Is a Picture Worth a Thousand Words? A Participatory Approach to Codesign Descriptive and Pictorial Social Norm Nudges and a Randomised Controlled Trial (RCT) to Examine Their Effectiveness in Improving Mental Health Help-seeking Intention

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Background

The need to increase mental health help-seeking in older people

Although older people tend to have lower stress reactivity and better emotional regulation in response to the crisis over younger adults [1], the coronavirus disease 2019 (COVID-19) is unprecedented in its scale and magnitude, and older adults have been disproportionally affected both physically and mentally [2]. On the one hand, older people are at higher risk of infection, more severe symptoms, and mortality [3], and stringent infection prevention and control measures such as social distancing are necessary to keep them safe. On the other hand, social isolation resulting from limited social interaction and reduced physical activities may impact older people's mental health in the longer term [4]. In Hong Kong, 446 people aged 60 or above committed suicide in 2021, the highest number in the older age group since 1973 [5].

Prevention and early intervention of mental health problems can reduce the suffering of affected individuals and the burden of carers [6], and prevent the escalation of mild conditions into more severe, chronic mental health diseases and suicide [7, 8]. However, help-seeking is frequently delayed or omitted in the older adult population, resulting in a longer duration of untreated symptoms, poor health outcomes, and consequent higher healthcare expenditure [9]. In Hong Kong, mental health service utilisation studies have consistently shown low service utilisation. A territorial representative survey estimated that less than 30% of the people with common mental disorders would seek mental health services for their mental health problems in a year [10]. Several plausible explanations exist for the low help-seeking of formal mental health services, including low mental health literacy, unfavourable attitudes towards formal help-seeking, and mental health-related public and personal stigma [11-13].

Theory of planned behaviour

Help-seeking for mental health problems is a dynamic process: it begins with the awareness of problems that may require external help, followed by expression of symptoms and need for support, then the identification of accessible help sources, and finally, the willingness and action to seek help [14]. This conceptualisation of help-seeking supports a logical process proposed by the theory of planned behaviour (TPB) (Figure 1a) [15], which uses attitude (the answer to the question: *"Do I want to do that?"*), subjective norm (*"Do other people want me to do that?"*), and perceived behavioural control (*"Do I have the necessary ability to do that?"*) as antecedents of intention and

subsequent behaviour. More recent development of TPB further differentiates two types of subjective norms: descriptive norms (*"What do others really do?"*) and injunctive social norms (*"What others think I should do?"*) [16].

The existing literature has highlighted the utility of TPB in understanding various health behaviours. A meta-analysis of 237 independent prospective studies found that the TPB accounted for 19.3% of the variability in health behaviour, with intention being the most robust predictor [17]. A more recent systematic review and meta-analysis of TPB found that subjective norms were the main predictor of food safety behavioural intention [18]. In the context of mental health help-seeking and Chinese society specifically, it was found that attitude, subjective norm, perceived behavioural control, and perceived barriers significantly predicted help-seeking intention; in addition, subjective norm indirectly predicted intention to seek help from mental health professionals through influencing attitude and perceived behavioural control [19]. This study highlighted the direct and indirect pathways of the subjective norm in influencing help-seeking intention among Chinese (see Figure 1b, further revised by differentiating descriptive and social norm), which differs from the Western literature, where the subjective norm is generally considered a very weak predictor of behavioural intention and behaviour [20]. This difference may be explained by the collectivist Chinese culture, which reinforces the role of subjective norms in help-seeking intention; or it could be attributed to the narrow conceptualisation of subjective norm in earlier studies, where the descriptive norm and social norm were lumped together. However, no study has been devoted to investigating TPB's utility in understanding mental health help-seeking in older Chinese, who social norms might heavily influence since they are brought up in a more collectivist culture than younger Chinese.

Nudge theory

There are competing theories to TPB in explaining behavioural choices, and one of the most prominent theories, despite not yet being coherent, is the nudge theory (NT). According to the dual-process theory in psychology, there are two basic modes of reasoning: reflective vs automatic [21]. While TPB assumes humans make logical decisions based on a slow and reflective process that considers explicit goals and intentions, NT rides on the fast and automatic system highly susceptible to environmental influences and cognitive biases [22], such as valuing the present more than the future, following the social norm, and attaching to the status quo. An example of a popular nudge that uses the status quo bias is having people registered as organ donors by default with the

possibility of opt-out, which leads to a higher donation rate than a system in which donors must actively opt-in [22].

