THE ROLE OF COMMUNITY SAVINGS GROUPS IN ADDRESSING HIV AMONG FEMALE SEX WORKERS IN IRINGA, TANZANIA

by
Andrea R. Mantsios

A dissertation submitted to Johns Hopkins Bloomberg School of Public Health in conformity with the requirements for the degree of Doctor of Philosophy

Baltimore, Maryland
December, 2016

Abstract

Background: Financial insecurity has been linked to heightened HIV risk among female sex workers (FSW). Community empowerment (CE) approaches have demonstrated effectiveness in reducing HIV risk and vulnerability through FSW taking collective action to address structural barriers to their health and human rights. This study examines organically formed community savings groups among FSW in Iringa, Tanzania for their potential role within a CE approach to addressing HIV among FSW.

Methods: Logistic regression was used to determine the associations between financial security, community savings group participation, and consistent condom use (CCU) among a cohort of 496 FSW in Iringa. Mediation analysis was used to assess whether community savings group participation mediates the relationship between financial security and CCU. Qualitative methods included 27 in-depth interviews with 15 FSW and 4 focus group discussions with 35 FSW who participate in community savings groups as well as 10 key informant interviews with group collectors. Content analysis was conducted to identify salient themes including those related to the dynamic nature of participants' sex work and financial realities, the meaning and importance of community savings groups to the women, and overall group operations and functioning.

Results: In quantitative analysis, FSW who participated in community savings groups had nearly two times greater odds of CCU in the last 30 days with new clients than women who did not participate in the groups (aOR: 1.80; 95% CI: 1.08, 2.97). Higher financial security (i.e. monthly income) was positively associated with CCU (aOR: 1.54; 95% CI:

0.94, 2.53) and mediation analysis suggested that community savings group participation partially mediates the relationship between financial security and CCU. Qualitatively, women described savings groups as an important addition to their often unsteady income, which can leave them vulnerable to high-risk sex with clients. Savings groups were described as providing a safety net women utilized in times of financial need, making them less likely to engage in high-risk sex with clients. Women described a sense of agency resulting from group participation playing out in their ability to negotiate condom use and be more selective about clients. Savings groups helped participants afford health care and HIV-infected participants described saving from the groups enabled them to cover the costs of eating healthy foods, medications, and transportation for clinic appointments. Beyond the individual level, groups were seen as fostering a sense of solidarity and collective identity. Participants expressed their desires to formally register their groups and be recognized by the larger community.

<u>Conclusion</u>: Findings suggest that community savings groups may improve financial security and enhance individual agency in decision making influencing sexual risk behaviors among FSW. They may also impact the overall health and well-being of FSW and help HIV-infected FSW achieve improved HIV treatment and care outcomes. Through greater social cohesion and collective action among FSW the groups further efforts for their social and economic inclusion. Community savings groups may be an important economic empowerment strategy within a CE framework for FSW communities and enable sex workers to intervene on structural factors contributing to their HIV vulnerability and ultimately to gain more equal access to resources.

<u>Dissertation Committee Members</u>
Associate Professor Deanna Kerrigan
Professor Susan Sherman
Associate Professor Caitlin Kennedy
Associate Professor Noya Galai

Acknowledgments

As I wrote various sections of this dissertation about solidarity and social support, I felt profound gratitude as I reflected on how these very dynamics have characterized my own life as my friends and family supported me through this process. I have been extremely fortunate to have advanced through this doctoral program with a wonderful group of peers by my side who have become dear friends and respected colleagues – Cristina, Zoe, Philip, Kelly, Ryan, Dzifa, Raimee, Anna, Sahnah and Jenita. I am grateful for the amazing support of my brother and sister-in-law and my friends in other sectors of my life who have no idea what Endnote is but cheered me on with fervent enthusiasm anyway.

There are no words for the love, appreciation, and adoration I have for my parents who are two of the most spectacular humans on the planet. They have been by my side providing stimulating conversation and heart-felt cheerleading every step of this dissertation journey, often accompanied by very helpful wine and cheese breaks. As the daughter of two academics who have dedicated their entire lives to social justice and fighting for the rights of disadvantaged groups, I could not be prouder to have arrived at the point where I am working on public health of marginalized women with a social justice focus. If I can make even a fraction of the impact they have made on the world, I will have done good.

The wise oracle on a mountaintop who I call my husband provided the much needed voice of sanity telling me to pace myself, take breaks, and relax. He was a true sounding

board to process with and share my excitement with as the research unfolded. The feta-stuffed olives he had delivered to my door on occasion when I was having writer's block were also extremely helpful.

I am very grateful for the Sexually Transmitted Infections Training Grant for both the funding support and the guidance provided by Dr. Susan Sherman and Dr. Jacky Jennings through the work group meetings. I am also very appreciative for the Department of Health, Behavior and Society Distinguished Doctoral Research Award and the Office of Global Health Field Research Award for the funding support to carry out research in the field. Each member of my committee has had an ongoing presence throughout this work. I want to thank Dr. Susan Sherman, Dr. Caitlin Kennedy and Dr. Noya Galai for their involvement, input and support at various stages throughout this process.

