

Innovative Community-Based HIV/AIDS Implementation Programs & Research in Cambodia

Siyan Yi, MD, MHSc, PhD

Saw Swee Hock School of Public Health, NUS

KHANA Center for Population Health Research, Cambodia

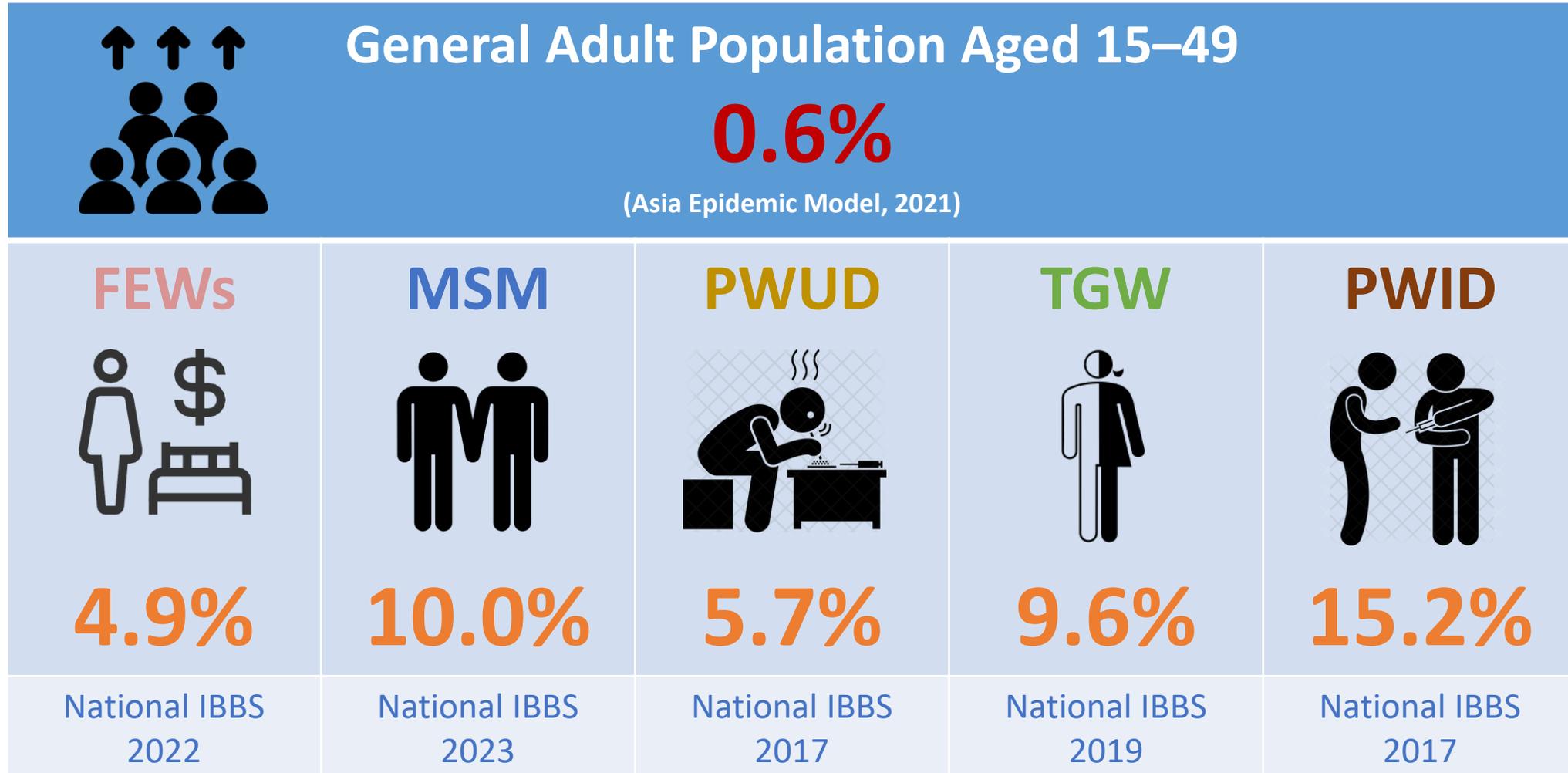
Center for Global Health Research, Touro University California, CA, USA

Email: siyan@nus.edu.sg

Outlines

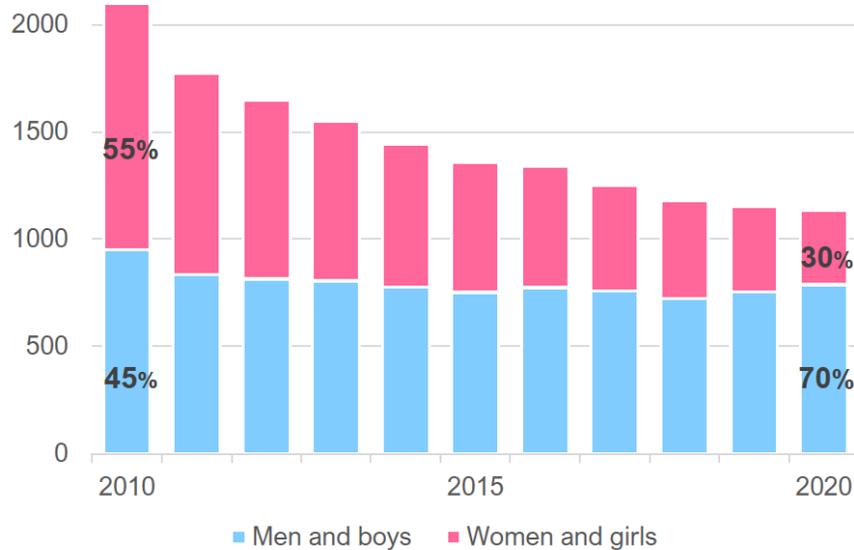
1. Updates on the HIV epidemic in Cambodia
2. Major challenges in vulnerable and key populations
3. Contributing innovative programs in the past 10 years
4. Large-scale operational studies in the past 5 years
5. Conclusions

