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Help-seeking preferences among Chinese college students exposed to a natural disaster: a person-centered approach

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ABSTRACT

Background: Direct exposure to natural disasters is associated with increased mental disorders. Help-seeking behaviour among Chinese adults is low and the barriers and facilitators of help-seeking among Chinese adults exposed to natural disasters is understudied.
Objective: Using a person-centred approach, this study describes help-seeking preferences and their correlates in a sample of Chinese college students after experiencing Typhoon Hato, the strongest storm to affect Macao, China in the past 50 years.
Method: The baseline sample was collected one month following exposure to the Typhoon (September 2017). Six months following the baseline study (April, 2018), a total of 815 students (females = 71.5%) completed follow-up and were included in the data analysis. Latent Class Analysis (LCA) and Multinomial Logistic Regression were used to analyse the data via Mplus 7.4 and Stata 15.0.
Results: Three latent classes of help-seeking preferences were identified in this study, including: 'mental health professionals and close people' (MHPCP, 52%), non-seekers (31%), and 'multiple sources' (17%). The results of multinomial logistic regression showed that region of origin (mainland versus Macao, China), self-stigma, perceived helpfulness of professional mental health help, previous professional help-seeking behaviour, and perceived social support, were significantly associated with MHPCP help-seeking preferences.
Conclusion: A large proportion of students preferred to seek support from loved ones and professionals. However, over 30% of the sample preferred not seeking help for mental health concerns. Further research is needed to enhance mental health treatment seeking preferences among Chinese college students.

Preferencias de búsqueda de ayuda entre estudiantes universitarios chinos expuestos a un desastre natural: Un enfoque centrado en la persona

Antecedentes: La exposición directa a los desastres naturales se asocia con un aumento de los trastornos mentales. El comportamiento de búsqueda de ayuda entre los adultos chinos es bajo y las barreras y los facilitadores de la búsqueda de ayuda entre los adultos chinos expuestos a desastres naturales están poco estudiadas.
Objetivo: Utilizando un enfoque centrado en la persona, este estudio describe las preferencias de búsqueda de ayuda y sus correlatos en una muestra de estudiantes universitarios chinos después de experimentar el tifón Hato, la tormenta más fuerte que ha afectado a Macao, China en los últimos 50 años.
Método: Se incluyeron en el análisis de datos un total de 815 estudiantes (mujeres = 71,5%) que completaron la línea de base (del 21 de septiembre al 6 de diciembre de 2017) y un seguimiento de 6 meses (del 3 de abril al 3 de mayo de 2018). Se utilizaron el análisis de clase latente (LCA en su sigla en inglés) y la regresión logística multinomial para analizar los datos a través de Mplus 7.4 y STATA 14.0.
Resultados: Se identificaron tres clases latentes de preferencias de búsqueda de ayuda en este estudio, que incluyen: "profesionales de la salud mental y personas cercanas" (PSMPC, 52%), no buscadores (31%), y "múltiples fuentes" (17%). Los resultados de la regresión logística multinomial mostraron que la región de origen (continental versus Macao, China), el autoestigma, la utilidad percibida de la ayuda profesional de salud mental, el comportamiento previo de búsqueda de ayuda profesional, y el apoyo social percibido, se asociaron significativamente con la preferencia de búsqueda de ayuda de PSMPC.
Conclusión: Una gran proporción de estudiantes prefirió buscar el apoyo de sus seres queridos y profesionales. Sin embargo, más del 30% de la muestra prefirió no buscar ayuda por problemas de salud mental. Se necesita más investigación para mejorar las preferencias de búsqueda de tratamiento de salud mental entre los estudiantes universitarios chinos.

HIGHLIGHTS
• Help seeking preferences among 815 disaster-exposed Chinese college students were described using latent class analysis.
• 52% of participants preferred seeking help from professionals and loved ones, but more than 30% preferred not seeking help.
• Preferences for seeking help from fortune tellers and traditional Chinese Medicine Doctors had the lowest endorsement.
• The region of origin and perceived helpfulness of professional mental health providers were key factors associated with non-help seeking preferences.

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🔘 Supplemental data for this article can be accessed here

遭受自然灾害的中国大学生的求助偏好：以人为中心的方法

背景：直接暴露于自然灾害与增多的精神障碍相关。在中国成年人中求助的行为很少，而在遭受自然灾害的中国成年人中求助的障碍和促进因素也未得到充分研究。

目的：本研究使用以人为本的方法，描述了经历了近50年来影响中国澳门的最强风暴"台风天鸽"的中国大学生样本中的求助偏好及其相关变量。

方法：共有完成基线（2017年9月21日至12月6日）及6个月随访（2018年4月3日至5月3日）的815名学生（女性＝71.5％）被纳入数据分析。通过Mplus 7.4和STATA 14.0使用潜在类别分析（LCA）和多项式逻辑回归进行数据分析。

结果：本研究确定了三类潜在的求助偏好，包括："心理健康专业人员和亲近的人"（MHPCP，52％），不求助者（31％）和"多种来源"（17％）。多项逻辑回归结果显示，籍贯（中国大陆与中国澳门）、自我污名、感知的专业心理健康帮助益处、过去的专业求助行为以及感知社会支持与MHPCP求助偏好显著相关。

结论：很大一部分学生倾向于寻求亲人和专业人士的支持。但是，超过30％的样本倾向于不寻求心理健康方面的帮助。需要进一步的研究来提高中国大学生寻求心理健康治疗的偏好。

1. Introduction

Natural disasters (e.g. earthquakes, floods, hurricanes, and firestorm) are associated with stressful events including loss of loved ones, injury and disability, disruption to life routines, damage to homes, and the financial burden of cleanup or repair (Manzoor & Ali, 2018). These events motivate 'fight or flight' reactions, and also give rise to various mental disorders, such as depression and post-traumatic stress disorder (PTSD) (Boscarino et al., 2014). Almost everyone exposed to a natural disaster experience different degrees of immediate psychological reactions (Manzoor & Ali, 2018) and previous studies demonstrated that exposure to natural disasters was associated with a risk of developing mental disorders (Hall et al., 2019; Wang et al., 2012). For example, a study of Hurricane Sandy showed that that exposure to the natural disaster led to a 14.5% and 6% prevalence of PTSD and depression respectively (Boscarino et al., 2014). In China, exposure to the Wenchuan earthquake was associated with 28.4% and 19.5% prevalence of PTSD and depression (Wang et al., 2012). In Macao, exposure to Typhoon Hato was associated with a 5.1% prevalence of PTSD (Hall et al., 2019).