And finally, I would like to thank my advisor, Dr. Deanna Kerrigan, who I truly feel should win an academy award for mentorship. In the 13 years since she was my advisor during my MHS degree at JHSPH she has provided me with incredible support and guidance; modeled for me integrity and work ethic in her research; and opened countless doors to opportunities that have shaped me professionally and personally. I am truly indebted to her for all she has done for me and the impact she has made on my life.

Contents

Tables

Figures

Introduction

Female sex workers (FSW) bear a disproportionately high burden of disease in the global distribution of HIV.[1] A recent meta-analysis to assess the burden of HIV among FSW in low- and middle-income countries identified a pooled global HIV prevalence of 11.8%.[1] FSW were globally estimated to have 13.5 times greater odds of having HIV than other adult women.[1] Regional analysis has identified a combined HIV prevalence of 29.3% among FSW in sub-Saharan Africa, significantly higher than any other geographic region.[2] HIV prevalence estimates for FSW in eastern and southern African countries range from 32% to 70%.[3]

Globally, FSW are at heightened risk for HIV due to multiple and overlapping behavioral, social and structural factors. Behavioral factors such as high numbers of sexual partners and inconsistent condom use, as well as socio-structural constraints such as poverty, stigma and discrimination, patriarchal gender norms, violence, and legal and policy environments are all at play in the context of HIV risk for sex workers.[4-10] The International Labor Organization officially recognized sex work as work in 2010 when it incorporated sex work into international labor standards.[11] However, sex work remains illegal and highly stigmatized in most countries around the world making legal and political environments a major barrier in efforts to protect and promote the health and human rights of sex workers.[9] There is an active international community advocating for sex workers rights with the core tenet that sex work is work and the health, safety and human rights of sex workers must be acknowledged and respected the same as workers in any other occupation.[12] These are the principles upheld in conducting this research.

HIV in Tanzania and the study region

Transmission of HIV in Tanzania occurs mainly through heterosexual intercourse.[13] National HIV prevalence is 5.1% among 15-49 year olds; however, by sex, HIV prevalence among women is 6.2% while it is 3.8% among men.[13] Notably higher than the national level, the Iringa region in the southwest highlands has an HIV prevalence of 9.1% and the gender disparity is even more striking.[13] In Iringa, 11% of adult women are HIV-infected compared with 6.9% of adult men.[13] Previous analysis of Demographic Health Survey (DHS) data suggest that young women, particularly those with multiple, concurrent and older sexual partners are at heightened risk for HIV infection.[14-17] Additionally, prior formative work suggests that the higher HIV prevalence and more pronounced gender disparity in HIV in the region could be partly due to its geographic location along the TanZam highway, a major transport and trucking route.[18] There is high mobility and migration in the region related to the numerous agricultural plantations located in Iringa which attract seasonal workers. These dynamics within the region create and sustain demand for sex work.[18]

FSW in Tanzania and the study region

The Tanzanian government estimates that HIV prevalence among FSW working in bars is between 32% and 50% and that among FSW working at truck stops along major highways and transport routes, the prevalence is as high as 60%.[19] A study among FSW in Mbeya, a region near Iringa which also lies along the TanZam highway, found a prevalence of 68% and an estimated annual HIV incidence of 13.9/100 person years among FSW.[20] The National AIDS Control Program's 2013 biological and behavioral survey (IBBS) conducted among FSW in 7 regions throughout Tanzania, including Iringa, estimated the population size of FSW in the seven regions at 31,434 and identified HIV prevalence to be 26.6%.[21] HIV prevalence among female sex workers in Iringa was found to be 32.9% with a population estimate of 3,000 FSW in the Iringa region.[21]

Context and setting

Tanzania's sociopolitical history is relevant to understanding this research in context. Julius Nyerere, Tanzania's first president after gaining independence in 1961, introduced socialism to the nation. His implementation of *African Socialism* was considered an extension of the traditional concept of *ujamaa* which upheld that "land was communally owned, labor was pooled, decisions were made through a participatory democracy, and the costs and benefits of cooperatives were shared equitably among participants."[22] A characteristic of *ujamaa* that had major impact on the restructuring of the country was "villagization," the consolidation of existing smaller villages to larger ones along transport corridors. Although it was abandoned in the 1970s, *ujamaa* had a lasting impact on Tanzania in that it successfully implemented a universal healthcare system with health clinics spread throughout the country and enabled every Tanzanian at that time to gain access to primary and secondary education, ultimately achieving a 91% national literacy rate.[22]

The "villagization" process in which communities came together to work towards health, shelter, education and food was the cornerstone of this very significant chapter in the nation's history. In 1973, Nyerere wrote, "if real development is to take place, the people have to be involved."[23] Tanzania's longstanding history of the involvement of communities in shaping their own conditions has not gone unnoticed in conducting this research on community-led groups. The following quote from an address Nyerere made to parliament in 1970 captures the sentiment of community solidarity during the era of *ujamaa* and serves as a reminder of what lies at the heart of traditional African society and at the core of Tanzania's transformation after independence: "Ujamaa is familyhood and an attitude of the mind that is needed to ensure people care for each other's welfare. In traditional African society, the people take care of the community and the community takes care of them, without exploiting each other."[24]

The study setting is unique and warrants brief discussion as it is also important for understanding this research in context. The TanZam highway is a major transport corridor which bifurcates Iringa. Truckers traveling the highway often spend multiple days traversing the region, thus there are guesthouses, bars, restaurants, gas stations, weigh stations and truck stops in the larger villages and small towns along the route. Many of these stops also serve as sex work venues, and truckers comprise a large portion of FSW clientele. Tea, timber, and tomato farms and plantations are scattered through the region and seasonal tomato markets line the route.