HIV Prevalence in General and Key Populations in Cambodia

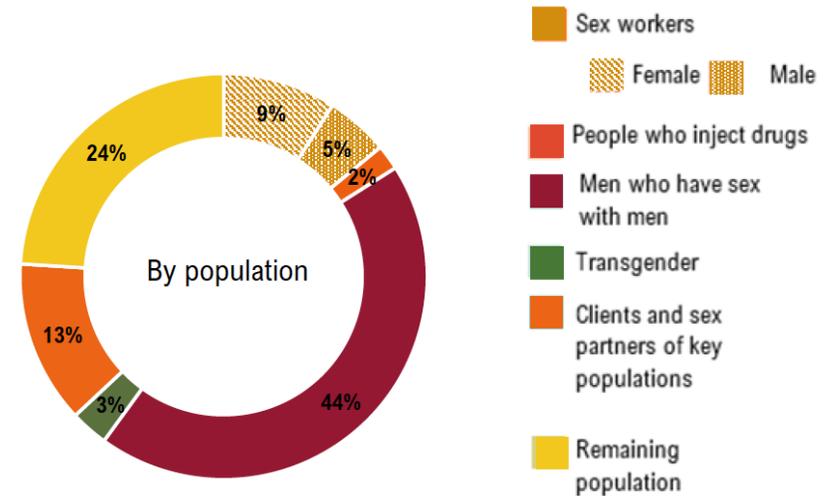


New HIV Infections by Sex and Populations in Cambodia

Proportion of new HIV infections by sex
2010 to 2020

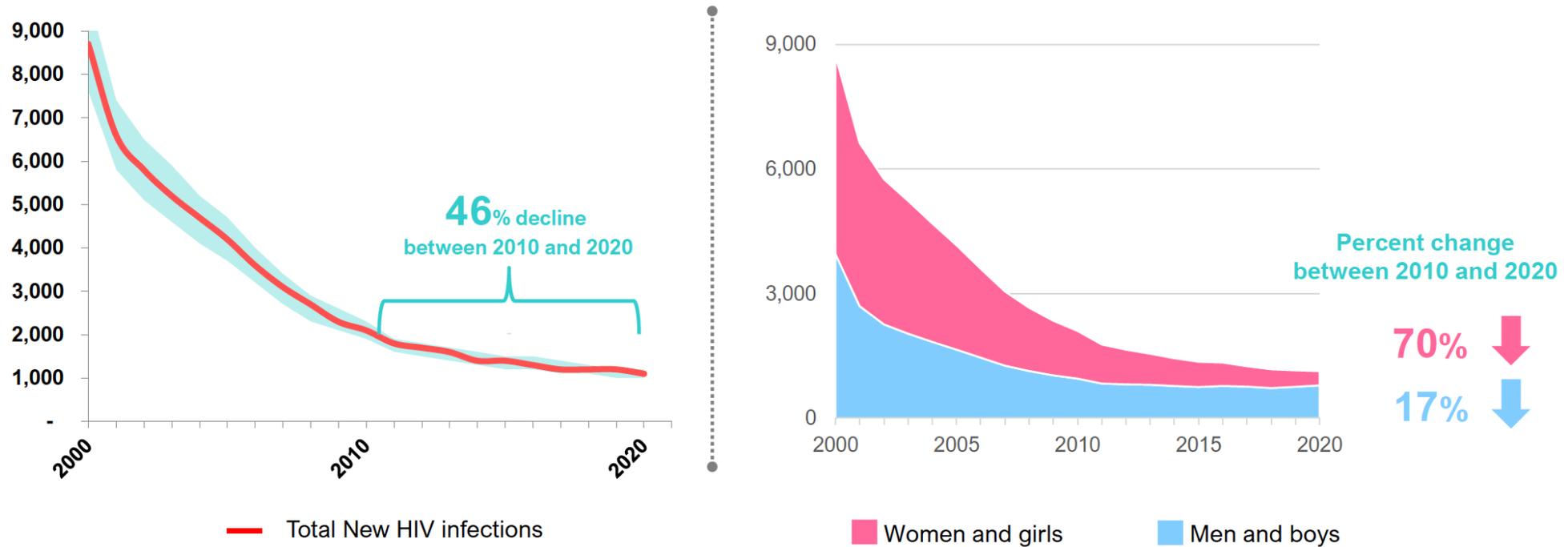


Distribution of new HIV infections by population, 2020



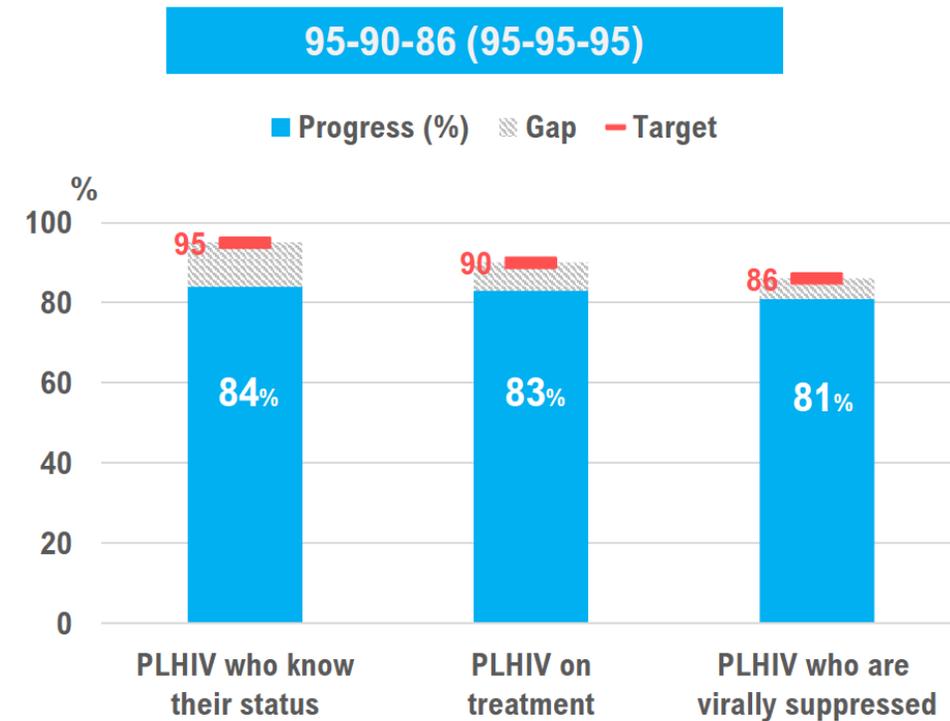
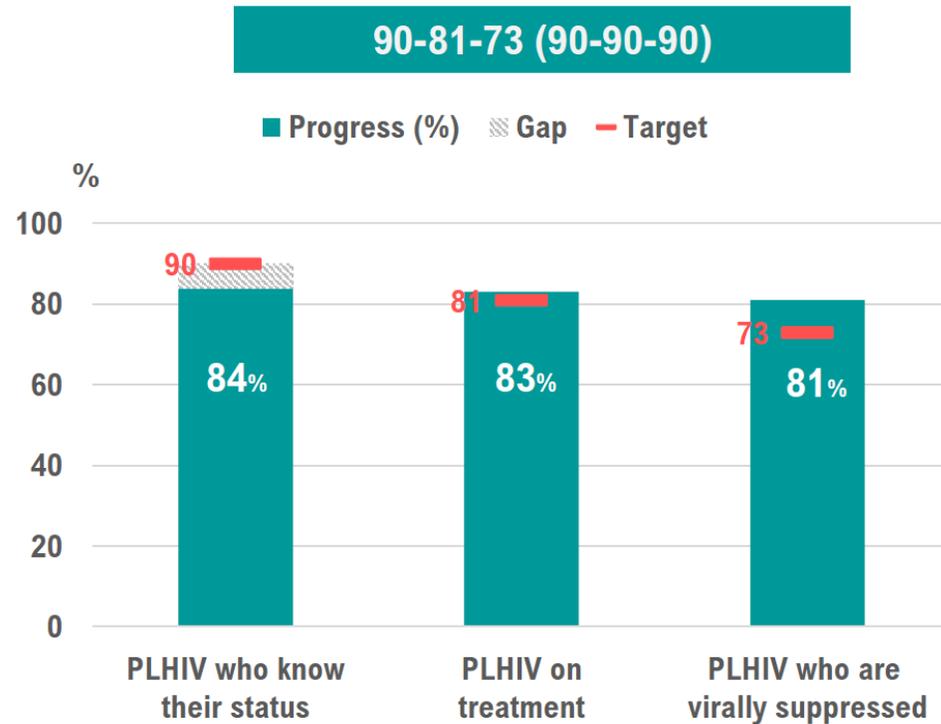
Source: Cambodia HIV Estimates 2021 (NCHADS, 2022)