Natural disasters take a tremendous toll on human lives, personal property, social processes, economic resources, and cause disruption to social networks and communal loss of resources. Moreover, it involves further consequences, namely various mental disorders in a large proportion of the population of affected people (Goldmann & Galea, 2014). Previous research revealed that survivors suffer from more severe mental disorders and need multi-faceted supports from society and the government than the general population (e.g. Wang et al., 2012). Thus, their help-seeking might differ from the help-seeking of the general population with psychological symptoms. Additionally, previous disaster management models, such as Traditional Continuum Model (Coburn, Spence, & Pomonis, 1994) illustrate the importance of disaster risk management to mitigate the consequences of natural disasters. It's necessary to explore the help-seeking preferences after a natural disaster, which could help to conduct better strategies for mitigation, response, and recovery following future disasters.

Whether or not survivors of disasters seek mental health help is a function of structural, cultural, and need related factors. Some survivors of disaster suffer from long-term psychological symptoms and may benefit from psychological treatment (Crosby & Bossley, 2012). Community service needs may also tax the mental health system. After the Northern California firestorm, the number of residents seeking mental health help in Sonoma County nearly doubled (Johnson, 2017). Given the increase in psychiatric morbidity following natural disasters, it is critical to understand the help-seeking intentions of people affected in order to identify factors that can enhance treatment-seeking behaviour when indicated.

Previous studies indicated that very few Chinese participants sought help from mental health professionals after experiencing a natural disaster. In a study of 210 Red Cross nurses within 1 year after an earthquake found that the prevalence of PTSD was 30.0%, but less than 5.0% used mental health services (Zhen et al., 2012). A study of 1,841 junior middle school students exposed to the Wenchuan Earthquake in China indicated that only 5.0% sought professional psychological treatment (Wang et al., 2012). Furthermore, two epidemiologic studies of flood survivors in Hunan, China showed that no participants sought help, despite a prevalence of PTSD and depression of 8.6% and 9.5% respectively (Liu et al., 2008, 2006).

Prior studies described key factors associated with increased mental health help-seeking. First, some sociodemographic factors associated with help-seeking include gender, age, education level, region, religion, and family income, and past help-seeking experience or behaviour (e.g., Crosby & Bossley, 2012) were correlates of help-seeking. Second, the

severity of mental disorders, including depression, anxiety, stress, and PTSD significantly influence the intention to seek mental health treatment (e.g. Boyd et al., 2011; Eisenman et al., 2008). Furthermore, since there is a difference in the influence, degree, and trajectory of various mental disorders (e.g. depression, anxiety, stress, and PTSD), the degree to which these symptoms influence help-seeking need to be evaluated (e.g. Bonner et al., 2013; Roness, Mykletun, & Dahl, 2005).

Self-stigma (Vogel, Wade, & Haake, 2006) and public stigma (Vogel, Wade, & Hackler, 2007) are key barriers to help-seeking. Especially relevant in the Chinese context, losing face-concern was found to be a key factor that prevented people from mental health help-seeking (Gong, Gage, & Tacata, 2003). Furthermore, mental health literacy and awareness along with perceived helpfulness of help-seeking (Andrade et al., 2014), influences mental health help-seeking intention. In addition, the perceived availability of social support is positively associated with help-seeking (Tieu & Konnert, 2014).

There are several research gaps identified in the literature this study fills. First, limited studies used a person-centred method to explore help-seeking intention and preferences and rely on variable-centred methods among Chinese populations (e.g. Abe-Kim, Takeuchi, & Hwang, 2002). Understanding help-seeking intentions among understudied populations can assist in tailoring appropriate services or bolstering care structures following a natural disaster, and to provide the opportunity to fully explore population heterogeneity of treatment preferences. In recent years, person-centred approaches, such as Latent Class Analysis (LCA), have become more popular in the field of behavioural research (e.g., Parker, Gielen, Castillo, Webster, & Glass, 2016). Person-centred models offer alternative approaches to better understand the different behavioural patterns and their correlates (e.g., Tomczyk, Schomerus, Stolzenburg, Muehlan, & Schmidt, 2018). Second, to our knowledge, no previous study explored help-seeking preferences within a population exposed to a natural disaster or among Chinese adults using this approach.

Third, the most common pattern of help-seeking preferences remains unclear. For example, in a sample of 862 American adults, Woodward, Chatters, Taylor, and Taylor (2015) found three latent classes including the largest group 'limited provider use' (80.5%), followed by 'physician plus mental health provider' (14.4%), and 'health provider plus clergy' (5.1%). Moreover, four latent classes were identified by Hays and Gilreath (2017) in a sample of 564 Black Americans, including 'formal mental health group (mainly MHP),' 'all support group (high percent for all help-seeking sources),' 'mixed source group (MHP,

clergy, and family),' and informal/primary care group (family physician, clergy, and family/friends)," in which both informal and formal group accounted for the highest probabilities (around 41%). Furthermore, in a sample of 188 German adults with depression, a longitudinal survey also reported four latent classes of help-seeking preference, namely 'mental health professionals,' 'multiple sources,' 'primary care,' and 'non-seekers,' in which 'non-seekers' (51.1%) was the largest group (Tomczyk et al., 2018). Moreover, these previous studies suggested that more relevant factors influencing the patterns of mental health help-seeking needed to be explored, such as religion, illness severity, education, and cultural factors (e.g. Hays & Gilreath, 2017; Tomczyk et al., 2018).

