Title of Project: The efficacy of using online narratives in changing HIV risk perceptions and behaviors among men who have sex with men in Hong Kong

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Abstract

HIV is an important public health concern over the globe. Men who have sex with men (MSM) play a critical role in the transmission of HIV in Hong Kong. Evidence has shown that HIV risk perception is strongly associated with behavioral change, however, the level of risk perception towards HIV and STD among MSM in Hong Kong is relatively low. It has been suggested that narratives, which refer to the use of personal experiences in promoting a behavior, offer a useful alternative in changing risk perceptions and behaviors. From our knowledge, no study to date utilizes narratives in changing HIV risk perception and behaviors among Chinese MSM. Moreover, the emergence of internet technology allows health interventions to be delivered in a fast and convenient manner. The proposed study aims to test the efficacy of online narratives in increasing HIV risk perception and reducing HIV risk behaviors among MSM in Hong Kong.

A 2-armed randomized controlled trial is proposed, Chinese men who self-reported having anal sex with another man in the past six months will be recruited and randomly allocated into the intervention (N=238) and the control group (N=238). Participants in the intervention group will be asked to visit the study site which contains didactic information about HIV/STD and narratives of HIV negative and HIV positive peer MSM. Participants in the control group will only access the didactic information about HIV/STD on the study site. Participants will be evaluated at baseline, and one month and six months after the intervention using online questionnaires. The primary outcome will be unprotected anal intercourse (UAI); secondary outcomes will include perceived risk of contracting STD and HIV in the future, perceived severity of STD and HIV, condom social norms, HIV testing behavior, intention to use condom, and intention to receive HIV testing. The mechanism which the intervention influences HIV perception and risk behaviors through identification and engagement with the study site will also be tested. The proposed intervention, if found successful, will have significant implication for implementation as it can be launched in many MSM websites, NGOs or other internet-based domains, it can reach many MSM at a very low cost and has the potential to reduce the increasing HIV epidemic among MSM in Hong Kong.

(a) Background of research

Men who have sex with men as an important target for HIV prevention

Human immunodeficiency virus (HIV) is a serious global epidemic causing heavy social and medical costs. HIV prevalence in Hong Kong was 4.08% in 2011. Although HIV prevalence in Hong Kong has been fairly stable in the past few years, men who have sex with men (MSM) remain the principal method of HIV transmission. Local reports have shown that the proportion of HIV cases attributed to male same-sex behaviors have increased drastically from 24% in 2004 [1] to 34% in 2010 [2] among all HIV cases, and from 29% in 2004 [1] to 50% in 2010 among HIV cases in men [2]. The prevalence of sexually transmitted diseases

(STD) among MSM in Hong Kong is also very high [14], which further increases the risk of HIV transmission [15].

Unprotected anal intercourse (UAI) is one of the most risky of behaviors that is known to result in the transmission of HIV and STD among MSM [16]. Respectively, 48-58% and 20-39% of the local population of MSM do not use condoms consistently with their regular and non-regular male sex partners [17]. Effective intervention in reducing UAI is greatly warranted to prevent a further increase of new HIV infections among this population.

Risk perception as an important component on HIV behavioral change

Perceiving a personal risk is a major component for behavioral change in many psychological health theories [9]. Studies have demonstrated a strong association between risk perceptions and behaviors in different health topics [18, 19], including as regards HIV [20, 21]. A local study by the co-I (WM) reported that risk perception predicted condom use among MSM at 1-month follow up [22]. Despite the importance of risk perception in behavioral change, many MSM in Hong Kong report a low level of risk perception as regards STD or HIV. Local studies, including those conducted by the PI, have shown that only 3% and 6.1% of the sampled MSM in Hong Kong perceived their chance of contracting genital warts and HPV in the next year to be high or very high, respectively [23, 24], and more than half (54.2%) of the MSM in Hong Kong thought they had no chance of contracting HIV in the future [25]. Effective approaches in disseminating information about HIV risk and preventive behaviors are greatly warranted.