Trend in New HIV Infections by Sex in Cambodia

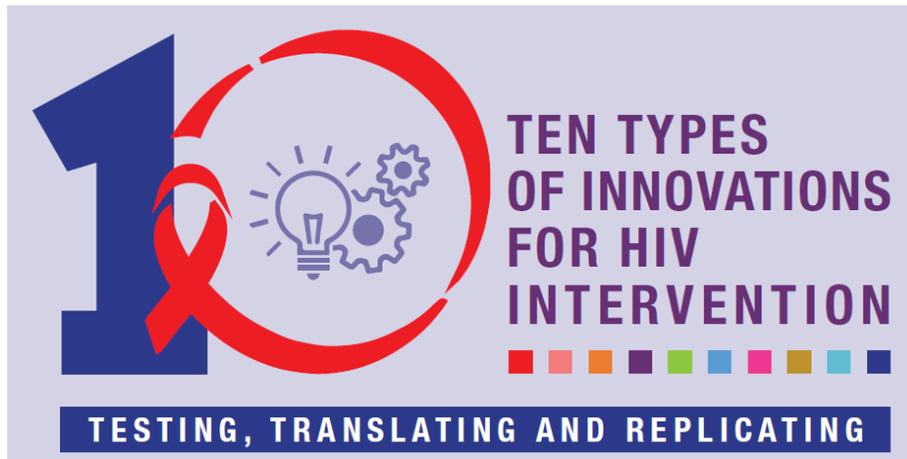


Source: Cambodia HIV Estimates 2021 (NCHADS, 2022)

HIV Testing & Treatment Cascade in Cambodia



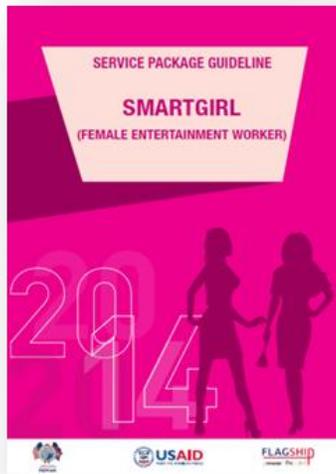
Source: Global AIDS Monitoring 2022



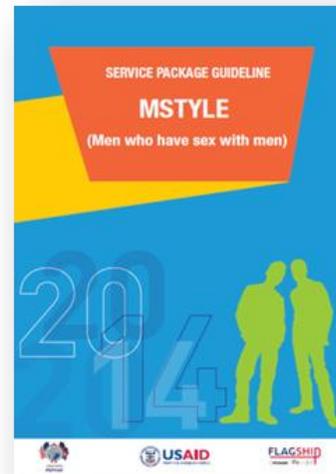
- 1** USE OF TECHNOLOGY-BASED TOOLS FOR SCREENING KEY POPULATIONS
- 2** STRENGTHENING OF ON-SITE MARKETING OF CONDOMS AND LUBRICANTS TO HIGH-RISK GROUPS
- 3** DEVELOPMENT OF APPROACHES DELIVERING SOCIAL AND BEHAVIOUR CHANGE COMMUNICATION
- 4** IMPLEMENTATION OF SEXUAL AND REPRODUCTIVE HEALTH AND HIV PREVENTION THROUGH SMARTGIRL
- 5** IMPLEMENTATION OF MHEALTH AMONG KEY POPULATIONS IN CAMBODIA
- 6** RISK TRACING SNOWBALL FOR HIGHER-RISK POPULATIONS
- 7** INTEGRATION OF HPV SCREENING WITH HIV TESTING AND TREATMENT
- 8** POSITIVE PREVENTION
- 9** INTEGRATED SIZE ESTIMATION SURVEY AND BEHAVIOURAL SURVEILLANCE STUDY FOR MEN WHO HAVE SEX WITH MEN IN CAMBODIA
- 10** DEVELOPMENT OF UNIQUE IDENTIFIER CODE FOR KEY POPULATIONS IN CAMBODIA

Source: KHANA Annual Report, 2018

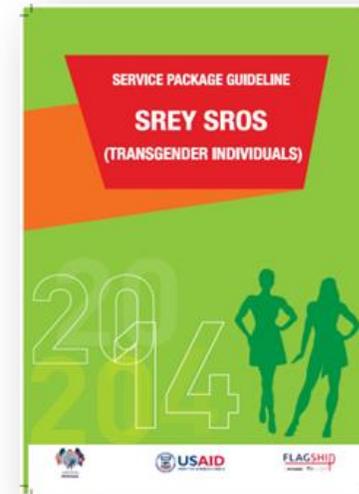
Branded Programs & Strategic Behavioral Communication



FEWs



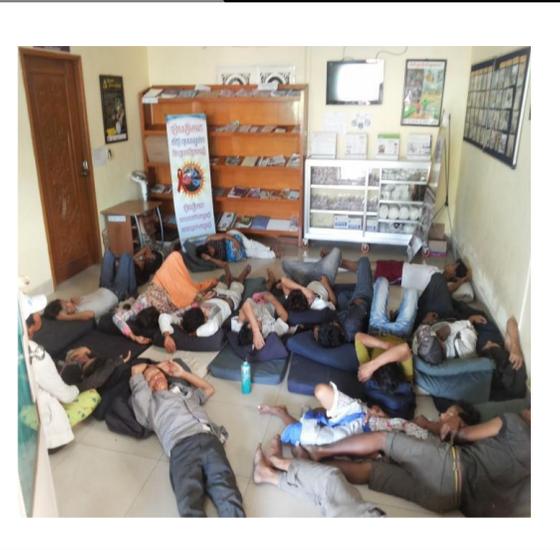
MSM



TGW

Websites and Facebook Pages for Key Populations





Drop-in Centers & Outreach for Key Populations

The Mobile Link

- A community-based RCT: 3 years
- Using mHealth approach to reach FEWs with information and link them to existing care and support services:
 - HIV, STIs, and SRH
 - Gender-based violence and legal aid
 - Substance abuse (forced drinking and drugs)
 - Other women's health issues

STUDY PROTOCOL Open Access

Mobile Link – a theory-based messaging intervention for improving sexual and reproductive health of female entertainment workers in Cambodia: study protocol of a randomized controlled trial

Carinne Brody¹, Sovannay Tuot², Pheak Chhou², Dallas Swendenman³, Kathryn C. Kaplan⁴ and Sivan Yi^{1,5*}

Abstract

Background: In Cambodia, HIV pre-exposure prophylaxis (PrEP) services for female entertainment workers (FEWs) who may have higher rates of HIV and sexually transmitted infections (STIs) are limited. PrEP services may be an effective intervention to reduce HIV risk, but access is limited. This study protocol describes the design and implementation of the Mobile Link, a theory-based messaging intervention (the Mobile Link) aiming to improve access to health services for female entertainment workers in Cambodia. The intervention and its reach are being evaluated in a randomized controlled trial.