Most sex work in Iringa is venue-based, occurring at the bars, guesthouses, night clubs, marketplaces and truck stops along the highway and in the towns along the route.[18] Prior formative work with FSW in Iringa found that sex work in the region, as appears to be the case throughout Tanzania, involves women working independently from pimps, madams or other intermediaries; sex workers work for themselves, and are not required to give a percentage of their earnings to anyone else. Women working in bars have a salary but it is for their work within the bar, such as serving food and drinks to customers. FSW make their own arrangements with customers determining price, sex acts, and where and when to meet independently of the venue where they work.

Prior formative work in Iringa identified organically formed community savings groups among FSW in the region, locally called *mchezo*. Through the current study, savings group structure and operations have been clarified. A basic overview is provided here. At the start of the group's cycle, members choose a number that dictates when in the cycle they will receive the payout. Each member contributes the group's pre-specified amount of money on a regular basis and the payout of the lump sum is given to the member whose turn it is to receive the payout. The length of the cycle is determined by how many members are in the group. The amount of the regular contribution can either be determined by the collector or decided upon by the group.

Relevant literature and conceptual development

Financial security and HIV risk among FSW

FSW are an economically marginalized population, often living in poverty and balancing competing financial priorities such as food, housing, children's expenses, and medical costs. [25-28] Economic realities for FSW often include low education and lack of skills for formal employment, scarcity of jobs, and low pay, all of which leave them with few livelihood options.[29,30] FSW are often supporting children or other family members who are dependent on them, which contributes to their financial need.[31] For many women living and working near truck stops and along main transport routes, selling food and liquor and exchanging sex for money allows them a livelihood to support their family.[32] Women may count on sex work to augment other income or it may be the case that a woman performing a small number of sex acts per week can earn enough money to ensure food or other basic necessities for herself and her family.[33]

There is a growing literature indicating the importance of financial insecurity as a driver of HIV risk behaviors such as unprotected sex among FSW.[34-39] For a sex worker facing financial insecurity, factors such as higher pay for sex without a condom may impede her ability to negotiate and demand condom use to protect herself from HIV.[34,40,41] The impact of condom use on FSW earnings has been quantified in multiple and diverse settings indicating marked price differences between sex with and without a condom.[31,42-47] Higher premiums for unprotected sex are particularly compelling when additional pay can help cover basics such as food and other needs such as housing or health care for one's family, underscoring the role of financial incentives in decision-making around condom use for economically vulnerable FSW.

Numerous studies indicate that financial insecurity places sex workers in a position of limited power to negotiate condom use and to refuse unsafe sex with clients. Studies in Vietnam, India and the Philippines show that the need to make more money and being in debt are factors related to not negotiating condom use and that sex workers who reported having debt or other economic hardships were more likely to report unsafe sex practices and have STI symptoms.[8,40,48,49] One study with female sex workers in India indicates that having another income source in addition to money earned from sex work better positions FSW to negotiate condom use potentially because refusing unsafe sex would not result in economically distressing consequences for them.[50] A study among FSW in Mongolia found that women's power to negotiate condom use was inhibited by the fact that sex work constituted the majority of the women's income and over half of the women were offered more money for sex without a condom half or more than half of the time.[34] In a study among FSW in Swaziland, over half of the women indicated that condom negotiation was somewhat or very difficult in the case that the client provided regular economic support and when the client offered more money for sex without a condom.[51]

Structural interventions

Early interventions among FSW focused on individual behavior change involving peer education, condom promotion and provision of sexual health services.[52,53] However, as it became more widely recognized that structural factors presented barriers to an individual's ability to adopt HIV preventive behaviors and thus hampered the ability of individual-level prevention efforts to succeed,[54] interventions were developed to address underlying drivers of HIV transmission.[55] The next generation of interventions utilize structural approaches that attempt to alter social, economic, political and environmental factors that influence HIV risk and vulnerability.[54] Structural interventions focus on factors including violence, stigma, gender inequality, and economic vulnerability in the lives of women engaging in sex work. A recent review paper on such programs highlights multipronged structural interventions as critical to HIV prevention efforts with this population.[9]