Traditionally, interventions aiming to increase risk perception and reduce risk behaviors mainly use a didactic or expository approach involving the presentation of evidence-based information about the health issues. While evidence-based information is important, it is not necessarily the case that people find such information comprehensible. There is a growing body of literature suggesting that many people have considerable difficulty understanding technical health information [26]. It is also argued that information about HIV risk perception and preventive behaviors are often unwelcomed and are received with substantial defensiveness, and statistical evidence has found such information to be ineffective in producing change when the message is inconsistent with the audience's beliefs [27].

The use of narratives as a useful approach for health promotion

It has been suggested that contextualizing health messages, which describe the experience or consequences of a potential health problem, may be a potentially useful approach in promoting behavioral change [28]. Studies conducted by the PI and co-Is (PM, NC, ES) have shown that people often seek for others with similar background and value their personal experiences when it comes to health decision making [29-31]. In contrast to informational and expository communication that presents facts or arguments in favor of a particular behavior, narratives use storytelling and testimonials to describe experiences and the consequences of a behavior. Recently, narratives have been increasingly recognized and used as a tool for health promotion. It has been proposed that narratives are more effective in conveying risk information than factual or statistical information. The Elaboration Likelihood Model (ELM) [32] proposes that there are two routes of cognitive processing: central and peripheral. The central processing involves scrutiny of message and it usually occurs when audiences are highly involved in the subject matter or the motivation to process the message is high. On the other hand, peripheral processing does not involve elaboration of the message through cognitive processing. It is based more on superficial cues and occurs when motivation to process the message is low. According to the ELM, narratives might be more effective in promoting a health message that is inconsistent with the audience's personal

beliefs, such as information about HIV risks, as they depend less on extensive message scrutiny, and reflect more in the way of heuristic and affective responses.

Hinyard and Kreuter [33] have suggested several ways in which narratives may be effective in promoting attitude or behavioral change. First, narratives can increase engagement, which refers to an individual's cognitive and affective immersion to the message [13]. Engagement with a message can reduce an individual's likelihood in generating thoughts in rejecting the message (i.e. counterarguing) [34], and increase cognitive rehearsal and recall. Second, narratives also facilitate identification, which refers to the experience of taking on the perspective of the character [13, 35]. Identifying with the message can influence attitudes, perceptions on susceptibility and social norms [36]. It can also reduce ones' ability to produce counterarguments, leading to changes in attitudes and behavior [37].

Some behavior-change models have also provided explanations for the possible mechanisms through which narratives could influence attitudes and behavior. For example, Social Cognitive Theory [38] suggests that individuals can learn a behavior by observing a model performing the behavior (behavioral modeling). The Precaution Adoption Process Model [39] suggests that an individual's perceived vulnerability of a health problem can be influenced by other people's behavior and values (cognitive readiness) and proposes that participants who are exposed to narratives that are perceived to be similar themselves will be more likely to perform the behavior. Finally, the Theory of Planned Behavior [40] suggests that the belief that others approve or disapprove of the behavior (perceived social norms) can influence an individual's attitudes and intention to perform a particular behavior.

Effective interventions using narratives

Numerous studies, including those by the PI and co-Is (PM, NC, ES), have been done to explore how patient narratives affect decision making and the management of disease in diseased populations [31, 41-45]. There has also been evidence that interventions using a narrative approach can be useful in promoting risk perceptions or behavioral changes for various health behaviors. For example, the Witness Project involving breast cancer survivors sharing their personal experiences showed that those in the intervention groups reported increased mammography and self–examination of their breasts compared to those in the control group [12]. Other studies involving narratives from breast cancer survivors have also shown that compared to the didactic approach, women who watched the narrative video experienced more positive and negative affect, identified more with the message source and were more engaged, which in turn influenced perceived barriers and cancer fatalism [46]. They also reported fewer barriers to mammography and more confidence that mammograms work [47].

Other studies have also reported that narratives are useful in educating patients about anticoagulant medication [48], decreasing intentions to tan among college students [49], and improving motivation for colorectal cancer (CRC) screening, although no significant difference in CRC screening was observed at 6 months [11]. A random-effects meta-analysis of 22 studies comparing narrative messages to statistical messages showed that narrative messages were significantly more effective in changing attitudes [50].