Methods: A two-arm RCT will be used to evaluate the Mobile Link. The intervention group will receive the Mobile Link, a theory-based messaging intervention, and the control group will receive standard care. The intervention will be delivered via SMS and voice messages. The control group will receive standard care. The intervention will be delivered via SMS and voice messages. The control group will receive standard care. The intervention will be delivered via SMS and voice messages. The control group will receive standard care.

Discussion: The Mobile Link trial is a screening and treatment for HIV and a number of ways. First, the option of a medium that best links them to seek intervention using SMS/voice to support hard-to-reach, and dynamic population.

Trial registration: ClinicalTrials.gov, NCT03811111

Keywords: Female entertainment workers, controlled trial, study protocol, Cambodia

Improving access to health services for female entertainment workers in Cambodia: findings from the Mobile Link randomised controlled trial

Carinne Brody, Pheak Chhou, Tuot Sovannay, Anne E. Fehrenbacher, Alexander Mares, Dallas Swendenman, Sivan Yi

Abstract

Background: Female entertainment workers (FEWs) in Cambodia who work at karaoke bars, massage parlours, and beer gardens have higher rates of HIV and sexually transmitted infections (STIs), psychological distress, substance use, and gender-based violence than the general population. Reaching these workers with health education and services has been difficult because of their intervention, which aims to engage FEWs in reproductive health, and gender-based violence prevention.

Methods: The Mobile Link intervention consists of a two-arm RCT. The intervention group will receive the Mobile Link, a theory-based messaging intervention, and the control group will receive standard care. The intervention will be delivered via SMS and voice messages. The control group will receive standard care. The intervention will be delivered via SMS and voice messages. The control group will receive standard care.

Findings: Between March, 2018, and June, 2019, 211 FEWs were enrolled in the trial. The intervention group had significantly higher rates of HIV testing, PrEP use, and STI treatment compared to the control group. The intervention also had a significant impact on psychological distress, substance use, and gender-based violence.

Interpretation: The Mobile Link intervention improved access to health services for female entertainment workers in Cambodia. The intervention had a significant impact on HIV testing, PrEP use, and STI treatment. The intervention also had a significant impact on psychological distress, substance use, and gender-based violence.

Funding: 5% Initiative through Expertise France

Copyright: © The Authors. Published by Elsevier

Declaration of interests: We declare no competing interests.

Abstract

Background: Female entertainment workers (FEWs) in Cambodia experience a greater prevalence of human immunodeficiency virus (HIV), other sexually transmitted infections (STIs), psychological distress, substance abuse, and gender-based violence (GBV) than the general female population. Reaching FEWs with health education and linking them to services has been difficult because of their hidden and stigmatized status.

Objective: This study evaluated the efficacy of the Mobile Link intervention in improving FEWs' health by engaging and connecting them to existing HIV, sexual and reproductive health, and GBV services.

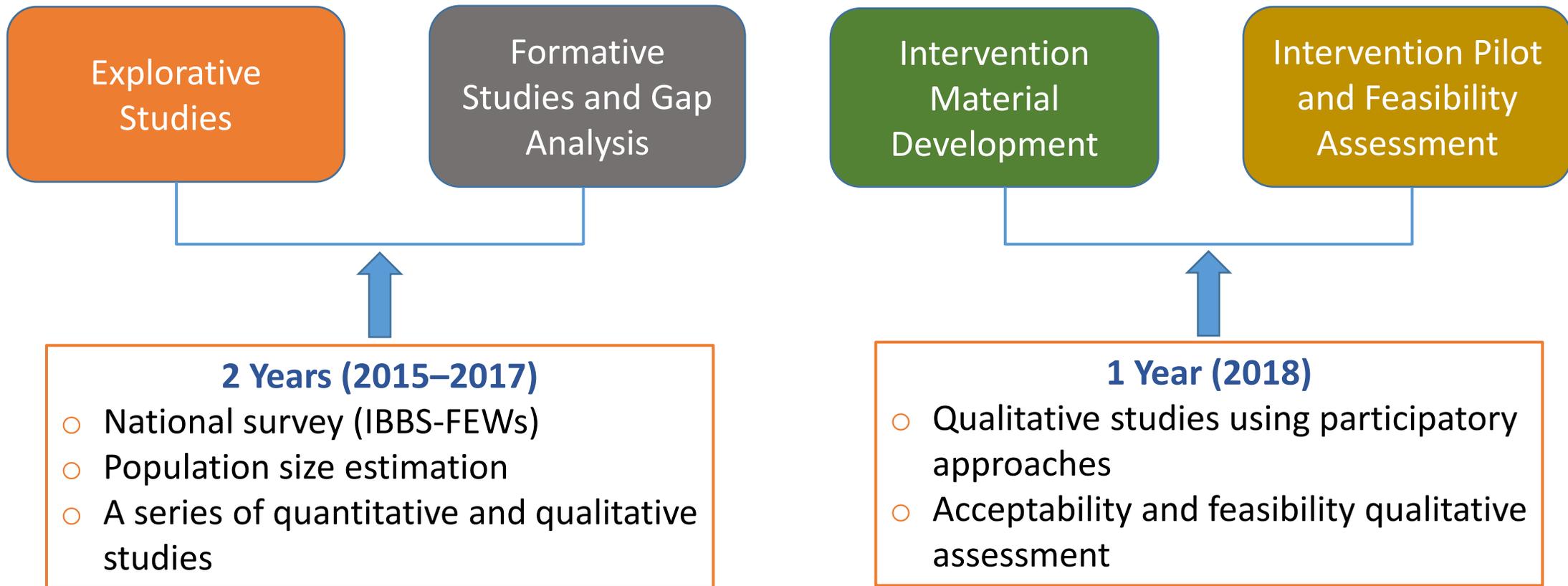
Methods: A randomized controlled trial was conducted between March 2018 and June 2019 in the capital city and 3 other provinces in Cambodia. FEWs in the intervention arm received automated twice-weekly Short Message Service (SMS) messages and voice messages with health information and direct links to outreach workers. The control group received the existing standard care, including HIV and STI counseling and testing and a hot line helpline staffed by trained counselors. We used a stratified random sampling method to select participants from 5 study sites in the 4 selected provinces. Initially, we randomly selected 600 participants from a list of 4000 FEWs by age group (18–24 and 25–30 years) and study site using a random number generator and emailed them to enroll. The primary outcome measures included self-reported HIV and STI testing, condom use, and contraceptive use assessed through a face-to-face structured interview. We also measured secondary outcomes, including contact with outreach workers, receipt of referral services, alcohol drinking, and GBV experiences. Intervention effects were modeled using repeated measures, multilevel mixed-effects logistic regression.