Community empowerment among FSW

Community empowerment-based approaches that are designed, implemented, and led by sex workers are now recognized as having a vital role in HIV prevention efforts with FSW.[56] Community empowerment (CE) approaches recognize sex work as a legitimate occupation and aim to ensure the health and human rights of sex workers rather than trying to rescue or rehabilitate them from this work.[57] With a focus on the broader context of social and structural barriers, a community empowerment (CE) framework is one in which the community takes collective ownership of strategies to address structural barriers to their health and human rights.[57] A recent systematic review and meta-analysis of the effectiveness of community empowerment approaches addressing HIV among sex workers found that these approaches were significantly associated with reductions in HIV and increases in consistent condom use with clients.[5] CE approaches focus on reducing HIV vulnerability for sex workers by confronting the social and structural barriers they face to engaging in protective sexual behaviors. The literature indicates that CE programs promote solidarity, social cohesion, mutual trust, and collective identity, which serve as mechanisms through which individual and collective empowerment are achieved.[58-62] The ultimate goal of CE is to empower FSW to gain voice and visibility outside of the sex worker community, partnering with other actors and groups to gain access to resources and address the structural barriers that contribute to their HIV risk and vulnerability.[57]

Economic empowerment among FSW

Economic empowerment approaches are structural interventions that attempt to address the economic conditions of sex workers' lives that contribute to HIV risk. These interventions acknowledge the role of economic vulnerability in the lives of FSW and its impact on sexual decision-making and aim to promote financial security thereby reducing vulnerability to unprotected sex with clients. Strategies for increasing financial security can include microfinance, microenterprise, collective banking, group lending, income generating activities, seeking additional or alternative income and focusing on savings and money management. Which of these strategies an intervention focuses on reflects a fundamentally different understanding of and approach to economic empowerment of FSW. Focusing on the role of savings and money management can promote financial security without intervening on a woman's decision to engage in sex work. Focusing on securing alternative income can be conflated with efforts to rehabilitate or rescue women from sex work. It is critical to note here that this is not the lens through which economic empowerment of sex workers is viewed in this study; having women leave sex work is not necessary to improve economic conditions but rather increasing financial security with the income they have from sex work is central.

There is a vast literature on microfinance including microcredit and microenterprise that will not be reviewed here as it is less relevant to the unique characteristics of the economic empowerment strategy being explored in this study - community savings groups. The savings groups that are the subject of this research are organically formed and peer-run which have unique implications for their sustainability and functioning. Sex worker-led peer groups have been recognized as an effective community mobilization strategy to empower women.[63] Organizing into peer groups allows FSW to collectively challenge structural barriers contributing to their vulnerability to HIV/STI, including stigma, discrimination, violence, and social inequality.[58,64] Situating economic interventions within community empowerment-based approaches allows for these efforts to occur within the context of socially cohesive FSW communities taking collective action to confront the economic barriers they face rather than programs focused on increasing individual income alone.

Durbar (a.k.a., the Sonagachi Project) in Kolkata, India was among the first community empowerment-based programs to demonstrate the impact of a peer-run savings and lending cooperative on addressing economic vulnerabilities of FSW.[58,65] Usha Multi-purpose Cooperative Society, the program's cooperative bank, began providing access to safe and secure savings for FSW by utilizing sex worker "field tellers" who went from house to house in their community encouraging their peers to start a savings plan and made regular follow-up visits to collect deposits and report account balances to the women.[58] In their efforts to establish USHA as a registered savings and lending cooperative, FSW in Kolkata's red-light district faced significant push back from government officials refusing to permit a sex worker group to form a cooperative on the grounds of a "morality" clause. The women began a lobbying and advocacy campaign to garner support for their cooperative and succeeded in getting the controversial clause abolished and becoming the first formally recognized cooperative of sex workers in India. In the process, sex work became formally acknowledged by the State as an occupation, the sex worker community gained voice and presence in the political, social and business sectors, and social norms and perceptions of sex work were changed.[66] Durbar successfully redefined the status of the sex worker community "from socially and economically excluded to an empowered workforce."[65]

The program was shown to reduce the economic vulnerability that affects FSW condom negotiating capacities with clients by increasing savings among the women.[38,58] In addition to reporting increases in consistent condom use and reductions in HIV prevalence among brothel-based FSW,[67-69] Durbar demonstrated increased collective agency and improved economic status among program participants.[58,64] Durbar and the Usha cooperative model demonstrate how economic empowerment within a community empowerment framework can occur within the context of forming social cohesion among FSW communities and can allow FSW to address economic issues alongside and as part of empowerment strategies to address other structural vulnerabilities.

Programs within the Avahan Initiative, also employing a community empowerment-based approach and operating in multiple states throughout India, offer savings and credit mechanisms to FSW specifically aimed at enhancing financial security in the community.[70,71] Studies of these projects have identified associations between community mobilization, reported levels of individual and collective empowerment and improved health, social and economic outcomes.[60,63,71] As part of Avahan, through the Karnataka Health Promotion Trust (KHPT), FSW have come together as members of cooperative bank structures and studies have shown that FSW participating in the savings activities were more likely to report condom use at last sex with client than their peers not engaged in savings groups.[71] Within Africa, Nikat in Ethiopia and Survivor in Kenya are two programs that model community-led efforts to improve financial security of FSW through peer-run savings and loans mechanisms to securely save money and have access to loans for emergency funds.[72] Evaluation of these programs is needed to understand more about their impact on the communities of FSW they serve. Studies on these programs would help fill the major gap in research examining the potential of such groups in sub-Saharan Africa.