The current study used latent class analysis (LCA) to identify and categorized help-seeking preferences in a sample of Chinese college students exposed to a natural disaster. The study investigated the associations between help-seeking preferences and related influence factors, such as demographic characteristics (gender, age, education level, region, religion, family income, and past help-seeking experience or behaviour), mental disorder symptom severity (depression, anxiety, stress, and PTSD), cultural help-seeking barriers (self-stigma, public stigma, and losing face concern), and perceived social support. Rather than explore each help-seeking preference independently, LCA provides a person-centred perspective to understand how a series of help-seeking resources converge together to indicate the help-seeking intention preferences among Chinese exposed to a natural disaster at the population level. This study is unique because it includes a range of help-seeking sources and respondents' intentions, including traditional forms of help unique to Chinese culture. Moreover, it is imperative to investigate the association between subgroups of help-seeking preferences and related correlates which is beneficial for understanding the barriers to help-seeking, and correlates of help-seeking preferences within the latent classes. This allows for enhanced disaster preparedness and for promoting help-seeking after a natural disaster.

2. Method

2.1. Context

Typhoon Hato occurred on 23 August 2017. It was the largest typhoon to hit Macao in the past 50 years. Several populated areas of the territory and the university campus were affected by major flooding and property damage, along with citywide electric power and water outage lasting for more than 24 hours. It was reported that 10 people died and over 200 people were injured (Guijarro, 2018). In total, this super typhoon led to an economic loss of an estimated USD1.55 billion (Guijarro, 2018).

2.2. Participants and procedure

Participants were screened one month following Typhoon Hato (September, 2017) and followed for 6 months. The self-report questionnaire was distributed to all students at the University of Macau. There were 9,782 Chinese students studying at the University at that time. 1,867 Chinese students were enrolled electronically in baseline survey who were at least 16 years old, full-time students, and exposed to Typhoon Hato (Sep. 21st – Dec. 6th, 2017). In the 6-month follow-up survey, 815 students participated (April 3rd – May 3rd, 2018). All participants completed the online survey via Qualtrics (a software platform for online questionnaires). Written informed consent was obtained at the beginning of the survey. A random sample of 50 participants from baseline and 6-month follow-up surveys, were rewarded 100 Macao Patacas (around 13 USD) in supermarket coupons as a participation incentive. Institutional Review Board Approval was obtained by the Research Ethics Panel of the University of Macau.

2.3. Measures

2.3.1. Baseline survey

The Chinese version of 21-item Depression Anxiety and Stress Scales (DASS-21) was used to measure the negative emotional states of depression, anxiety and stress (Lovibond & Lovibond, 1995). Based on 4-point Likert-type scale (0 = never, 3 = almost always), participants were asked to rate the extent to which they experienced each symptom over the past week, with a higher score indicating greater symptom severity. The DASS-21 includes three sub-scales, each with 7-items. Following conventions, mild symptoms or higher were used to classify people with having clinically significant depression, anxiety, or stress (Gomez, 2016). The Chinese version had good reliability, with Cronbach's alphas all above 0.80 for sub-scales and over 0.90 for the total scale (Wang et al., 2016), which was consistent with this study.

Posttraumatic stress disorder (PTSD) was measured by the Chinese version of the PTSD checklist for DSM-5 (PCL-5) (Weathers et al., 2013). The 20-item PCL-5 was used to assess the severity of PTSD symptoms in the past month. Responses were rated on a five-point Likert scale (0 = not at all, 4 = extreme), resulting in a symptom severity score between 0 and 80. Previous studies about disaster exposure have indicated that Chinese version of PCL-5 had excellent reliability (Cronbach's α ranging from 0.91 to 0.97) and validity (Hall et al., 2019; Wang et al., 2015). The scale reliability in the current study was excellent (Cronbach's α = 0.96).

Perceived social support refers to individual's perception of the availability of social support, which was assessed by the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS includes 12 items rated on a seven-point Likert-type scale (1 = very strongly disagree, 7 = very strongly agree). Higher scores on this scale indicate greater perceived social support in that domain. The Chinese version of the MSPSS was used in this study, with a Cronbach's alpha of 0.89 (Chou, 2000). The scale reliability in the current study was excellent (Cronbach's α = 0.95).

2.3..2 6-month follow-up survey

The self-stigma of seeking psychological help refers to the reduction of one's self-esteem or self-worth, caused by the perception of oneself as socially unacceptable when seeking psychological help. Self-stigma was assessed by a 5-item Self-Stigma of Seeking Help Scale, which is a short version of original 10-item SSOSH scale after removing the 5 reversed items (Items 2, 4, 5, 7, and 9) (Vogel, Wade, & Ascheman, 2009). Responses on this scale were rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 3 (agree and disagree equally) to 5 (strongly agree). The Chinese version of this scale demonstrated good reliability (Cronbach's alpha = 0.82) (Zhou, Lemmer, Xu, & Rief, 2019). The Cronbach's α in the current study was 0.80.

The public stigma of seeking psychological help is defined as perceived social disapproval of, and discontent with, those who seek psychological help (Vogel, Shechtman, & Wade, 2010). The public stigma of help-seeking was measured by a 5-item Social Stigma of Receiving Psychological Help scale (Pinto, Hickman, & Thomas, 2015). Respondents rate the degree they agree or disagree with each item using a 5-point Likert-scale format from 1 (strongly disagree) to 3 (agree and disagree equally) to 5 (strongly agree). Cronbach's alpha of the Chinese-version scale was 0.71 in previous study (Zhou et al., 2019). The scale reliability in the current study was good (Cronbach's α = 0.85).