Results: A total of 1118 participants were recruited and enrolled in the study. We included 218 FEWs in the intervention arm and 170 FEWs in the control arm in the per-protocol analyses after removing 750 dropouts. Evidence of positive intervention effects was detected for the following secondary outcomes: contacting an outreach worker (or 30 weeks) adjusted odds ratio (AOR) 1.29, 95% CI 1.28–1.47; receiving an escorted referral (or 30 weeks) AOR 2.86, 95% CI 1.97–5.32; 40 weeks AOR 8.13, 95% CI 1.63–42.23; and never being forced to drink at work (or 40 weeks) AOR 3.95, 95% CI 1.43–9.80. Over time, no significant differences between intervention and control groups were observed for any primary outcomes in the fully adjusted models.

The *Mobile Link*'s Objectives

1. To develop and pilot test the *Mobile Link* intervention by conducting participant observation, focus groups, and cognitive pilot interviews
2. To evaluate the efficacy of the *Mobile Link* in providing HIV, STI, SRH, and GBV information to FEWs and linking them to services
3. To qualitatively assess the *Mobile Link*'s acceptability, effectiveness, and feasibility among key stakeholders

The “Mobile Link” Project Development



Emerging Health Issues Explored in Formative Studies

- Exposure to gender-based violence (GBV):
 - Physical and sexual abuse in and outside the workplace
 - Forced drinking and substance abuse
 - Emotional abuse by the establishment owners/managers
- Other neglected health issues:
 - Health concerns as consequences of heavy alcohol drinking
 - Women's health problems other than HIV, STIs, and SRH (e.g., intravaginal hygiene, other gynecologic issues, cervical cancer)
 - Mental and psychological wellbeing
 - Unwanted pregnancy and induced abortion



Original Research
Journal of Interpersonal Violence
1-22
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journalsPermissions
DOI: 10.1177/0886260520948145
journals.sagepub.com/home/jiv
SAGE

Gender-Based Violence and Factors Associated with Victimization among Female Entertainment Workers in Cambodia: A Cross-Sectional Study

Carlijn Willeke Wiet¹, Sovannary Tuot¹, and Siyan Yi^{1,2,3,4}

Abstract
Women working in the entertainment forms of gender-based violence are understudied, particularly in Cambodia. This study aims to examine the prevalence of gender-based violence (GBV) among female entertainment workers (FEWs) in Cambodia and to evaluate a randomized controlled trial of a structured questionnaire. We conducted a cross-sectional evaluation of a randomized controlled trial of a structured questionnaire in the capital city and administered a structured questionnaire to 200 FEWs in Cambodia. Of the 200 FEWs, 100 were in the capital city and 100 were in the provinces. The prevalence of GBV was 100% among FEWs in Cambodia. The prevalence of GBV was 100% among FEWs in Cambodia. The prevalence of GBV was 100% among FEWs in Cambodia.

Keywords: Gender-based violence, Cambodia, Entertainment workers, Victimization, Cross-sectional study

ORIGINAL ARTICLE
“We Cannot Avoid Drinking”: Alcohol Use among Female Entertainment Workers in Cambodia

Carinne Brody¹, Kathi and Siyan Yi²

Abstract
Background: Female entertainment workers (FEWs) in Cambodia are often pressured to consume alcohol. This study aims to explore the prevalence of alcohol use among FEWs in Cambodia. Methods: We conducted 27 focus group discussions from four provinces, and 16 follow-up semi-structured in-depth interviews with purposively selected participants in two provinces. Data collection occurred over three weeks, with concurrent data transcription and translation. The data from the transcripts were analyzed using Dedoose, an online, open-access qualitative analysis software. Two researchers independently labeled sections of transcripts associated with broader categories and subcategories based on the initial content analysis matrix and created codes. This process continued iteratively until a final coding schema and conceptual model was created. Results: We found that FEWs are widely practiced among FEWs in Cambodia and are associated with internalized and enacted stigma. Stigma was an overarching theme that impacted the sub-themes of (1) messages about cleaning, (2) the cleaning process, and (3) the impact of cleaning. Experiences of enacted stigma and internalized stigma permeated conversations about FEWs, including feeling pressured by peers to keep themselves clean, practicing internal cleaning after transactional sex, and being called dirty by health providers. Conclusions: FEWs who practice MP talk about it in the context of their lived experiences stigma and discrimination. Highly stigmatized practices such as MP among FEWs may benefit from a harm reduction approach that emphasizes positive changes without judgment, coercion, or discrimination. Keywords: Sex work, Intravaginal practices, Cambodia, Douching, Stigma

RESEARCH ARTICLE
“Feeling clean”: stigma and intravaginal practices among female entertainment workers in Cambodia

Carinne Brody¹, Rachel L. Berkowitz², Pheak Chhou³, Kathryn C. Kaplan³, Sovannary Tuot¹ and Siyan Yi⁴

Abstract
Background: Intravaginal practices (IVPs), methods used by women most often to manage vaginal hygiene and address perceived disruptions to vaginal health, may increase the risk of contracting human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs). This qualitative study explores the social, professional, and peer context surrounding IVPs, the experiences of self-cleaning or getting cleaned from a health professional, and the perceived impacts of IVPs among female entertainment workers (FEWs) in Cambodia. Methods: In 2017, we conducted 27 focus group discussions from four provinces, and 16 follow-up semi-structured in-depth interviews with purposively selected participants in two provinces. Data collection occurred over three weeks, with concurrent data transcription and translation. The data from the transcripts were analyzed using Dedoose, an online, open-access qualitative analysis software. Two researchers independently labeled sections of transcripts associated with broader categories and subcategories based on the initial content analysis matrix and created codes. This process continued iteratively until a final coding schema and conceptual model was created. Results: We found that IVPs are widely practiced among FEWs in Cambodia and are associated with internalized and enacted stigma. Stigma was an overarching theme that impacted the sub-themes of (1) messages about cleaning, (2) the cleaning process, and (3) the impact of cleaning. Experiences of enacted stigma and internalized stigma permeated conversations about IVPs, including feeling pressured by peers to keep themselves clean, practicing internal cleaning after transactional sex, and being called dirty by health providers. Conclusions: FEWs who practice IVP talk about it in the context of their lived experiences stigma and discrimination. Highly stigmatized practices such as IVP among FEWs may benefit from a harm reduction approach that emphasizes positive changes without judgment, coercion, or discrimination. Keywords: Sex work, Intravaginal practices, Cambodia, Douching, Stigma

Key Findings From the Formative Studies

- Health priorities, such as gynecologic issues, were emphasized more than HIV/STIs and family planning
- Misconceptions exist about contraception and STI transmission
- The need to build trust in outreach workers and services linkages
- The desire for information and supportive interventions to address mental health issues that may stem from GBV and perceived stigma and discrimination

Open Access Research

BMJ Open Factors associated with induced abortion among female entertainment workers: a cross-sectional study in Cambodia

Siyan Yi,^{1,2} Sovannary Tuot,¹ Pheak Chhoun,¹ Khuondyia Pal,¹ Khimsay Tith,¹ Carinne Brody³

ABSTRACT
Objective: To explore factors associated with induced abortion among female entertainment workers in Cambodia.
Design: Cross-sectional study.
Setting: Five entertainment establishments in Cambodia.
Participants: 18-47 years old female entertainment workers.
Primary and secondary results: Of 111 women, 25 (22.5%) reported having induced an abortion during the last 12 months. Factors associated with induced abortion included being a sex worker (OR 2.1, 95% CI 1.1-4.1), having a partner (OR 2.1, 95% CI 1.1-4.1), and being a sex worker with a partner (OR 3.1, 95% CI 1.1-9.1).
Conclusion: Induced abortion is common among female entertainment workers in Cambodia. Factors associated with induced abortion include being a sex worker, having a partner, and being a sex worker with a partner.