Narratives have also been found to be useful in HIV prevention. In one community-level HIV intervention in five cities, authentic stories describing how community members changed their HIV-related risk behaviors were shared with their community peers [51]. The results showed that the intervention group reported a greater level of consistent condom use and condom carrying than comparison communities. As the project also increased the availability of condoms and bleach kits, and provided basic AIDS information, the success of the

program could not be directly attributed to the narrative part of the intervention. However, the project shows some promises that narratives can be incorporated into HIV prevention efforts. Another study comparing the effect of narrative and statistical evidence in promoting vaccination against the hepatitis B virus (HBV) among MSM have showed that those who were presented with narratives showed higher perceptions of personal risks and of an intention to obtain a vaccination against HBV [10].

The current study proposes the use of narratives in changing HIV risk perceptions and behaviors among MSM. It is expected that narratives can be particularly useful in influencing attitudes and behaviors in the MSM community, as most of such MSM tend to have a very close circle of involved friends, and a strong attachment to them [52]. Studies report that most Chinese MSM are significantly socially engaged in the MSM group, are heavily involved in the MSM community, and have very close connections to each other [53]. As MSM is a highly marginalized community, individuals within it each may have a high level of perceived similarity with their MSM peers. It is thus expected that MSM find their peers' experiences particularly valuable. Such close relationships and a high level perceived similarity give their peers narratives an important position in influencing MSM's attitudes and behaviors.

The internet as a new form of intervention delivery

The internet provides a potentially useful platform to deliver health interventions to a mass audience in a cost-effective way [5]. Delivering health interventions via the internet has a lot of advantages, such as being sustainable, easily accessible, low-cost, anonymous, interactive, and tailored to the individual [54]. There has been a wealth of literature documenting the beneficial effects of online interventions across a range of populations. For example, studies conducted by the PI and co-Is on individuals living with HIV (PM) [44, 45, 55], cancer (NC, ES) [31, 56], and irritable bowel diseases (NC) [57] suggested that the internet can potentially offer support, promote patient empowerment and facilitate healthcare decision making. Meta analyses and review studies have suggested that internet-based interventions are effective in changing HIV risk perceptions and behaviors [58-60]. It is expected that online intervention will be a viable alternative to traditional forms of health intervention for MSM, as MSM generally have higher level of education and are active internet users and thus, have an adequate level of computer literacy to navigate internet-based interventions. A recent study has also suggested that many Chinese MSM were willing to use e-technologies for HIV prevention [61].

Identifying research gaps

Given the increase in the number of people affected by HIV among MSM in Hong Kong, there is an urgent need to design low-cost and effective interventions to reduce HIV risk behaviors among MSM. Locally, we have found only few behavioral interventions targeting MSM [3, 4]. Those that were found to be successful were mainly conducted in a Face-to-Face setting and thus issues as regards cost and sustainability are involved. Despite the increasing evidence of narratives on promoting behavioral changes, we have found limited studies on the efficacy of narratives in changing HIV risk perceptions and behaviors. Hinyard and Kreuter [33] proposed that the combination of narrative and statistical information may be the most effective method, however, most of the studies to date have only compared the efficacy of narrative interventions to those based on statistical information, and very few have examined the efficacy of interventions combining narrative and didactic information using a randomized controlled trial (RCT) approach. Based on the ELM, we hypothesize that online narratives might be more effective in changing HIV-related risk perceptions and other

cognitions that didactic approach, through increasing participants' engagement in and identification with the narratives.

The present study

The aim of this study is to test the efficacy of online narratives in changing HIV risk perceptions and behaviors among MSM in Hong Kong using a RCT design. The specific objectives are as below:

1. To examine the efficacy of an online intervention involving narratives and didactic information about HIV in reducing unprotected anal intercourse (UAI), increasing HIV risk perceptions (i.e. the perceived risk of contracting STD and HIV, the perceived severity of STD and HIV), improving condom social norms, increasing HIV testing behaviors, and increasing intentions to use condom and intentions to receive HIV testing among MSM, compared to the control group who will only receive online didactic information about HIV.