Losing face concern refers to worry about losing social status because of violating established cultural or social norms (Zane & Yeh, 2002). It was measured by the Loss of Face scale (LOF; Zane & Yeh, 2002) including 21 items. Each item in the scale was followed by a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Higher scores indicate greater losing face concern. The Chinese-version LOF demonstrated excellent reliability in previous studies (Mak, Chen, Lam, & Yiu, 2009), and was excellent (0.94) in the current study.

Mental health help-seeking preference refers to whether or not an individual would like to seek help from a variety of mental health resources (Hays & Gilreath, 2017). This study asked participants' help-seeking preference for 14 sources. We asked participants to indicate who they would intend

to seek help from if they were experiencing a mental health problem. The sources were friends, intimate partners, family, mental health professionals, classmates, school counsellors, phone helpline, other helpers in Mental Health Organizations in Macao, general medical practitioners, colleagues, teachers, religious leaders, traditional Chinese medicine doctors, and fortune-tellers. A 7-point Likert-type scale (1 = extremely unlikely, 4 = neutral, and 7 = extremely likely) were applied to assess the likelihood of treatment seeking across these sources. These help-seeking sources were extracted by the General Help-Seeking Questionnaire (GHSQ) (Thomas, Caputi, & Wilson, 2014) and linked with available psychological services in Macao (Macao Social Welfare Bureau, 2016). Responses for help-seeking preference were dichotomized such that 0 to 4 were unlikely to seek help, and 5 to 7 were likely to seek help.

In this study, the mental health professional refers to the professionals including psychologists, psychiatrists, psychotherapists, and mental health counsellors (Rickwood, Deane, Wilson, & Ciarrochi, 2005). Moreover, the perceived helpfulness of professional mental health help refers to whether or not an individual believes that he/she can get effective help or benefits from a professional mental health provider (Starzynski & Ullman, 2014). Furthermore, three questions were used to assess previous professional help-seeking behaviour (Rickwood et al., 2005), perceived helpfulness of professional mental health provider (Starzynski & Ullman, 2014), and psychological course taken, respectively, namely (1) Have you ever seen a mental health professional get help for personal problems?; (2) Do you believe you will benefit from seeking professional psychological help?; (3) Have you ever taken any psychological lesson on-campus or off-campus?. These three questions were dichotomous (0 = no, 1 = yes).

Demographic questions included age, gender, level of education (undergraduate, postgraduate, or Ph.D.), family income, region of origin (mainland China, Hong Kong, Macao, or Taiwan), and religion.

2.4. Statistical analysis

All 14 help-seeking preference indicators were included in the LCA model. The latent class model was estimated via Mplus 7.4 (Muthén & Muthén, 2007) using robust maximum likelihood estimation (MLR in Mplus). Modelling began with a single class model, and the number of classes was continuously increased (up to six) while comparing fit criteria between models. This study reported the following measures of overall fit [Lo-Mendell-Rubin likelihood ratio test (LMR LRT) and Parametric Bootstrapped Likelihood Ratio Test (BLRT)], parsimony [Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), sample-size-

adjusted Bayes Information Criterion (SSABIC)], and classification quality [entropy]. LMR LRT and BLRT compares a latent class model (k) to a model with one less class (k-1); a significant test favours the hypothesized model over the model with one less class. Lower AIC, BIC, and SSABIC estimates indicate the quality of the model. Entropy ranges from 0 to 1, with 1 signifying perfect classification of individuals into the latent class. In general, entropy is suggested to be higher than 0.7, which indicates a sufficient fit (Kim, 2014). The study chose the number of latent classes based on the statistical fit criteria and theoretical tenability as well (Kim, 2014). Additionally, the predictors of latent classes of help-seeking preference were explored using multinomial logistic regression, using Stata 15.0 (StataCorp, 2017).

3. Results

3.1. Participant characteristics

Total of 815 participants were followed in this study, including 583 females (71.5%) with a mean age of 20.3 years (SD = 2.7). Most of them were undergraduate (89.2%), did not report a religion (87.1%), and came from Macao (63.2%). The majority of participants believed they would benefit from seeking professional psychological help (80.7%). Most respondents did not take any psychological course (68.8%). Only 14.0% sought professional help before. The household monthly income of most participants belonged to the 20,001–40,000 (MOP) range ($2,500–5,000USD). The prevalence of depression, anxiety, stress, and PTSD were 22.0% (M = 7.6, SD = 8.0), 30.6% (M = 7.0, SD = 6.9), 10.67% (M = 8.5, SD = 7.7), and 4.7% (M = 6.24, SD = 10.2) respectively (see Table 1). Males and younger students tended to decline participation in the study more often than females and older students, but no significant differences were observed between those followed and lost to follow-up by education, region, religion, depression, anxiety, stress, and PTSD (all $ps > 0.10$). There was no item-level missing data in the study.

3.2. Latent classes of help-seeking preference

Based on the overall fit, the model with three classes indicated the best fit ($p_{LMR\ LRT} = 0.0001$, $p_{BLRT} < 0.001$, AIC = 10,920.489, BIC = 11,127.429, SSABIC = 10,987.702, and Entropy = 0.849), the model with four classes had a lower entropy and the p-value for LMR LRT was not significant. The model with two classes had the worse AIC, BIC, SSABIC, and entropy, even though the p-values for LMR LRT and BLRT were significant. AIC, BIC, and SSABIC are unstable because they usually become lower with the increase of latent classes (Kim, 2014). The p-value of LMR LRT should be

Table 1. Social demographic data, psychosocial variables, and prevalence of common mental disorders (n = 815).