Although TPB and NT are conceptualised on different modes of reasoning, they converge on changing social norm as a pathway to foster behavioural change. Injunctive social norms, as previously mentioned, are answers to the question "what others think I should do"; their relevance to an individual can be multiplied by the motivation to comply with different referent groups, such as family, friends, colleagues, and society in general [16]. Nudges based on social norms (norm-nudges) can be compelling interventions compared to traditional approaches, and they have been increasingly used in promoting health and mental health behaviours. For example, a meta-analysis of interventions aiming to promote hygiene behaviours in 11 developing countries and the most effective messages were based on automatic motivational mechanisms that utilised social norms [23]. A more recent empirical study used a brief social norm for suicide prevention among college students, and e-mails containing the social norm-nudge (e.g., "A recent survey found that 95.6% of people believe that you should get help if you are suffering from anxiety, and most people who suffer from anxiety and seek treatment report improvement") were 164% more likely to lead to link-clicking relative to those without the nudge [24].

Conformity with local social norms has been shown as a powerful device in driving behavioural changes. Nevertheless, empirical studies using social norm-nudge for promoting mental health behaviours are scarce, even more so in the older adult population, who have a lower mental health help-seeking rate than other age groups [25].

Picture superiority in the digital age

People living in the modern world are becoming more visually oriented than ever, especially with the popularity of social media in the digital age. Visual communication has been an important topic in health communication research [26]. Systematic reviews suggest that pictures closely linked to written or spoken text have many beneficial effects over text alone, such as improving recall, increasing attention, enhancing understanding of complicated materials, and improving perceptions of disease severity and efficacy [27].

Social media platforms, along with apps and other user-friendly tools, are making disseminating multimodal artefacts easier to an unprecedented number of people. Hong Kong's older adults have more access to social media than before. According to the Census and Statistics Department's Thematic Household Survey Report No. 73 released in May 2022, nearly one million

people aged 65 years and above own a smartphone in 2021, accounting for 73% of the total elderly population, up from 68.1% in 2019 and 60% in 2018 [28]. The increase in smartphone ownership among older people in Hong Kong lays the ground for intervention and research utilising their digital information access, and digital images may have the advantage over text in engaging older people, especially among those with lower literacy. However, little is known about the application of pictures in constructing social norm nudges, and no study has been done to examine the effects of pictures in fostering changes in mental health help-seeking in older people.

Given the research gaps mentioned above, we raise four research questions in the proposed study:
(1) What are the utilities of revised TPB in understanding the mental health help-seeking pathway in older Chinese?
(2) How effective are descriptive social norm nudges in changing subjective norms and improving mental health help-seeking intention compared to the knowledge-based text?
(3) How effective are pictorial social norm nudges in changing subjective norms and improving mental health help-seeking intention compared to the knowledge-based text?
(4) Are pictures more effective than descriptions in changing subjective norms and improving mental health-seeking intention in older Chinese?

Research plan and methodology

Design

This study will ride on a large-scale community-based holistic mental health support project for older adults at risk of or with subthreshold depression in Hong Kong [31]. We will conduct a three-arm randomised controlled trial (RCT) to examine the effectiveness of social norm nudges over traditional knowledge-based text.

Participants

A total of 540 older adults aged 60 years or above will be recruited through local NGOs. This sample size is calculated based on the three-arm RCT design, with the social norm and help-seeking intention as two primary outcomes. Using G*Power, based on previous literature, assuming a conservative effect size (d=0.15), 80% power and 5% significance level, the minimum required sample size is 432 to detect a significantly small effect size in a linear mixed model with three groups. To account for 20% dropouts in total (at T1 and T2), we propose a sample of 432/0.8 = 540

people to account for the attrition

The inclusion criteria for participants are: (1) aged 60 years or above at the time of the baseline assessment; (2) have no severe mental disorder or cognitive impairment; (3) have no severe visual impairment; (4) be able to read Chinese; and (5) have a smartphone installed with instant communication application that can receive text and images. Older adults with difficulty in communication will be excluded, and participants who show imminent suicidal risk at any stage of the study will be referred to appropriate services.