2. To examine the mechanism which the intervention changes the outcome variables listed above through identification and engagement with the study site.

(b) Research plan and methodology

Study design

A two-arm RCT will be implemented through a website. Study participants will be randomly allocated to either the control group or the intervention group. Participants will be assessed at baseline (T0), one month after the intervention (T1) and six months after the intervention (T2) using an online questionnaire.

Inclusion/exclusion criteria

The inclusion criteria are: (1) male; (2) age 18 or above; (3) self-reported to have engaged in anal sex with another man in the past six months; (4) self-reported as being regular internet users (use the internet at least once a week), (5) being able to read Chinese. The exclusion criterium is: having taken part in any HIV behavioral interventions in the past six months.

Procedure

Participants will be recruited from gay venues (bars and saunas) frequently visited by MSM. MSM fieldworkers will be recruited and trained by the research team. The MSM fieldworkers will visit the venues at different time slots during weekdays and weekends. They will brief prospective participants about the goals of the study and the logistics that will be involved. Interested participants will be asked a few questions to establish their eligibility. Eligible participants will be asked to provide their contact information (e.g. nick name, phone number, email address or instant messaging details). Advertisements for recruiting participants will also be placed in local websites managed and frequently visited by MSM. Participants who are interested in taking part in the study will be asked to contact our research assistant.

Within three days of their indication of interest in joining the study, prospective participants will be contacted by our research assistant. They will be invited to meet the research assistant at the collaborating NGO or other places convenient to them. The study purpose, study logistics, randomization procedure, and potential risk and benefits of participation will be explained. Those who have reconfirmed their participation will be randomly allocated into the intervention group or the control group using the web-based tool Research Randomizer. They will then receive a study package containing description of the study, their unique study

ID; and the link to the baseline survey. In the presence of the research assistant, they will first be asked to provide informed consent by clicking the "agree" button before self-administering the baseline survey online (about 20 minutes). After completion of the baseline survey, they will be provided with a link to either the intervention study site or to the control study site, together with their unique login details, based on the results of the aforementioned randomization.

Intervention group

Participants in the intervention group will be provided with a link to the study site which will be specifically designed for the study, a manual containing information about the study site, and a login identification number to log into the site. Their progress in the site will be monitored through electronic data indicating the dates and times each participant assesses each page of the site. The intervention consists of six sessions, which are made available sequentially weekly. Participants will be advised to access the intervention at least once a week. They will be asked to complete one session each week and after completion of one session, and materials for the next session will be made accessible to them in the coming week. Weekly reminders (through email, SMS or whatsapp message) will be sent to participants to encourage them to visit the study site. Participants who have defaulted for a particular session will be allowed to continue with visiting the site, and they will be able to access the materials that they skipped anytime they wish.

The content of the study site will cover didactic information and discussion about HIV and STD. Topics include modes of HIV transmission, the relationship between STD and HIV transmission, condom use and condom use negotiation skills, HIV testing, relationships and love, and the relationship between drug use and sex. These are the common topics for MSM behavioral interventions and have been covered in previous behavioral interventions in MSM [62]. In addition to the didactic information about HIV, narratives from peer MSM will also be provided to participants in the intervention group for each session. Six MSM, three HIV-positive and three HIV negative men who have been regarded as a role model for practising HIV preventive behaviors, will be nominated and approached by AIDS Concern, our collaborating NGO on HIV prevention. They will be invited to share their story and views related to sexual health, and their story will be produced as narrative video and shared in the intervention group. One narrative video will be available for each session (see section below on details of development of narratives). A few questions about the content of the session will be asked to tap participants' dedication to the study site.

Control group

Participants in the control group will be provided with a link to the aforementioned study site and details to log into the site. They will be able to access the same didactic information as those in the intervention group but they would not be able to access the narratives of the peer MSM. Same as those in the intervention group, weekly reminders will be sent to participants in the control group to encourage their visit to the study site and a few questions will be asked to tap their dedication to the study site.