Original Article

Using participatory methods to build an mHealth intervention for female entertainment workers in Cambodia: the development of the Mobile Link project

Pheak Chhoun¹, Kathryn C. Kaplan¹, Carlija Wieten¹, Ida Jebesh¹, Mitchell Liemmen², Sovannary Tuot¹, Siyan Yi^{1,2}, Carinne Brody³

Abstract
 Beyond the monopoly environment of the early 100% Condom Use Program in Cambodia, less is known about how current female entertainment workers negotiate condom use on their own, and what factors impact that negotiation. This study aims to understand the experiences of current female entertainment workers in negotiating condom use with clients in Cambodia. Data collection occurred over a period of 3 weeks (August–September 2017) with concurrent data transcription and translation. A total of 27 focus group discussions (FGDs) were conducted in the following groups: pilot FGD (5), karaoke bar (5), massage parlor (5), beer garden (5), on-call sex workers (3), cross-venue groups exploring parenting issues (2), and street-based sex workers (2). Female entertainment workers experience a range of control over negotiating condom use with clients. Participants reported times when they were able to take direct action and successfully insist on condom use, times when they agreed to participate in condomless sex for money in the face of economic insecurity, and times when male clients sabotaged their attempts to negotiate condom use with tricks, verbal threats or threats of violence. These experiences are influenced by alcohol use, economic shocks, trust between partners, and experiences with side effects. Our findings support the development of policies that re-invigorate the structural-level condom promotion programs while also acknowledging the many individual-level factors that shape condom use such as alcohol consumption, economic insecurity, trust, and side effects.

Keywords: Condom use · Female entertainment workers · Female sex workers · HIV · Condomless sex · Focus groups

What Did the Intervention Look Like?

02
Messages
Per Week

Do you feel burning or pain when you have sex? Sex does not have to be painful, and you have the right to enjoyable and pain-free sex. Find out WHY you might have these symptoms.

Are you scared to get an HIV test? Remember, if you are HIV+ you can still live a healthy life if you just get on medication. If you don't know, your health will get worse – so find out today!

Sisters, let's talk to each other and share tips to help avoid being drunk and stay safe. Our first tip for you – eat a lot of rice or noodles before you drink even if you feel a little sick. You need something in your stomach to soak up the alcohol!

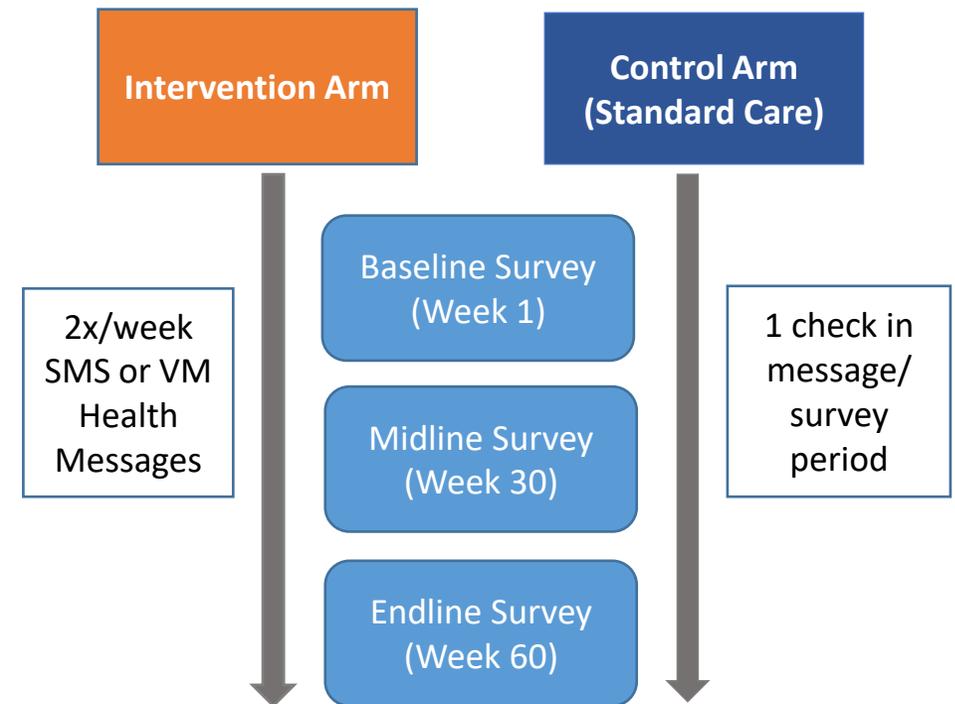
Links to Outreach Workers

If you would like to hear another message about this topic, **Press 1**. If you would like to be connected to *Mobile Link* staff to talk more about this issue or another issue or receive referrals, **Press 2**.



How Did We Conduct This study?

- Randomized controlled trial
- 5 cities in Cambodia
- Survey-based data collection:
 - Baseline: January 2018
 - Midline: November 2018
 - Endline: June 2019
- Intervention: 60 weeks of health topics and outreach messages



What Did We Measure?

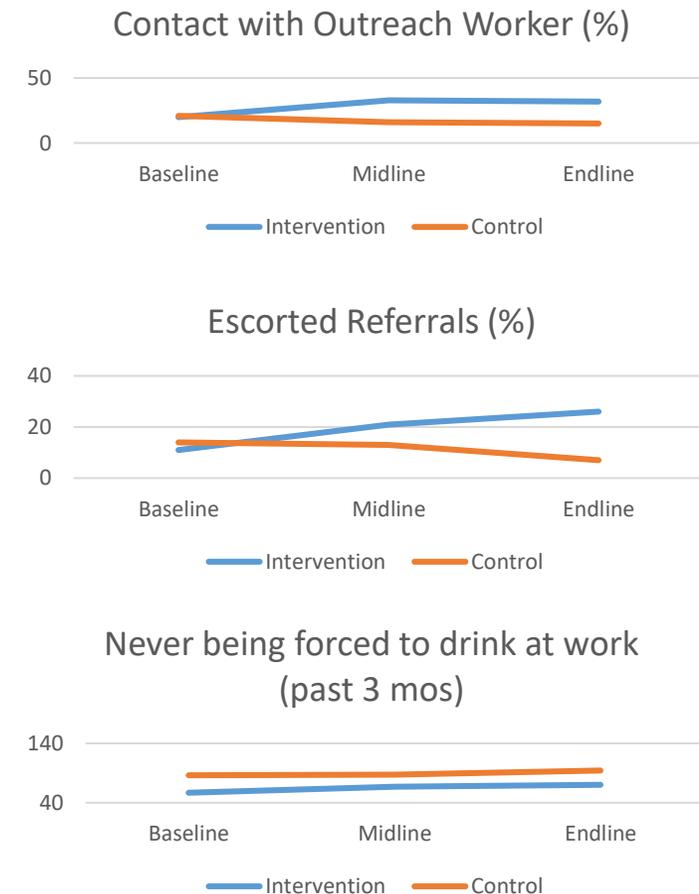
- Primary outcome measures:
 - HIV testing
 - STI testing
 - Condom use with different types of partners
 - Contraceptive use
- Secondary outcomes:
 - Contact with outreach workers
 - Use of escorted referral services
 - Forced drinking at work
 - GBV experiences and attitudes