Though not entirely peer-run, a trial assessing the impact of a savings-focused microfinance intervention coupled with an HIV prevention component informed by and developed for FSW in Mongolia found that women receiving the savings component reported reduced numbers of clients and were more likely to report consistent condom use with clients at follow-up than those receiving the HIV prevention component alone. [73] A study in Kenya assessing individual-level effects of an intervention adding promotion of savings to HIV prevention components for FSW revealed that close to half of the women reported having stopped sex work, the weekly mean number of regular partners decreased significantly over the follow-up period and self-reported condom use with all regular partners increased from baseline to study end.[35] Though this study included promotion of a savings culture among FSW, it provides an example of an approach to economic empowerment of FSW focused on increasing individual financial security rather than promoting financial security of the community. It also placed focus on leaving sex work, whereas Durbar and KHPT emphasized money management of income earned from sex work. Contrasting these interventions illustrates the fundamental differences in these approaches.

While a handful of programs provide useful models and encouraging results, other examples of interventions aimed at improving economic conditions through a CE approach and further evaluation of these programs are needed, particularly in the context of sub-Saharan Africa. Several recent publications have indicated the need to further integrate economic interventions that promote the financial security of FSW within the context of community empowerment initiatives.[35,41,45,51,58,74] Local sex workers in Iringa[15] as well as sex worker advocates working globally[75] have identified the need to better understand the complexities of economic factors and HIV risk for FSW. The Global Network of Sex Worker Projects (NSWP) and other sex worker advocacy groups have called for a research focus employing an economics perspective to HIV prevention with sex workers. The sex worker community has voiced the need for programmatic focus to include addressing the role of economic factors in the context of sex work.[75] This research intends to respond to that call.

Social and economic exclusion

This research is situated within the theoretical orientation of social and economic exclusion. Social exclusion has to do with lack of opportunities, isolation, discrimination, and marginalization from decision-making,[76] while economic exclusion can be broadly defined as "non-participation in or blocked access to the labor market, public services, finance, and the housing, educational and health sector."[77] It relates to an individual lacking capacity to purchase goods and services, to generate income and savings, and to participate in economic activities through the labor market.[77] Beyond an individual not having sufficient material resources, economic exclusion entails being outside of a group that has access to resources. Economic exclusion is a group-level phenomenon that can be understood as a form of discrimination based on group or non-group status and can be applied to any vulnerable or marginalized group in society.[77]

FSW face multiple and multifaceted forms of stigma and discrimination as women, as sex workers, in some cases as poor members of society and in other cases as persons at risk for or living with HIV. Their marginalized and stigmatized social status coupled with low education and literacy levels present significant barriers to their ability to access traditional banking services, economic activities and the labor market. They are often excluded from educational opportunities, job opportunities, and traditional financial institutions.[78] In the case of a marginalized group like sex workers, social and economic exclusion interact limiting their access to critical resources necessary to protect their health. Specifically in the case of HIV among FSW, economic exclusion plays into financial security and vulnerability to HIV infection. From this orientation, community empowerment and economic empowerment within that process introduce promising strategies for overcoming the complex interaction between social and economic exclusion that FSW face.

Empowerment theory

At the root of strategies to achieve social and economic inclusion for marginalized groups is empowerment theory which focuses on enhancing individual and collective agency and seeking to alter power relations between marginalized and dominant groups in society.[79-81] Through the community empowerment process, FSW gain collective agency to effectively address power imbalances and the social and structural sources of their HIV vulnerability.[60,62,79,80,82,83] As demonstrated by the USHA cooperative, membership in collectives and groups can foster development of social capital for FSW, helping them create a bridge from their status as an excluded group to the broader community where they can partner with allies and groups to collaboratively address their exclusion. Empowerment strategies that politicize the actions of sex workers advocating for their rights, as modeled by USHA, help FSW gain visibility outside their own community. This process reframes others perceptions of FSW and transforms FSW self-perceptions as a disadvantaged groups who may be "habituated to inequality" and "unaware of possibilities of social change."[80]

Structure and agency

Discussion of sex workers' economic vulnerability to HIV in this study is situated within the theoretical framing of structure and agency. Sociologist Anthony Giddens offers an account of the interplay between individual agency and social structures which recognizes that people are purposive actors making decision in their lives but that their actions are embedded in the context of the social structures that constrain them.[84] Through this lens, we recognize the role of contextual factors of sex workers' lived experiences and the critical role structure plays in determining their health choices.[85] The context in which sex work occurs is shaped by the socioeconomic status of sex workers and the socially ingrained patriarchal power relationships which constrain FSW ability to negotiate safer sex practices.[86] Giddens' structuration theory proposes a duality in which an individual's agency is influenced by structure and at the same time structures are maintained and adapted through the exercise of agency.[84] In this paradigm, agents can modify social structures by acting outside the constraints structures place on them. When FSW gain agency, they are empowered to act independently, to make strategic choices that affect their lives and work and ultimately, in doing so, are able to intervene on the norms and structures inhibiting their ability to protect themselves from HIV. This research explored the potential of community savings groups among FSW to reshape structure and agency. By exercising agency in creating a financial institution, FSW can transform the systems that economically marginalize and oppress them. In turn, by reshaping structure, FSW opportunities and agency to think and act autonomously are transformed.

