Evaluation of a peer-led web-based intervention for safe usage of dating applications in Hong Kong: a randomized controlled trial

Study Protocol

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Background information

With the improvement of mobile technology and reliance on smartphones, the use of dating applications has become increasingly prevalent (1). Dating applications users are able to access a wide pool of potential partners that are geographically nearby due to the GPS usage (2). Users can indicate whether they are interested or not in a potential partner and both parties can chat after there is a match in which both parties indicate they are interested. As the general public usually has their phone with them at all times, users are able to access this vast network of potential partners at any time of the day. Many of the applications are free and lack stringent joining criteria, resulting in a diverse range of users (2). The increasing usage of dating applications and the factors mentioned above indicates that dating application could be a significant risk factor in engaging in risky lifestyle behaviors that ultimately have an adverse impact on health.

Previous studies have found that dating application users were significantly more likely to have at least one prior diagnosis of sexually transmitted infection as compared to non-users and also had more sexual partners (3). Homosexual men using dating applications were also more likely to have unprotected sexual intercourse (4). A meta-analysis found that the odds for seroconcordant and serodiscordant unprotected anal intercourse was higher in online initiated encounters as compared to offline initiated encounters among men who have sex with men (MSM) (5). In a study regarding HIV risk among MSM in East and South-East Asia, findings suggested that online partner finding websites alone did not facilitate greater risk taking, but provided more avenues for MSM who engage in risky HIV behavior to find more partners (6). In a study conducted in Hong Kong college students, dating application usage was significantly associated with unprotected sexual intercourse with more lifetime partners, less consistent condom usage, and the likelihood of not using a condom in the last sexual encounter (2).

Apart from sexual risk, the usage of dating applications has also been associated with recreational drug use in college students (7). Furthermore, dating application users were more likely to have experienced sexual abuse in the past year as compared to non-users and are also at a higher risk for lifetime sexual abuse (8). The content presented on dating application profiles are also a source of concern, particularly for adolescents. A study analyzing content on a teen dating site found a variety of risk-related content such as sexual content, alcohol use, drug use, and violence (9). Concerns regarding personal information and monetary scams are also prevalent. This reveals a strong association between using dating applications and detrimental behavior, indicating the need for the development of interventions to encourage the safe usage of dating applications.

As adolescents and young adults spend a significant amount of time online, health interventions on the Internet represent a promising avenue to reach this population. A review of RCTs revealed that interactive computer based interventions were effective tools for sexual health learning and had positive effects on self-efficacy, intention, and sexual behavior (10). Other advantages of internet based interventions is the level of accessibility, confidentially, and availability of tailored messages or content (10). Peer led interventions have also been shown to be an appealing approach in health promotion for adolescents and young adults, as individuals in this age group tend to seek advice and information from their peers instead of from adults or other figures of authority (11). A peer led approach in the form of crowdsourcing has been shown to be useful in reaching and engaging communities in public health interventions (12). Crowdsourcing is conducted by having a large group of people work together to solve a problem (13). Ideas, concepts, designs, and other elements are collected from the group and synthesized into a final product that is presented to the community. Crowdsourcing may have some advantages over traditional methods of public health intervention development. Firstly, this is a bottom up approach that will involve community members instead of experts or academics. This may result in novel and more relatable ideas for the intervention. Secondly, crowdsourcing will also increase community involvement and awareness of a specific issue or public health topic (14). A systematic review found that crowdsourcing improved the quality, cost, and efficiency of research projects while engaging a large part of the public to create innovative material (15). Crowdsourcing has been a popular approach in developing HIV interventions and it has been shown to be feasible in engaging community members and in gathering culturally and locally relevant material (16). Crowdsourcing was also used in the CrowdOutAIDS project launched by UNAIDS to gather content incorporating youth perspectives and to increase community empowerment and mobilization (17).

Due to the aforementioned reasons, we believe that that a web based peer-led intervention to educate the public on dating application risks would be effective and appropriate. In this study, we evaluate the effectiveness of a web-based peer-led intervention to promote safe usage of dating applications among young adults aged 18-27 in Hong Kong. The trial will be conducted in compliance with the protocol, GCP, and the applicable regulatory requirements.