Data Analyses

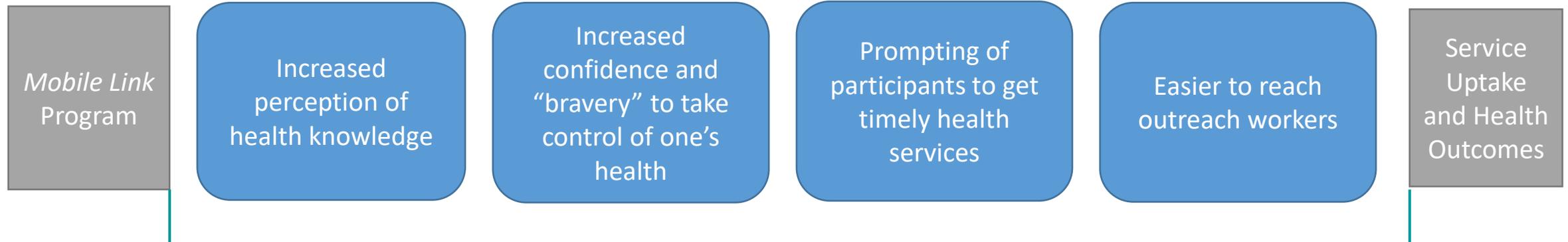
- Comparisons of baseline characteristics and outcome variables
- Crude and cluster-adjusted pooled tests of association (analytic vs. non-analytic sample)
- Intervention effects – multilevel mixed-effects logistic regression (group by time interaction terms at endline)
- Model fit was assessed for each outcome using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC)
- Sensitivity analyses – sensitivity analysis, we used intention-to-treat (ITT) principles

What Did We Find?

- Comparable baseline characteristics of intervention and control groups
- No significant primary health outcomes changes at the 60 weeks mark
- Participants in the intervention group were significantly more likely to have had contacts with outreach workers and escorted referrals
- Reduced forced drinking at work



Qualitative Evaluation



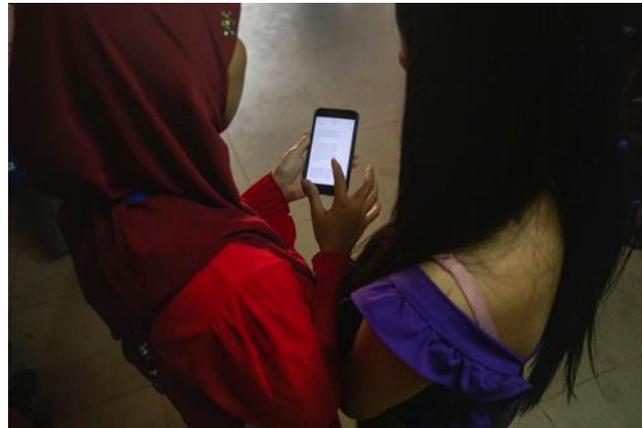
**Data from 6 focus group discussions (FGDs)
and 15 in-depth interviews (IDIs)**

Quotes from Intervention Participants



“The Mobile Link helps us learn the problems about our health that we are curious about by reading the text messages. We don’t have to go to the clinic to consult.”

– Battambang FGD



“Because of the Mobile Link, I dare to change my daily life. Dare to talk to a partner and dare to talk to clients directly when they came to our workplace.”

– Phnom Penh IDI

Quotes from Intervention Participations



“The Mobile Link offered us knowledge which pushed us to think more about our health, and then we were brave to go to the health providers alone. Before we were not daring enough to go along, we always asked someone to accompany us.”

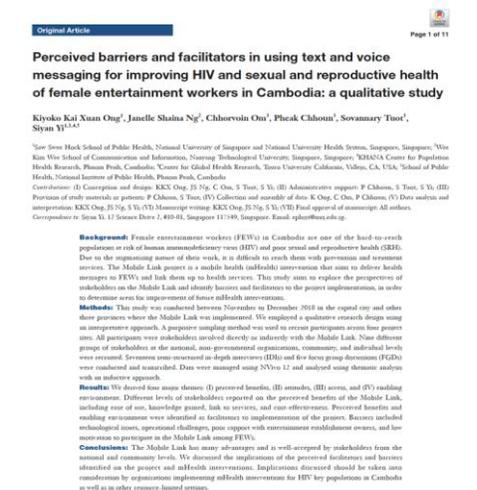
– Siem Reap FGD

“It feels good that they educate us to practice hygiene and protect ourselves.”

– Banteay Meanchey IDI

Qualitative Evaluation – Barriers & Facilitators

- The *Mobile Link* has many advantages and is well-accepted by stakeholders from the community to the national levels
- Perceived benefits – ease of use, knowledge gained, link to services, resource-efficient, rapport with establishment owners, the relationship between field staff and FEWs, and FEWs’ motivation
- Enabling environment – strong political supports, community partnerships, and financial aids



Limitations of the Study

- Too short intervention (18 months)
- High loss to follow up (~ 40% by the midterm) due to loss of contact and mobilization of FEWs (anticipated ~ 20%) –
 - Differential loss to follow-up between intervention and control groups
- High movements between venues among FEWs – leading to individual-level sampling and non-random assignment to intervention and control groups
- Participants were not blinded to the intervention –
 - Balance between study arms at baseline was achieved on all primary and secondary outcomes

Conclusions

- The *Mobile Link* enhances traditional in-person outreach approaches by community health workers.
- Replication of messaging services would benefit from qualitative research to inform adaptation.
- Successful linkages of vulnerable women to outreach workers and escorted referrals may lead to increased access to other services.
- Longer-term messaging and prompts of community health worker linkages have the potential to increase access to services and may impact FEWs' health outcomes in the future.

Sustainability & Scale-up

- Handing over the message bank and other materials to NCHADS and other key stakeholders
- Mobilizing resources for expanding the intervention among FEWs and other key populations (e.g., MSM, transgender women)
- Pilot testing the model using different platforms (e.g., WhatsApp, hotline calls)
- Funding commitment from donor agencies



Oral Health in Children Living with HIV

- Facility- and community-based RCT: 4 years
 - Oral health education sessions for children living with HIV
 - Daily oral self-care under the supervision of their caregivers
 - Aiming to improve oral health that would, in turn, improve the overall health of the children

Open access Original research

BMJ Paediatrics Open

Oral health among HIV-positive and HIV-negative children in Phnom Penh, Cambodia: a cross-sectional study

Kimiyo Kikuchi¹, Siyan Yi^{2,3}, Juniko Yasuoka⁴, Sovannary Tuot^{2,5}, Suniyo Okawa⁶, Makoto Murayama⁶, Sokunthra Yem⁷, Pheak Chhoun⁸, Sothea Eng⁹, Chantheary Huot⁹, Seisichi Morokuma¹⁰

ABSTRACT HIV positive children are at high risk for oral mucosal diseases. Additionally, it is associated with dental caries. This study examined the association between HIV status and oral health in Phnom Penh, Cambodia. **Methods** This was a cross-sectional study of 154 HIV positive and 154 HIV negative children and their caregivers. We collected questionnaire data to assess oral health and growth data. **Results** The mean number of permanent teeth (DMFT) and the DMFT of HIV positive children were 4.0 (SD 2.2) and 1.1, respectively. Among HIV negative children, the mean DMFT was 0.9 (SD 1.4) and 0.4 (SD 1.0), respectively. HIV positive children were significantly associated with DMFT (OR 3.7, 95% CI 1.1 to 12.3), in salivary flow (OR 0.4, 95% CI 0.2 to 0.8), and in salivary pH (OR 1.1, 95% CI 1.0 to 1.2). **Conclusions** HIV positive children have significantly worse oral health status than HIV negative children. Oral health status was significantly associated with DMFT, salivary flow, and salivary pH. **Keywords** HIV, Child, Oral health, Randomized controlled trial, Cambodia

What is known about the subject?