Demographics	N (%) or M (SD)
Age (range 17–35)	20.3 (2.7)
Gender	
Male	232 (28.5%)
Female	583 (71.5%)
Level of Education	
Undergraduate	727 (89.2%)
Postgraduate	64 (7.9%)
Ph.D.	24 (2.9%)
Region of origin	
Mainland China	265 (32.5%)
Hong Kong	24 (2.9%)
Macao	515 (63.2%)
Taiwan	11 (1.4%)
Household monthly income (MOP)	
0–20,000	294 (36.1%)
20,001–40,000	347 (42.6%)
40,001–60,000	103 (12.6%)
60,001–80,000	36 (4.4%)
80,001–100,000	5 (0.6%)
≥100,001	30 (3.7%)
Religion	
Yes	105 (12.9%)
No	710 (87.1%)
Psychological course took	
Yes	254 (31.2%)
No	561 (68.8%)
Perceived helpfulness of PMHH	
Yes	658 (80.7%)
No	157 (19.3%)
Previous professional help-seeking behaviour (i.e. counsellor, psychologist, psychiatrist)	
Yes	114 (14.0%)
No	701 (86.0%)
Depression (range 0–42)	7.5 (8.0)
Yes	179 (22.0%)
No	636 (78.0%)
Anxiety (range 0–38)	7.00 (6.9)
Yes	249 (30.6%)
No	566 (69.5%)
Stress (range 0–32)	8.49 (7.7)
Yes	87 (10.7%)
No	728 (89.3%)
PTSD (range 0–61)	6.24 (10.2)
Yes	38 (4.7%)
No	777 (95.3%)
Perceived social support (range 1–7)	5.14 (1.1)
Self-stigma (range 5–25)	11.98 (3.3)
Public stigma (range 5–25)	11.88 (3.7)
Face concern (range 21–147)	95.83 (18.2)

Note. M = Mean. SD = Standard Deviation

considered more in deciding the number of latent classes (Kim, 2014). The non-significance of LMR LRT in the five-class indicated that it was worse than the four-class model. Moreover, the five-class model lacked interpretability compared with the three-class model (see Appendix Figure 1). Therefore, the three-

class model was chosen after considering model fit and theoretical tenability (see Table 2). The correlation and covariance of help-seeking preference indicators were displayed in Appendix Table 3.

Latent class 1 ['multiple sources', n = 137 (17%)] was comprised of participants with the highest probabilities of help-seeking preference from all of 14 sources. Participants in latent class 2 ['non-seekers', n = 251 (31%)] had the lowest probabilities of help-seeking preference from a variety of different sources. Latent class 3 ['mental health professionals and close people (MHPCP)', n = 427 (52%)] had high probabilities of help-seeking preference from mental health professionals, or close friends, family members and romantic partners (see Figure 1 and Appendix Table 1).

3.3. Correlates of help-seeking preferences

Based on previous research (Hair, Black, Babin, & Anderson, 2010), the results of the multicollinearity diagnostic test indicated that there is a low probability of multicollinearity in this study model (all VIFs < 4 & no high correlation between predictors, see Appendix Table 2).

Table 3 displayed results from the multinomial logistic regression investigating the association between correlates and latent classes of help-seeking preferences. The 'non-seekers' class was used as the reference group for the models. Results are presented as relative risk ratios (RRR). If the RRR value is lower than 1, it represents that a correlate is associated with lower risk of being in the latent class, while a RRR higher than 1 indicates higher risk of being in the latent class.

When comparing 'multiple resources' and 'non-seekers' groups, it was found that gender (female, B = −0.656, RRR = 0.519, p = 0.012), region (mainland China, B = 0.710, RRR = 2.035, p = 0.02), perceived helpfulness of PMHH (yes, B = 1.604, RRR = 4.971, p < 0.001), perceived social support (B = 0.706, RRR = 2.025, p < 0.001), and PTSD (B = 0.042, RRR = 1.042, p = 0.001) were significantly associated with being in the multiple source class. Moreover, in the comparison between 'MHPCP' group and 'non-seekers' group, region (mainland China, B = 0.677, RRR = 1.967, p = 0.005), perceived helpfulness of PMHH (yes,

Table 2. Model fit criteria for latent class models of help-seeking preference for mental health problems after experiencing the natural disaster (n = 815).

Models Comparison	p-value (LMR LRT)	p-value (BLRT)	AIC	BIC	SSABIC	Entropy
1-Class	/	/	13,029.835	13,095.680	13,051.221	/
2-Class (VS 1-Class)	<0.001	<0.001	11,345.694	11,482.087	11,389.994	0.825
3-Class (VS 2-Class)	0.0001	<0.001	10,920.489	11,127.429	10,987.702	0.849
4-Class (VS 3-Class)	0.5409	<0.001	10,710.527	10,988.015	10,800.654	0.817
5-Class (VS 4-Class)	0.1803	<0.001	10,567.547	10,915.582	10,680.588	0.849
6-Class (VS 5-Class)	0.3405	<0.001	10,516.962	10,935.545	10,652.917	0.821