Conceptual framework

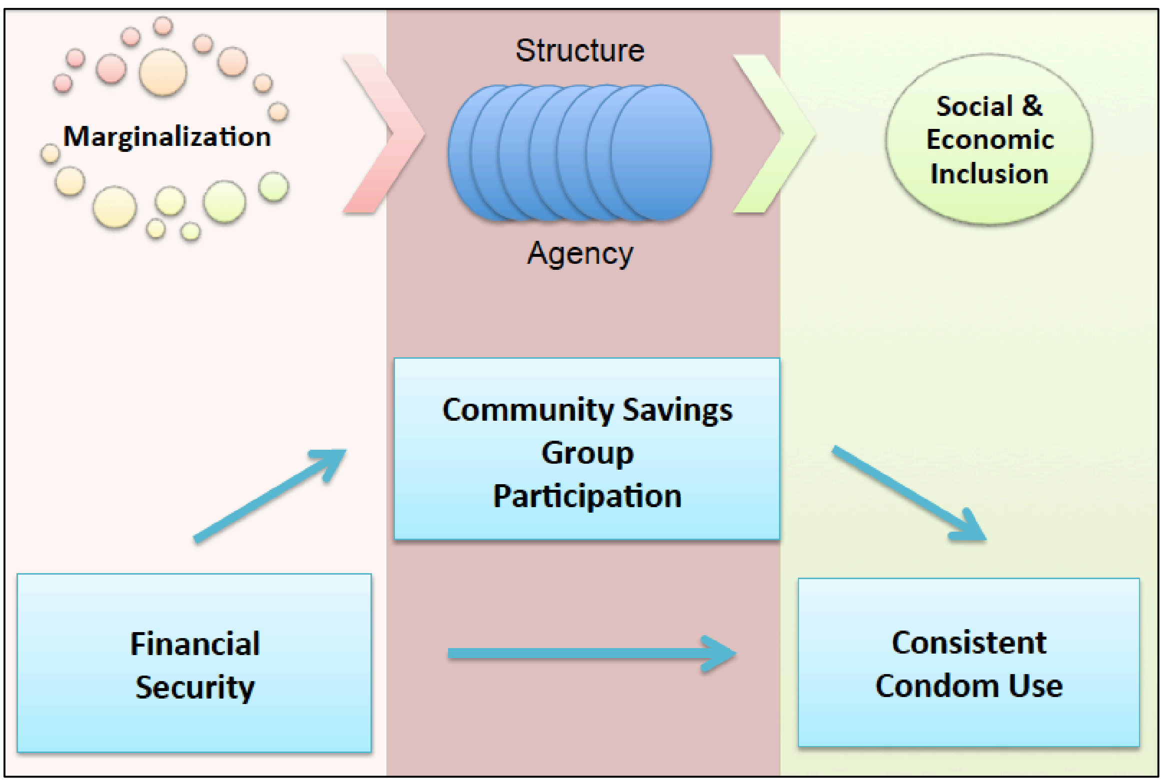

Figure 1. Conceptual Framework

The conceptual framework used in this study was developed by the student researcher to visually depict both the operational and theoretical relationships and processes explored through this research. At an operational level, the blue boxes and arrows represent the hypotheses explored in aim 1. Based on the literature, financial security and community savings groups were hypothesized to be positively associated with consistent condom use among FSW and it was hypothesized that community savings group participation would have a mediating role in the relationship between financial security and consistent condom use.

The operational framework is situated within a larger theoretical framing of the social systems and processes hypothesized to be at play and which are explored through aims 2 and 3. In the panel on the left side of the framework, financial security is situated within the context of the multiple sources of marginalization FSW face - as women within a social system rooted in patriarchal gender norms, as sex workers experiencing identity-based stigma and discrimination, and as a socially and economically excluded group within society with limited access to financial systems and social entitlements. For FSW, economic exclusion plays into their financial insecurity and vulnerability to HIV infection. For FSW as a marginalized group, the interaction of social and economic exclusion limits their access to resources necessary to protect their health and undermines their ability to engage in HIV protective behaviors.

The middle panel represents the potential community savings groups hold for reshaping structure and agency as addressed in aim 2. Informed by Giddens' theory of structuration and the duality of structure he proposes in which agency impacts structure while structure simultaneously impacts agency, this middle panel frames the hypothesized processes taking places through community savings group participation among FSW in Iringa. The blue circles are intended to represent the mutually dependent and internally related concepts of structure and agency as occurring through space and time. For a group whose ability to exercise meaningful choices is confined by the structural context of their marginalized status, developing agency allows FSW to act against the status quo and begin to reshape the very structures that constrain them. When FSW gain agency, they are empowered to act independently, to make strategic choices that affect their lives and work and ultimately, in doing so, are able to intervene on the norms and structures inhibiting their ability to protect themselves from HIV. By exercising agency in creating informal financial institutions, FSW can transform the systems that economically marginalize and oppress them. In turn, by reshaping structure, FSW opportunities and agency to think and act autonomously are transformed.