Trial Objectives and Purpose

Aim: To promote safe usage of dating applications among young adults in Hong Kong

Objectives

- To evaluate the effectiveness of a web-based, peer-led intervention in:
    - Providing appropriate and reliable information about dating applications to young adults in Hong Kong
    - Increasing the awareness of dating application associated risks and benefits among young adults in Hong Kong
    - Improving the attitudes towards risk perception and the safe usage of dating applications among young adults in Hong Kong

- Promoting behavioral skills related to the safe usage of dating applications in young adults in Hong Kong, specifically in preventing and handling negative experiences associated with dating applications

Trial Design

Study design

The study will use an open-labeled randomized control trial design with one intervention arm and one control. The control will have access to an online resource with similar interactive elements and time usage on a different topic. Both arms will complete the baseline and final questionnaire. There will not be any blinding as it is an open labeled study but participants will be randomly assigned to the intervention or control arm with a randomization software. Students in the Yijin program may be randomized by clusters to minimize the chance of contamination.

Intervention

The intervention is a web-based resource including text content, 4 videos, a scenario game and a risk assessment. The program can be accessed on both phones and other mobile devices such as smart phones and ipads. The topics of each segment is listed below:

Video 1: Introduction of the theme that meeting people on dating apps and meeting friends in real life present the same risks. The focus is that users should not have assumptions when meeting people in either context. This video also touches upon social expectations and pressures to pay for dates, leading to potential risk of falling victim to monetary scams.
Video 2: This video provides a specific example of the discrepancies in behavior in real life vs. when using dating apps. The situation is that one may be less alert when speaking to a stranger on an application.
Video 3: This video provides another example of the risks associated with using dating applications and how this compares to behavior in real life.
Video 4: This video is about the legal issues and risk of sexual assault. This video will also provide information on the steps to take following a negative experience and the available resources.

Scenario game: Participants will make a personalized profile and choose their app at the start of the game. They will then start conversation to start the game and go through a series of situations where they can pick between 5 choices. With a preset algorithm, the choices that the users make will ultimately get them to a certain outcome.
Topics that are explored in the game include: unsafe sexual behaviors, scams, leakage of personal data, intimate photos, and secret photographs.

Risk assessment: A 14-item risk assessment will generate an overall score for participants to infer of their level of risk in using dating applications.

Control

The control group will be the "Health Exercise for all" campaign website by the Hong Kong Government (18). The website provides information for types of exercises that are suitable for all ages and at different settings such as the workplace. The website provides informational pamphlets in PDF format, instructional videos on how to carry out different exercises, and interactive games (18).

The control website begins with an introduction regarding the background of the campaign and it's aims. Contact information for relevant offices for enquiry are provided. The campaign includes nine virtual classes that include 1) Introduction, 2) Points of Note and Exercise Guide and a set of videos of the exercise demonstrations. Videos range from 20 seconds to 10 minutes. Participants in the control group will be sent links to the virtual classes with instructions on which time matched video to watch. The website provides eight different interactive games such as "Calorie Restaurant", "Do I have a big tummy", and "I want to be more active". The "I want to be more active" game is most similar to the scenario game developed in the dating application intervention with seven questions to determine whether one is suitable to engaging is more active athletic activities.

Delivery of Intervention

There will be two modes of intervention delivery. In the educational settings, a research assistant and a member of the investigative team will attend a class session to provide a quick introduction to the study and deliver the web-based resource. Participants will be asked to bring their computers or phones and will be provided with the link to the intervention during a class session. Participants will be told that participation is voluntary and that their participation will not have any effect on their grades for the class.

For participants recruited from NGOs, the intervention will be delivered electronically. An email containing the same information as presented by the investigative team member in the educational settings will be sent to the participants along with the access link to the intervention.

Consent for participants in educational settings will be obtained with a written consent form. The investigative team will pass out the consent forms to the participants after the brief introduction of the study and before the delivery of the intervention content. Participants will be given time to read over the information and the signed consent form will be collected by the investigative team. There may be a possibility that a few students in the Yijin Program are under 18 as the program accepts students who just graduated from secondary 6. If this occurs and the student would like to participate, the school will provide consent for the student *in loco parentis,* or in the place of the parent or legal guardian.