Note. LMR LRT = Lo-Mendell-Rubin Adjusted LRT Test. BLRT = Parametric Bootstrapped Likelihood Ratio Test. AIC = Akaike Information Criterion. BIC = Bayesian information criterion. SSABIC = Sample-size-adjusted Bayesian Information Criterion.
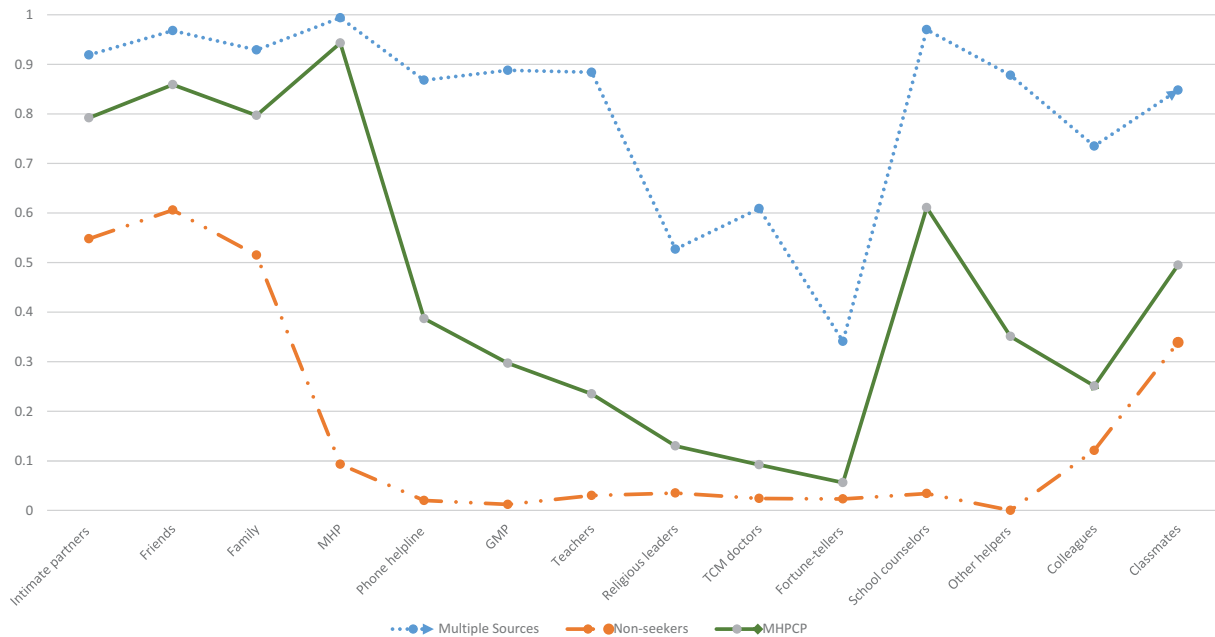
Figure 1. Estimated indicator probabilities and latent class proportions for all three latent classes of help-seeking preference (n = 815).

Note. [1] The probabilities correspond with the response scale for help-seeking preference (0 = no; 1 = yes), a higher probability indicates a higher likelihood of seeking help. [2] **MHPCP** = Mental Health Professionals and Close People. **MHP** = Mental Health Professionals. **GMP** = General Medical Practitioners. **TCM** = Traditional Chinese Medicine. [3] **Religious Leaders**: It refers to one who is recognized by a religious body as having some authority within that body, e.g. priest, Rabbi, Chaplain, monk; **School Counsellor**: Those professional school counsellors from Student Counselling Centre, University of Macau; **Traditional Chinese Medicine (TCM) doctors**: TCM is a branch of traditional medicine based on more than 3,500 years of Chinese medical practice. TCM doctors use various mind and body practices (such as acupuncture and tai chi) as well as herbal products to address health problems; **Fortune-tellers**: It refers to someone who can predict the information about a person's life, e.g. crystal-gazer, seer, soothsayer, clairvoyant, and prophet; **Other helpers**: It refers to those workers in the local mental health services organizations of Macau (e.g. Sheng Kung Hui Macau, Caritas, Education, and Youth Affairs Bureau).

B = 1.193, RRR = 3.296, *p* < .001), previous professional help-seeking (yes, B = 0.931, RRR = 2.537, *p* = 0.004), self-stigma (B = −0.102, RRR = 0.903, *p* = 0.005), and perceived social support (B = 0.672, RRR = 1.957, *p* < 0.001) were significant correlates of being in the MHPCP class. Across both models, students who chose multiple sources or MHPCP were from mainland China, perceived PMHH as helpful, and had higher perceived social support.

4. Discussion

This study identified three latent classes of help-seeking preferences in a sample of Chinese college student exposed to the natural disaster. The 'MHPCP' class (mental health professionals and close people) accounted for the highest proportion in the sample, which was 52%, followed by the 'non-seekers' class (31%) and 'multiple sources' class (17%). This result suggested that most Chinese college students were willing to seek mental health help after experiencing a natural disaster. However, prior studies reported different results. Some previous studies reported that most Chinese young people would not seek mental health help after experiencing a natural disaster (e.g. Liu et al., 2006; Wang et al., 2012). The

current study finding indicates that Chinese college students might be more willing to seek psychological help after experiencing a natural disaster. Thus, more resources, information, services and treatments for mental health support should be prepared and given to Chinese college students exposed to natural disasters. This can include increasing the number of the psychological professionals on campus, providing evidence-based treatments, and expanding public outreach and education about mental health after natural disaster. Furthermore, this study found there was high estimated probabilities of help-seeking preferences for close people (e.g. intimate partner, friend, family, or classmate) in all three classes, which suggested the importance and necessity in developing psychological training programme targeting those families and peers who may provide timely and effective mental support for the patients with mental disorders following a natural disaster. Additionally, consistent with previous research showing that Chinese tend to rely on their close social network members (e.g. friends or family members) when suffering from mental health problems (Cheung, 1984), our finding is consistent with this evidence by demonstrating that mental health professionals and close loved ones were grouped together in this Chinese sample.

Table 3. Summary of main effects from multinomial logistic regression models for help-seeking preference (n = 815).