Thinking practically about where community savings groups fit within HIV prevention efforts to serve as an economic empowerment strategy among FSW, this research proposes they are most appropriately situated within a community empowerment approach. The literature indicates that community empowerment-based approaches foster social cohesion and promote collective action. The ultimate goal of community empowerment is for FSW to gain voice and visibility outside of the sex worker community, partnering with other actors and groups to gain access to resources and address the structural barriers that contribute to their HIV risk and vulnerability. Through this process FSW can work towards social and economic inclusion. This is explored in aim 3 examining the community-level impact of the groups and both the development of community empowerment and the readiness of the groups to take collective action for social change. The panel on the right side of the framework in which consistent condom use is situated represents the FSW community achieving social and economic inclusion. In doing so, FSW are able to address the socio-structural factors impeding their ability to engage in HIV protective behaviors within and alongside addressing other structural vulnerabilities FSW face.

This theoretical approach is relevant to the conceptualization of public health programming. Public health intends to help people use condoms and works to convince people to protect themselves however people's intentions are based on the goals that resonate with their lived experiences and needs. In forming community savings groups, FSW in Iringa are trying to build financial security and create economic stability for themselves and have exercised agency to reshape the structures that constrain them. Their increased agency around HIV decision-making is a result and additional benefit of that process. The savings groups explored in this study underscore the need for the process of embracing protective behaviors to be stimulated and supported by people and driven by their intentions to have their identified needs met. This requires a paradigm shift for public health programs to recognize that individuals know what can work best for them to improve their conditions and lives. With this framing, the role of public health should be to support them in their efforts and the adoption of protective behaviors will follow.

Methods

This research study is nested within Project Shikamana, an NIH-funded study of community-based combination HIV prevention among Tanzanian women at heightened risk (PI: Deanna Kerrigan). The main research question this study sought to answer was what role community savings groups have in addressing financial security and HIV risk among female sex workers (FSW) in Iringa, Tanzania. This question was addressed through three manuscripts with the following aims:

Aim 1: To assess the relationship between community savings group participation and consistent condom use with clients among FSW

Aim 2: To qualitatively explore the meaning and importance of community savings group participation in the lives of FSW and how they may influence their financial security and sexual risk decision-making with clients

Aim 3: To qualitatively explore how community savings groups may influence social components of the FSW community and fit within community empowerment approaches to HIV prevention among FSW

This dissertation employed both quantitative and qualitative methods carried out in stages to address these aims. The rationale for the study design was to use quantitative methods to determine a statistical association between the relationships of interest followed by qualitative methods to provide nuanced information to understand the trends and associations identified. Quantitative analysis would first be conducted using baseline data from the Project Shikamana cohort to determine an association between financial security and savings group participation and consistent condom use (manuscript 1). If this was established, the intention was to use qualitative data including in-depth interviews, focus group discussions and key informant interviews to provide insights and a nuanced understanding of the context and individual experiences that could help explain the quantitative findings (manuscript 2). Further analysis of the qualitative data would then be conducted to improve our understanding of how community savings groups operate, influence the sex worker community, and what implications they have for future program design (manuscript 3).

Project Shikamana overview

Project Shikamana ("Stick Together") is a 3-year Phase II trial of a community-based model of combination HIV prevention among FSW. The longitudinal two-arm community randomized controlled trial aims to determine the initial effects of a multi-component intervention on HIV incidence and treatment outcomes and assess its feasibility, safety and acceptance. The combination intervention model includes biomedical, behavioral, and structural elements and employs a community-based approach placing the FSW community in a leadership role to help tailor, implement, and evaluate the intervention.

The two study communities were randomized to receive either the intervention or the standard of care prior to the baseline assessment. The sample included half HIV-uninfected and half HIV-infected FSW consistent with the goals of combination prevention that aim to prevent acquisition among those uninfected and minimize forward transmission among those infected. Participants were screened for HIV (viral load was assessed as relevant) and surveyed at baseline and will be screened and surveyed again at a 12 months follow-up visit. The intervention components include: (1) venue based peer education and condom distribution; (2) venue based HIV counseling & testing; (3) peer service navigation to facilitate access to HIV treatment; (4) SMS text message reminders to promote ART adherence; (5) sensitivity training of HIV service providers; and (6) a community-led drop-in-center to promote a sense of internal social cohesion and stimulate collective action and mobilization to reduce stigma and discrimination towards FSW by the larger community.

Quantitative research methods

Characteristics of the quantitative study sample

The Shikamana cohort consists of 496 female sex workers, recruited from sex work venues in two towns in the Iringa region of Tanzania. The two study communities of Ilula and Mafinga are located along the TanZam highway and were matched on demographics and HIV risk. Both towns have approximately 25,000 people with similar age distribution and sex ratio statistics. HIV prevalence in the general population of these communities is estimated to be 7% based on the most recent HIV surveillance data available from women in antenatal care at the district hospitals. Eligibility criteria included being 18 years or older, having exchanged sex for money in the last 30 days, and working at a sex work venue in one of the two study communities. Exclusion criteria included being unable to provide informed consent and/or having a notable psychiatric condition. The sample included both HIV-uninfected (n=293) and HIV-infected (n=203) FSW.