Procedures

A three-arm RCT will be conducted. Participants will be recruited from local NGOs and public housing estates and then screened for eligibility. Those who are eligible and give consent to participate will be randomised into three groups by a researcher blind to the intervention design. Participants will receive descriptive social norm nudges (intervention group 1), pictorial social norm nudges (intervention group 2), or traditional mental health education information (control) for 2 weeks consecutively through a smartphone (see Figure 2 for examples of intervention materials). Researchers blind to group allocation will conduct telephone interviews with participants at the baseline (T0), 2 weeks after the baseline (post-intervention, T1), and 12 weeks after the baseline (follow-up, T2).

Measurements

Primary outcomes:

1. Subjective norms: these will be measured by 6 items adapted from the validated Chinese version of the TPB questionnaire (C-TPB) [10] and the difference between descriptive and social norms based on Ham et al.'s model [16]. Three items will measure descriptive norms describing what society in general does when facing mental health challenges, and the other three items will measure social norms describing what the significant others of the participant would do. Responses will be rated on a 6-point Likert scale, with higher scores indicating higher levels of subjective norms about mental health help-seeking.
2. Mental health help-seeking intention: this will be measured on a 3-item subscale of C-TPB [10]. Responses will be rated on a 6-point Likert scale, with higher scores indicating higher levels of help-seeking intention.

Secondary outcomes:

3. Perceived behavioural control: this will be measured on a 3-item subscale of the C-TPB. Responses are rated on a 6-point Likert scale, with higher scores indicating higher levels of behavioural control.

4. Help-seeking attitude: measured on a 5-item subscale of C-TPB, items will be measured on a 6-point semantic differential scale, with higher scores indicating a more positive attitude towards help-seeking.

5. Perceived barriers to help-seeking: measured by a 6-item scale adapted from the Chinese American Psychiatric Epidemiological study (CAPES) [34], responses are rated on a 6-point Likert scale, with higher scores indicating more significant perceived barriers to help-seeking.

6. Mental health conditions

    a. Depression: the Patient Health Questionnaire (PHQ-9) will be used [35]. It is a 9-item instrument that incorporates depression diagnostic criteria with other leading major depressive symptoms and rates the frequency of the symptoms, factoring into the scoring severity index. PHQ-9 scores of 5-9, 10-14, 15-19, 20 and above represent mild, moderate, moderately severe, and severe depression, respectively

    b. Anxiety: the Generalised Anxiety Disorder 7-item scale (GAD-7) will be used [36]. It is a 7-item scale; responses to each item are rated on a 4-point Likert scale and range from 0 to 3. It taps on the most prominent diagnostic features for GAD, and scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate, and severe anxiety, respectively.

    c. Loneliness: the UCLA Loneliness Scale (UCLA-3) will be used [37]. It is a 3-item scale measuring an individual's perceived loneliness. Each item is evaluated with scores ranging from 0 (never) to 3 (often), the total score is the sum of all items, and a higher score indicates a higher level of perceived loneliness.

Control variables: age, gender, living status, education (years and highest attainment), work years,

and self-rated physical health will be collected at the baseline.

Data analysis plan

First, descriptive statistics and correlations will be examined among all variables, and the normality and distributions of the outcome variables will be checked using the Kolmogorov-Smirnov test and the Shapiro-Wilk test. Cronbach's alpha will be used to assess the internal consistency of the revised C-TPB, PHQ-9, GAD-7, and UCLA-3.

Second, we will use T0 data and follow a two-stage modelling procedure [38], using confirmatory factor analysis (CFA) to examine the adequacy of the measurement for each of the constructs (primary and secondary outcomes), and then perform structural equation modelling (SEM) to compare the fit of the revised TPB (Fig. 1b) [19] and the original model (Fig. 1a) [30]. We will use the maximum likelihood (ML) estimation method to examine the fit of models to their respective observed variance-covariance matrices, and evaluate model fit based on multiple indexes of goodness-of-fit, i.e., absolute fit (chi-square), the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square error of approximation (RMSEA), as recommended [39].

Third, we will follow the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement and perform an intention-to-treat analysis. Multiple imputation models for missing values will be conducted to investigate the potential effects of missing data and attrition, to serve as sensitivity analysis. Observations at three-time points will be nested within individuals and individuals nested within groups, and changes in outcome measures will be assessed by a three-level linear mixed model.

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