Predictors	Multiple sources vs. Non-seekers			MHPCP vs. Non-seekers		
	B	SE	RRR (95% CI)	B	SE	RRR (95% CI)
Gender (Ref. Male)						
Female	−0.656	0.260	0.519 (0.312–0.864)*	0.203	0.211	1.225 (0.810–1.855)
Age	−0.008	0.076	0.992 (0.854–1.152)	0.072	0.058	1.074 (0.960–1.202)
Level of education (Ref. Undergraduate)						
Postgraduate	1.013	0.677	2.753 (0.730–10.384)	0.295	0.577	1.343 (0.434–4.161)
PhD.	−0.050	1.021	0.952 (0.129–7.044)	−0.778	0.820	0.460 (0.092–2.294)
Region (Ref. Macao)						
Hong Kong	1.185	0.718	3.272 (0.801–13.356)	0.688	0.628	1.990 (0.581–6.811)
Mainland China	0.710	0.306	2.035 (1.117–3.706)*	0.677	0.244	1.967 (1.220–3.172)*
Taiwan	−0.002	0.977	0.998 (0.147–6.782)	−0.429	0.832	0.651 (0.127–3.325)
Household monthly income (MOP) (Ref. 0–20,000)						
20,001–40,000	0.298	0.289	1.347 (0.765–2.373)	0.414	0.222	1.513 (0.979–2.337)
40,001–60,000	0.065	0.387	1.067 (0.499–2.280)	−0.035	0.305	0.966 (0.531–1.757)
60,001–80,000	0.606	0.577	1.834 (0.591–5.687)	0.162	0.490	1.176 (0.450–3.070)
80,001–100,000	−12.670	703.941	0	0.644	1.148	1.904 (0.201–18.056)
≥100,001	0.327	0.659	1.387 (0.382–5.044)	0.306	0.557	1.357 (0.456–4.041)
Religion (Ref. No)						
Yes	0.299	0.352	1.348 (0.676–2.688)	0.086	0.289	1.089 (0.618–1.920)
Psychological course took (Ref. No.)						
Yes	−0.154	0.268	0.858 (0.507–1.449)	−0.169	0.210	0.844 (0.560–1.274)
Perceived helpfulness of professional mental health help (Ref. No)						
Yes	1.604	0.363	4.971 (2.441–10.124)**	1.193	0.238	3.296 (2.068–5.252)**
Previous professional help-seeking behaviour (Ref. No)						
Yes	0.531	0.398	1.700 (0.779–3.712)	0.931	0.327	2.537 (1.336–4.818)*
Self-stigma	−0.044	0.045	0.957 (0.876–1.046)	−0.102	0.036	0.903 (0.841–0.969)*
Public stigma	−0.052	0.042	0.949 (0.874–1.031)	0.009	0.033	1.009 (0.946–1.076)
Losing face concern	−0.008	0.007	0.992 (0.978–1.006)	0.008	0.006	1.009 (0.997–1.020)
Perceived social support	0.706	0.132	2.025 (1.565–2.621)**	0.672	0.102	1.957 (1.604–2.389)**
Depression	−0.039	0.027	0.962 (0.913–1.013)	0.024	0.019	1.025 (0.987–1.064)
Anxiety	0.011	0.031	1.011 (0.951–1.074)	−0.029	0.024	0.972 (0.928–1.018)
Stress	0.004	0.030	1.004 (0.947–1.064)	−0.006	0.023	0.994 (0.951–1.039)
PTSD	0.042	0.012	1.042 (1.018–1.068)*	0.008	0.011	1.008 (0.987–1.029)

Note. Reference group (Ref.): non-seeker. Pseudo R^2 is measured by McFadden's R^2: RRR = Relative Risk Ratio; CI = confidence interval. MHPCP = mental health professionals and close people.
[a]Overall model statistics (Model fit index): Pseudo R^2 = 0.162; χ^2 (48) = 265.01**
*p <0.05. **p <0.001

This study found that perceived helpfulness of professional mental health help was the strongest and key correlate of help-seeking preference in comparisons between 'MHPCP' and 'non-seekers'. If participants perceived that professional mental health services were helpful (versus not helpful), the relative risk to be in the 'MHPCP' class was 3.296 (RRR). This result is in line with previous research. For example, a study in the sample of 2,095 Asian Americans, perceived helpfulness was associated with higher rates of psychological service usage (Abe-Kim et al., 2007). Prior research also showed that perceptions of treatment helpfulness were positively related to future help-seeking intentions (Cusack, Deane, Wilson, & Ciarrochi, 2006). These findings suggest that to promote professional help-seeking after a natural disaster, education about the possible benefits and helpfulness of these services may improve treatment seeking preferences among Chinese college students.

When comparing between 'MHPCP' and 'non-seekers' classes, previous professional help-seeking behaviour was associated with a 2.53 RRR in help-seeking preferences. This result suggests that Chinese college students with previous help-seeking behaviour/experience were more to prefer help from 'MHPCP' after the natural disaster. This is consistent with a previous study of 2,721 young people aged 14–24 years that found positive past help-seeking experiences was a facilitator of future help-seeking (Rickwood et al., 2005). In a separate study, in-depth interviews with 50 Chinese respondents found past help-seeking experience had a vital impact on willingness to seek mental health help in the future (Chen, 2018). Therefore, it is essential if a student does seek mental health help, that the services provided are high quality to ensure subsequent mental health seeking behaviour when services are indicated.

This study found that when the increase of PTSD scores by one unit, participants were more likely to seek help from the 'multiple sources' with a factor of 1.042 (RRR) relative to the 'non-seekers' group. Consistent with this finding, a study among 148 Chinese workers affected by the World Trade Centre attacks found that participants with higher PTSD scores were significantly more likely to mental health help-seeking (De Bocanegra, Moskalenko, & Kramer, 2006). However, PTSD symptom severity did not differentiate between the 'MHPCP' and 'non-seekers' classes. Previous research provided a possible explanation that identifying mental illness was significantly associated with higher symptom severity, which would impede subsequent help-seeking

among people with high stigma (Clement et al., 2015). Consistent with this literature, this study also demonstrated that self-stigma was inversely associated with seeking help from professionals or loved ones after the disaster.