Participants recruited from NGOs will be sent an electronic consent form. The online consent form is made on the program Survey Gizmo and participants can access this form either from a share link or through a QR code. Information on the study is provided in the online form and participants are prompted to tick the necessary items to indicate their understanding and agreement. Participants will then be able to sign the form electronically with their computer mouse or touch screen. The age range for recruitment for NGOs will be 18-27 therefore there should not be anyone below 18.

The primary endpoint will be 1 month after the delivery of the intervention. Students will fill out a baseline questionnaire before the delivery of the intervention and an immediate post questionnaire. 1 month later, students will access a follow-up questionnaire via HKU Survey Gizmo, a secure survey tool to ensure all data is kept confidential. The details of the delivery method of the follow-questionnaire will be discussed with the college's staff. Research staff may attend a special session or class to delivery the follow-up questionnaire. Another option is to have teachers deliver the follow up questionnaire. The follow-up questionnaire will be online hence participants will be able to access it on their computers, phones, or other mobile devices. Participants are estimated to participant in the trial for no longer than 4 months. Participants are allowed to withdraw from the study at any point in time without any criterion.

Selection and Withdrawal of Subjects

Inclusion criteria

- Aged 17-27
- Able to read and understand Chinese
- Able to provide an active email

Exclusion criteria

- People who have a physical impediment in which they cannot access the material in the intervention

Participants are allowed to withdraw from the study at any point in time without any criterion. We will utilize the "intention to treat" approach to deal with subjects withdrawn.

Treatment of Subjects

The intervention is a web based intervention and will not involve any medical treatments, drugs, or pharmaceuticals. The route of administration is access through any device that can access web-based content and the dosage is one visit.

Assessment of Efficacy

Evaluation will be done with an online survey tool called HKU Survey Gizmo. There will be a pre questionnaire containing baseline demographics and other questions concerning dating application usage. The participants will be given 30-45 minutes to access the program. Following that, the participants will be given a post questionnaire. 1 month later, the participants will be asked to fill in a follow up questionnaire.

Assessment of Safety
Participants will be given contact information to a dedicated staff if they have any questions of concerns regarding the study and their participation in the study. Additional psychological risk may occur as the study involves bringing up sensitive topics such as risky sexual behavior and personal data, to minimize this risk, participants will be ensured that their information is protected with the utmost care and that all their gathered information will only be used for researched purposes. Any adverse events will be recorded.

Statistics

Sample size calculation
The sample size was be calculated with the following components:

- α (two-tailed) of 0.05
- $\beta = 0.8$
- Obtained from a study with a peer-led safe sex online intervention for Hong Kong adolescents aged <25 (19)
    - Standard deviation: 0.52
    - Effect size: 0.21

Attrition rate: 15% in online studies (20, 21)

112 people per intervention arm

Data Analysis
Data will be analyzed using SPSS. Descriptive statistics will be carried out analyze the demographics of the target population. Differences in baseline demographic characteristics between the intervention and control group will be assessed using chi-squared tests.
For outcome evaluation, paired t-tests will be used to examine within group outcome changes. For the primary outcome that is a score, linear regression will be used to evaluate the difference between the control and intervention group.
Independent t-tests will be carried out to evaluate the score change within group and also between groups. The outcome difference at baseline and at follow-up will also be evaluated with linear regression.

Direct Access to Source Data/Documents

The investigator/institution will permit trial-related monitoring, audits, IRB/IEC review, regulatory inspections, providing direct access to source data/documents.

Quality Control and Quality Assurance

Ethics

Major ethical issues involve asking about sensitive information regarding risky sex behaviors, users' privacy, and legal issues. Participants will be ensured by the project's researchers that their information is kept strictly confidential. Researchers will also ensure that participants understand the purpose and procedure of every step of the project and participants will be provided with a contact for whenever they have any questions or concerns. Patients also understand that they are allowed to withdraw at any given point of the study.

Data Handling and Record Keeping

The PI will be responsible for the safekeeping of the personal data during and after the study. Members of the investigative team and a research assistant will have access to the data. The data will be kept in a password locked computer and will be destroyed after the storage period of 7 years.

Financing and Insurance

Financing and insurance addressed in the IRB application form.

Publication Policy

The results of this study will be used for a PhD thesis and other academic publications produced by the investigative team.

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