Association of oral health status with the CD4+ cell count in children living with HIV in Phnom Penh, Cambodia

Kimiyo Kikuchi¹, Yousuf & Siyan Yi^{2,3}

RESEARCH ARTICLE Open Access

Impact of oral intervention on the oral and overall health of children living with HIV in Cambodia: a randomized controlled trial

Kimiyo Kikuchi¹, Sovannary Tuot^{2,3,4}, Juniko Yasuoka⁵, Makoto Murayama⁶, Suniyo Okawa⁷, Akira Shibamura⁸, Keiko Nanshi⁹, Sothea Eng¹⁰, Chantheary Huot¹¹, and Siyan Yi^{11,12}

Abstract Maintaining oral health is essential for improving overall health of children living with HIV. Therefore, we evaluated the effectiveness of an oral health intervention for improving their oral and overall health. In addition, we examined the longitudinal association between changes in oral and overall health. **Methods** We conducted a 2-year randomized controlled trial involving children living with HIV in Cambodia. Children aged 3–15 years and their caregivers were randomly allocated either to the intervention (group A) or control (group B) arm. A second control arm (group C) included children without HIV. The group A children received oral health education sessions and practiced home-based daily care. **Results** In the baseline survey, 482 children participated (group A: n=160, group B: n=168, group C: n=154), and 350 completed the endline survey. An interaction effect in teeth brushing duration was observed in children in group A relative to group B (ACR=2.69, 95% CI: 1.37–5.31) and group C (ACR=3.78, 95% CI: 1.70–8.40). Longitudinal associations were observed between changes in oral hygiene and overall health, as presented by alterations in dental caries in permanent teeth with vital root detection (adjusted odds ratio = 3.58, 95% CI: 1.10–11.23), in salivary flow quantity with the overall quality of life (QoL) (OR=0.07, 95% CI <0.01–0.13), as well as in dental caries, salivary pH, debris index with body mass index for age among group A children. **Conclusions** Oral health intervention may improve oral care behaviors and potentially enhance overall health among children living with HIV in antiretroviral therapy in a resource-constrained setting. **Trial registration** ISRCTN15117479. **Keywords** HIV, Child, Oral health, Randomized controlled trial, Cambodia



Community-based ART Delivery Model

- Community-based quasi-experimental study:
 - To develop and evaluate the efficiency of a community-based ART delivery model among PLHIV in 6 provinces
 - To reduce socio-economic burden in PLHIV and workload in facility-based health providers



STUDY PROTOCOL

Open Access



Community-based model for the delivery of antiretroviral therapy in Cambodia: a quasi-experimental study protocol

Sovanary Tuot^{1,2,3†}, Alvin Kuo Jing Teo¹, Kiesha Prem^{4,5†}, Pheak Chhoun¹, Chamroen Pall¹, Mengling Ung^{1,6}, Penh Sun Ly⁷, Masamine Jimba² and Siyan Yi^{4,8†} 

Abstract

Background: Multi-month dispensing (MMD) is the mainstay mechanism for clinically stable people living with HIV in Cambodia to refill antiretroviral therapy (ART) every 3-6 months. However, less frequent ART dispensing through the community-based ART delivery (CAD) model could further reduce the clients' and health facilities' burden. While community-based services have been recognized as an integral component of HIV response in Cambodia, their role and effectiveness in ART delivery have yet to be systematically assessed. This study aims to evaluate the CAD model's effectiveness on the continuum of care and treatment outcomes for stable people living with HIV in Cambodia.

Methods: We will conduct this quasi-experimental study in 20 ART clinics across the capital city and nine provinces between May 2021 and April 2023. Study sites were purposively selected based on the availability of implementing partners, the number of people living with HIV each clinic serves, and the accessibility of the clinics. In the intervention arm, approximately 2000 stable people living with HIV will receive ART and services from the CAD model. Another 2000 stable people living with HIV in the control arm will receive MMD—a standard care model for stable people living with HIV. The primary outcomes will be retention in care, viral load suppression, and adherence to ART. The secondary endpoints will include health providers' work burden, the model's cost-effectiveness, quality of life, mental health, social support, stigma, and discrimination. We will compare the outcome indicators within each arm at baseline, midline, and endline using descriptive and inferential statistics. We will evaluate the differences between the intervention and control arms using the difference-in-differences method. We will perform economic evaluations to determine if the intervention is cost-effective.

Discussion: This study will build the evidence base for future implementation and scale-up of CAD model in Cambodia and other similar settings. Furthermore, it will strengthen engagements with community stakeholders and further improve community mobilization, a vital pillar of the Cambodian HIV response.

* Correspondence: siyan@sochp.com

[†]Sovanary Tuot, Alvin Kuo Jing Teo, Kiesha Prem and Siyan Yi contributed equally to this work.

¹ANAN Center for Population Health Research, Phnom Penh, Cambodia

²Saw Swee Hock School of Public Health, National University of Singapore

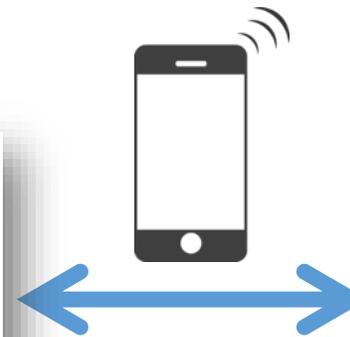
and National University Health System, 12 Science Drive 2, #1601, Singapore 117549, Singapore

Full list of author information is available at the end of the article

 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

24-hour Chatline for GBV Response for FEWs in Cambodia

To provide FEWs with 24-hour confidential support by trained staff to make it easier for survivors to be connected to services and get the support when they need it.



Conclusions

- Cambodia has been successful in HIV care and support services, but less successful in preventing new infections in key populations.
- Innovative approaches to reach sub-pockets of the key populations that have not been reached by traditional approaches.
- Other issues in vulnerable and key populations:
 - Co-morbidities (e.g., HCV, TB, STIs, NCDs)
 - Gender-based violence and its subsequent mental health problems
 - Barriers in access to health care due to stigma and discrimination
 - Legal barriers, particularly for people who use drugs and LGBTI



Thank you!

Q & A