Another notable finding was that students from mainland China were more likely to seek help than students from Macao. One previous study among 391 college students studying in Macao provided supportive evidence for these results, showing that compared with Macao students, those from Mainland China could be more likely to seek mental health help (Cheang & Davis, 2014). Macao is a small, conservative, and densely populated city so local students may have greater concern and barriers (e.g. privacy, stigma, face) for seeking psychological help. There are also few mental health treatment providers within the city (Hall et al., 2017), and in general, Macao society tends to have less established norms around professional help seeking. Additional outreach activities are likely indicated to engage Macao local students in professional mental health services.

Perceived social support was also a key correlate of help-seeking preferences. Chinese college students were more likely to seek help when they had higher perceived social support. This result is consistent with a study of 149 Chinese immigrants in Canada that found participants with greater perceived social support exhibited more positive mental health help-seeking attitudes (Tieu & Konnert, 2014). A psychiatric epidemiological study with a sample of 1,503 Chinese Americans also showed that perceived family social support promoted help-seeking behaviour (Abe-Kim et al., 2002). Therefore, enhancing social supports might promote mental health help-seeking among Chinese college students after experiencing a natural disaster.

Self-stigma was found to be a significant predictor of help-seeking preferences. Chinese college students with higher self-stigma were less likely to prefer to seek help from mental health professionals or loved ones after experiencing the natural disaster, which was consistent with some previous studies. Cheang and Davis (2014) conducted a survey among 413 Chinese college students in Macao and reported that self-stigma had a significant and negative impact on professional help-seeking. Another study with a representative sample of 1,312 Australian adults showed that participants with a higher level of self-stigma were more reluctant to seek professional help (Barney, Griffiths, Jorm, & Christensen, 2006).

However, the current study found that compared with the other significant predictors (e.g. Perceived helpfulness of professional mental health help, previous professional help-seeking behaviour, perceived social support, and region of origin), self-stigma displayed a lower relative effect on help-seeking

preference for the group of 'MHPCP.' Consistent with this finding, a meta-analysis with a total of 144 studies reported that the small effect of stigma on help-seeking (Clement et al., 2015). Another meta-analysis analysed 27 studies and revealed that self-stigma was not significantly associated with help-seeking (Schnyder, Panczak, Groth, & Schultze-Lutter, 2017). These findings suggested when addressing barriers to treatment seeking among Chinese, strategies might need to consider factors other than emphasizing stigma reduction among young adult Chinese exposed to disasters. Additionally, some previous studies suggested that attitudinal barriers and subjective norms could be the more influential factors for the help-seeking in Chinese society, which is also consistent in this study (e.g. Mak & Davis 2014; Mo & Mak, 2009).

Contrary to previous research, losing face concern was not significantly associated with help-seeking preferences in this study. Some researchers indicated that losing face concern significantly influenced help-seeking among Chinese populations (e.g. Gong et al., 2003). A possible reason for this finding was that this study sample only focused on Chinese youth. A prior study among 149 older Chinese adults pointed out that different from Chinese youth, many older respondents saw the use of psychiatric services as a loss of face (Tieu & Konnert, 2014). This suggests that age and cohort effects may potentially influence the association of losing face concern with help-seeking preferences. Furthermore, two previous studies among Chinese students supported this result that the loss of face concern was not a significant predictor of mental health help-seeking (Cheang & Davis, 2014; Kung, 2004). The influence of losing face concern on help-seeking preferences needs to be further explored among Chinese populations.

This study found that there were low probabilities in seeking help from Traditional Chinese Medicine doctors and fortune-tellers. Previous research among Chinese Americans indicated that respondents consult traditional Chinese Medicine Doctors to treat their mental disorders rather than seek professional psychiatric services (Yang, Phelan, & Link, 2008) or fortune-tellers (Tabora & Flaskerud, 1997). Possible explanations for our result is that age and the level of acculturation may influence help-seeking preferences among Chinese populations (Tabora & Flaskerud, 1997). In this study, the average age of all respondents was around 20, but the mean age of the previous two studies was more than 40 (Tabora & Flaskerud, 1997; Yang et al., 2008). Moreover, youth usually have a higher level of preferences towards Western psychological services than older adults, thus they are more likely to seek help from professionals rather than solely focusing on Traditional Chinese treatment methods (Tabora & Flaskerud, 1997).

4.1. Limitations

There were several limitations in this study. First, the data collection of help-seeking preferences occurred at 6-months follow-up. Loss to follow-up was large and >60% of the baseline sample was lost to follow-up. While minimal differences were observed between the two samples, selection bias may be present in the current analysis. Moreover, some potential participants might not be included in this survey, such as those who could not check the email because of some special reasons, such as, sickness, hospitalization, or who had broken computer/phone. The results of this study may also not generalize to the entire Chinese population, since participants were young adults. Additional studies are needed to evaluate help-seeking preferences and intentions among middle-aged and older adults. Second, we were also not able to measure actual help-seeking behaviour across the 14 sources of support, and behaviour occurring within baseline and follow-up may have influenced the preferences reported in the study. Third, although an expanded set of correlates were used in the current study, additional barriers and facilitators of help-seeking could be included in future studies. For example, since social norms are known to influence behaviour in collectivistic cultures, knowledge about friend or family member's mental health seeking may also influence help seeking preferences. Finally, this study utilized a latent class analysis approach of latent class analysis. Other methods, such as latent profile analyses and categorical models with trichotomous indicators (positive, neutral and negative) could be considered to explore this issue in the future.

5. Conclusion

This is the first study known to apply latent class analysis (LCA) to explore the help-seeking preference among Chinese college students after experiencing a natural disaster. Furthermore, this study investigated how different factors influence help-seeking preferences, which can enhance our understanding of the variation within help-seeking and develop a more efficient treatment for Chinese college students exposed to a natural disaster. The results made a clearer profile of the 'non-seekers' group, which helps to explain why some Chinese college students exposed to a natural disaster are less likely to seek mental health help. Additional research is needed to enhance help seeking among Chinese college students.

Disclosure statement

No potential conflict of interest was reported by the authors.

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