Development and pre-test of the Intervention

For the narratives, interviews will be made with those MSM who have consented to share their story. The PI (PM) and co-I (ES) have previous experiences in conducting patient narrative research [63, 64] and the procedures in developing narratives will be followed [65]. The interview will begin by asking the respondents general questions to elicit their story and their experience in their own words. The aim of this is to identify their meaning and priorities as a MSM. For example, if the interview is with a HIV-positive MSM he will be asked to

share how he was infected, what has happened to him since being diagnosed, and the impact of HIV on him. If the interview is with a HIV-negative MSM he will be asked to share his experience as a MSM. Once they have finished sharing their story some additional questions about HIV prevention will be asked concerning details such as condom use practice, barriers with condom use and how to tackle them, risk perceptions, and issues related to HIV testing. All interviews will be audio tape recorded. The tapes will be transcribed, edited and returned to the respondents for approval. A video will then be developed based on the transcription. They will be assured that only pseudonyms will be used in producing the narrative video.

For the didactic information about HIV, a detailed literature review will be conducted on the most prevailing HIV-related issues among MSM in Hong Kong. Discussion will be initiated between peer MSM and staff at the collaborating NGO to identify the MSM's most common misconceptions about HIV. Based on the results from the literature review and discussions with MSM, and staff at the collaborating NGO, the content of the intervention will be developed by the research team. A focus group discussion involving MSM, staff at the collaborating NGO, and our research team will be initiated to obtain feedback on this draft version. The team will then refine the draft version based on their feedback and the intervention site will then be developed. The collaborators in the research team have expertise in various areas including, health psychology and health promotion (PM, NC), HIV psychosocial research (PM, WM), online patient experience research (PM, ES), online interventions (NC, WM) and RCT designs (PM, WM), health communication research (CL, AL) and frontline prevention and intervention work with MSM (NK).

To test the feasibility and acceptability of the intervention site, ten MSM will be recruited and invited to take part in the intervention. A focus group discussion will be held and participants of the pilot intervention will be asked to comment on the intervention's acceptability, relevance and perceived efficacy. Their input will be brought back to the team and further revisions will then be made. The site will further be refined and discussed among the team. The site will also be distributed to the experts whom we have consulted previously. Finalization of the intervention will be made based on their feedback.

Measures

The following outcomes will be measured among all participants at T0, T1, T2:

Socio-demographic variables, such as age, highest education level, employment status, relationship status, and self-identified sexual orientation will be asked. They will also be asked to report their HIV status, whether they had any STD in the last six months, and their level of exposure to personal blogs or online discussion with regards to HIV/STD.

UAI. The primary outcome is UAI. Participants will be asked to report the number of regular MSM sex partners, commercial MSM sex partners (sex trade that involves the exchange of money or gifts), non-regular MSM sex partners in the last month, as well as whether they have had anal or oral sex with such partners. They will be asked to rate their frequency of condom use in both receptive and insertive anal sex with different types of sex partners on a five-point Likert Scale from 0=never to 4=every time, and whether they had used a condom in the last sex encounter with the different types of sex partners. Participants who score 0 to 3 will be classified as having UAI. These items have been used in Chinese MSM [66].

Perceived risk of contracting STD and HIV in the future. Participants will be asked to rate their perceived chance of contracting STD and HIV in the future six months (2 items). Items will be rated on a 10-point scale from 1=no chance at all to 10=very high chance. These items have been used in Chinese MSM [66].

Perceived severity of STD and HIV. Participants will be asked to rate the overall level of perceived severity of contracting syphilis, genital warts, and HIV (3 items). Items will be rated on a 10-point scale from 1=not severe at all to 10=extremely severe. These items have been used in Chinese MSM [66].

Condom social norms. Condom social norm will be measured by the 4-item Condom Social Norm Scale [67]. Items are rated on a five-point Likert scale from 1=strongly disagree to 5=strongly agree. It was originally developed in the Chinese context and it has been used in on Chinese MSM [68].

