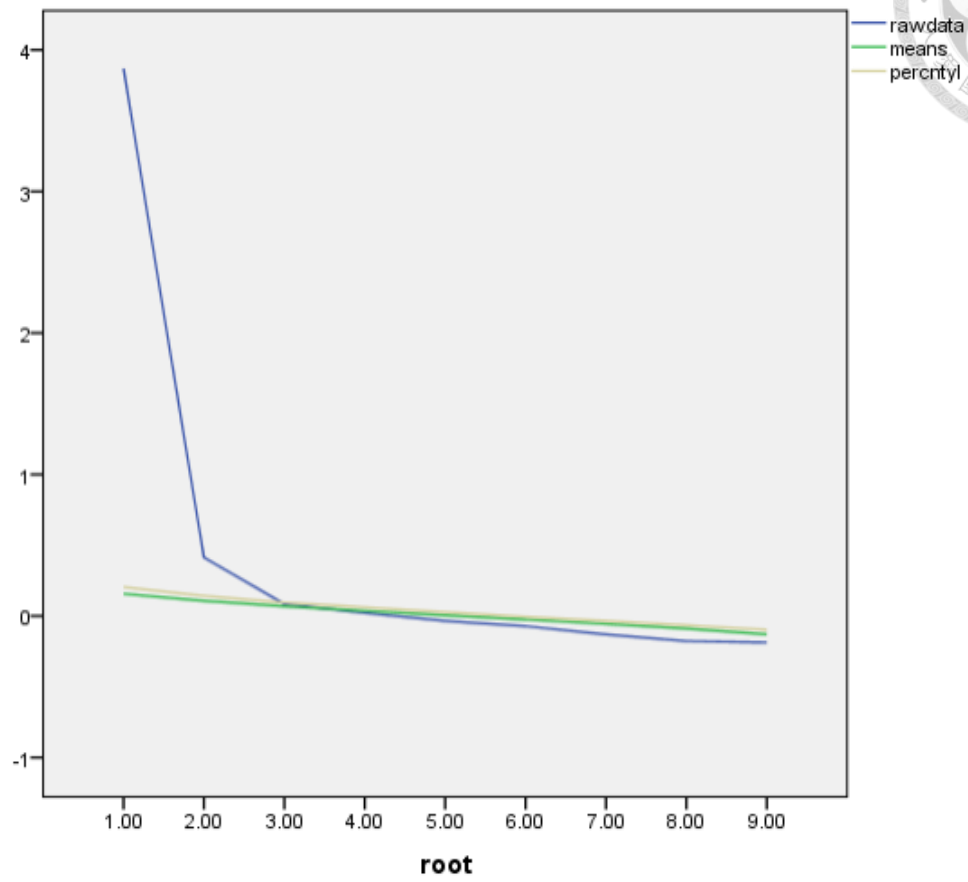
**Table 6. Logistic regression analysis of the association of gatekeeper self-efficacy (SE)-knowledge with helping confidence and intentions to take five specific actions.**

Variables	Unadjusted Model			Adjusted Model <sup>a</sup>			Adjusted Model <sup>b</sup>		
	OR	95%CI	p	OR	95%CI	p	OR	95%CI	p
Helping confidence	3.62	(2.90 , 4.53)	<0.001	4.07	(3.20 , 5.18)	<0.001	2.06	(1.56 , 2.72)	<0.001
Recommended actions									
Intention to ask feeling	2.44	(1.93 , 3.08)	<0.001	2.36	(1.85 , 3.01)	<0.001	1.27	(0.94 , 1.73)	0.12
Intention to make appointment	4.16	(3.22 , 5.37)	<0.001	3.89	(2.99 , 5.07)	<0.001	2.91	(2.13 , 3.97)	<0.001
Intention to ask suicide	1.69	(1.39 , 2.05)	<0.001	1.65	(1.35 , 2.03)	<0.001	1.10	(0.86 , 1.42)	0.45
Non-recommended actions									
Intention to tell suicide is wrong	1.55	(1.27 , 1.89)	<0.001	1.64	(1.33 , 2.02)	<0.001	0.75	(0.90 , 1.53)	0.24
Intention to tell suicide hurts family	1.38	(1.10 , 1.73)	0.006	1.37	(1.08 , 1.74)	0.010	0.75	(0.55 , 1.03)	0.075

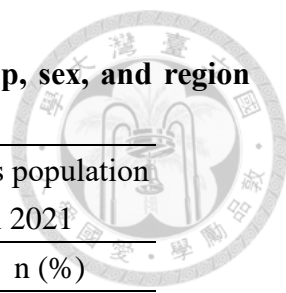
<sup>a</sup> Adjusted for age, sex, marital status, education, living areas, previous exposure to suicidal individuals, gatekeeper training experience and professional experience in suicide prevention.

<sup>b</sup> Adjusted for age, sex, marital status, education, living areas, previous exposure to suicidal individuals, gatekeeper training experience, professional experience and SE-skill

Figure 1. Scree plot.



**Appendix Table 1. Comparison of the distributions of age group, sex, and region between the study sample and Taiwan's population in 2021.**



Characteristics	Unweighted	Weighted	Taiwan's population
	n (%)	n (%)	in 2021 n (%)
<b>Age group</b>			
20-29	181 (18.2)	189 (19.2)	3,013,701 (19.5)
30-39	184 (18.5)	216 (21.9)	3,354,753 (21.7)
40-49	231 (23.2)	242 (24.6)	3,797,782 (24.6)
50-59	259 (26.0)	231 (23.5)	3,590,260 (23.3)
60-64	142 (14.2)	106 (10.8)	1,682,323 (10.9)
<b>Sex</b>			
Female	503 (50.5)	494 (50.2)	7,732,535 (50.1)
Male	494 (49.5)	490 (49.8)	7,706,284 (49.9)
<b>Place of residence</b>			
Taipei City	81 (8.1)	103 (10.4)	1,591,055 (10.3)
New Taipei City	141 (14.1)	175 (17.8)	2,705,873 (17.5)
Taoyuan City	76 (7.6)	98 (10.0)	1,520,537 (9.8)
Taichung City	85 (8.5)	121 (12.4)	1,881,022 (12.2)
Tainan City	126 (12.6)	80 (8.1)	1,239,074 (8.0)
Kaohsiung City	84 (8.4)	118 (12.0)	1,823,335 (11.8)
Keelung City	29 (2.9)	15 (1.5)	244,563 (1.6)
Hsinchu City	32 (3.2)	19 (1.9)	291,709 (1.9)
Chiayi City	25 (2.5)	11 (1.1)	171,556 (1.1)
Yilan County	28 (2.8)	19 (1.9)	296,155 (1.9)
Hsinchu County	28 (2.8)	19 (1.9)	376,079 (2.4)
Miaoli County	29 (2.9)	21 (2.2)	351,510 (2.3)
Changhua County	33 (3.3)	53 (5.4)	817,130 (5.3)
Yunlin County	31 (3.1)	28 (2.8)	432,109 (2.8)
Chiayi County	33 (3.3)	21 (2.1)	322,713 (2.1)
Pintung County	30 (3.0)	34 (3.5)	534,126 (3.5)
Hualien County	26 (2.6)	12 (1.2)	210,283 (1.4)
Taitung County	12 (1.2)	5 (0.5)	140,306 (0.9)
Nantou County	46 (4.6)	20 (2.1)	316,442 (2.0)
Remote islands	22 (2.2)	11 (1.1)	173,242 (1.1)