HIV testing behavior. Participants will be asked whether they have taken part in HIV testing during the intervention period at T1, and in the past six months at T2 [69].

Intention to use condom. Participants will be asked to rate their intention to use condom consistently with regular MSM sex partners, and non-regular MSM sex partners in the future six months on a five-point Likert Scale from 1=very unlikely to 5=very likely. These items have been used in Chinese MSM [66].

Intention to receive HIV testing. Participants will be asked to rate their intention to take up HIV testing in the future six months on a five-point Likert Scale from 1=very unlikely to 5=very likely. These items have been used in Chinese MSM [69].

The following outcomes will be measured among all participants at T1 and T2:
Engagement with the study site. Engagement with the study site will be measured by the 12-item Narrative Engagement Scale [70]. It measures four constructs: understanding, attentional focus, presence, and emotional engagement. Items are rated on a 7-point Likert Scale, from 1=strongly disagree to 7=strongly agree. It has been used in the Chinese population [71].

Identification with the study site. Identification with the study site will be measured by the 6-item Identification with Character Scale [35]. Items are rated on a five-point Likert Scale from 1=not at all to 5=extremely. It has been used in the Chinese population [72].

Evaluations

All of the evaluations (T0, T1 and T2) will be conducted online. The online questionnaires will be developed and hosted by an online survey hosting service. All questionnaires will be password protected. An incentive of a supermarket coupon of HKD50 will be given to participants after completion each of the three evaluations.

Sample size planning

Assuming at the baseline, about 50% of the participants would have had UAI in the last month [17]. A sample size of 167 per group will allow us to detect a smallest between-group difference (Absolute Risk Reduction) of 15% (power=.8, α=.05). Taking into a drop-out rate of 30% at T2, a sample size of about 238 per group is required.

Ethical consideration

Informed consent will be obtained from all participants prior to the online surveys. The purpose of the study, and potential risks and benefits of participation will be described. Participants will be told that they can provide their nickname or alias, according to their preference. Participants will complete the surveys anonymously, with those data identified only by study ID numbers. A file linking participant aliases and contact information with study ID numbers will be stored securely in a locked file cabinet accessible only to study staff. Participants' information will not be released without their written permission, except

as necessary for review, monitoring, and/or auditing. Participants' study information, other than de-identified data, will be destroyed 6 years after the completion of the proposed study. Ethical approval has been obtained from the Chinese University of Hong Kong.

Statistical Analysis

Data will be presented using appropriate descriptive statistics. For variables that involve more than one item, its mean score will be computed and presented. Baseline characteristics between the two arms of participants will be compared using Student's t test, the Mann-Whitney test, the Pearson Chisquare test or Fisher's exact test, as appropriate. Intention-to-treat (ITT) analysis will be performed. Generalized linear mixed effects models will be used to compare the differential changes of the outcome variables across the time points T0, T1 and T2 between the two study arms with adjustment for potential confounding variables. This type of model can account for the within subjects correlation inherent to longitudinal data and accommodate missing data caused by incomplete visits or dropout, provided the data are missing at random, and thus is particularly suitable for ITT without the need of imputation for missing data. To preserve the value of randomization, all randomized participants will be included in the analyses, provided at least one episode of outcome variables across the time points is available. The mechanism which the intervention changes HIV perceptions and risk behaviors through identification and engagement with the intervention will be tested using the approaches suggested by Baron and Kenny [73]. If identification and engagement are the mediators between the relationship between the intervention and the outcomes, the RR or regression coefficient will diminish after adjusting for identification and engagement.

Significance and implications of the study

The epidemic of HIV is increasing drastically among MSM in Hong Kong, effective interventions are warranted. The proposed study will be one of the very few evidence-based RCT studies investigating the use of online narratives in changing HIV risk perceptions and behaviors targeting MSM in Hong Kong. The results, if found significant, have a high potential for implementation as the online intervention can be used by many gay sites, NGOs and other internet-based domains, with no or very low maintenance costs. It is highly sustainable and scalable. It can reach many MSM at a relatively low cost and thus has the potential to reduce the increasing HIV epidemic among MSM in Hong Kong.

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