Participant recruitment/sampling

FSW were recruited from venues where sex work is known to occur using Time Location Sampling (TLS) method in an effort to obtain a representative sample. This methodology is frequently used to approximate probability sampling with hard-to-reach populations. TLS approximates probability sampling by generating a Universe of Venues, which contains all possible locations where the target population can be reached and specifies 3-hours blocks of time that constitute venue-day-time (VDT) sampling units for each location. Within this comprehensive frame, venues and VDTs are selected randomly for each month of recruitment. Since different women may work in different establishments, on different days of the week and at different hours in the day, the intention is to sample across all days and hours. The venues were identified by the study team's previous work in which they mapped all active sex work venues in the two study communities including modern bars, local bars (vilabu), guesthouses, groceries/mini-bars/pubs, and dance clubs. The study team conducted venue assessments to document estimated number of sex workers onsite, availability of condoms, availability of private space in which study visits can be conducted and in order to consent the owner or manager of the establishment to be a site where study participants can be enrolled and surveyed. Surveys took place at or near the venue where the participant worked or the study offices. Survey data was captured electronically with tablet computers using computer-assisted personal interviewing software. After survey completion and blood draw, participants were compensated for their time in the amount of 5,000 Tanzania Shillings ($2.50 USD).

Quantitative measurement

Demographic and sex work variables

Due to non-normal distribution of the data, dichotomous variables were created, using the median, for age, education (no schooling or some primary school versus some secondary school or higher) and marital status (married versus not married). Living situation was assessed by asking participants to report with whom they lived. Length of time in sex work was calculated by subtracting the age when first engaged in sex work from the respondent's age at the time of the survey. Participants were asked to report the type of establishment where they work, the number of sex work clients they had in the past week, and the average pay they received per sexual encounter with a client. Participant's recruitment community was also included. HIV status was determined through serological testing including parallel rapid HIV-1 antibody tests (Determine and Unigold), followed by ELISA in the case of discordant results.

Consistent condom use

The primary outcome measure was consistent condom use (CCU) in the last 30 days assessed by asking about CCU with new clients, regular clients and steady non-paying partners, respectively. Participants were asked if they had always, almost always, sometimes, almost never, or never used a condom during vaginal sex in the last 30 days with each partner type. This variable was then dichotomized into consistent (always) and non-consistent (less than always) condom use for each partner type. New clients were defined as clients the respondent had sex with only once or twice in her life, regular clients were defined as those whom she had sex with at least three times in her life and who pay her for sex, and steady non-paying partners were defined as partners she had sex with at least three times in her life and who do not pay her for sex acts.

Financial indicators

Community savings group participation was the primary independent variable of interest based on the study hypothesis that participating in a savings group may have a protective effect on HIV risk behaviors and was assessed by a survey question asking participants if they currently participated in *mchezo*, the local word used for the savings groups. Financial indicators were chosen for inclusion in analysis as independent variables based on existing literature and conceptual relevance. Monthly total income and monthly sex work income were each dichotomized using the median as the cut-point to create higher and lower income groups for analysis. Percentage of income from sex work was created by dividing sex work income by total income and multiplying by 100 and was then dichotomized at the median. Other financial indicators included in analysis were: having dependents she financially supports and having someone to help her cover basic needs at times when her income was not enough. Having experienced household food insecurity in the past 30 days was assessed by asking participants four questions from the Household Food Insecurity Access Scale (HFIAS) and summing a composite score that was then dichotomized into having answered yes to any question reflecting food insecurity in the last 30 days versus not having answered yes to any of them.[87] Saving any amount of money on a monthly basis and participants' self-perceived financial security (poor, fair, good, or very good) were also included in the analysis.

Quantitative data analysis

All statistical analysis was conducted using Stata® version 13.1.[88] Data was examined for outliers and missing values and any inconsistencies were brought to the field team for investigation to ensure integrity of the data. Exploratory data analysis was conducted to examine frequencies and percentages for the sample, specifically demographics, financial security indicators and sex work and sexual risk behavior characteristics. Chi-square tests were calculated for each association between independent variables and the outcomes.

Bivariate logistic regression was conducted to determine odds ratios and confidence intervals for each independent variable against the outcomes. Independent variables that had a p-value of <0.10 in bivariate analysis were included in multivariate logistic regression models. Multivariate analysis was conducted through an iterative backward stepwise process dropping the least significant variable with each iteration. Generalized estimating equation (GEE)[89] approach was used to adjust for intra-class correlation among venues from which participants were recruited. Akaike Information Criterion (AIC) was used to compare the nested models and determine model selection, multi-collinearity was assessed by examining variance inflation factors (VIFs) of the predictor variables, and a Hosmer-Lemeshow goodness of fit test was conducted on the final model.

Baron and Kenny's multiple regression mediation methods[90] were used to conduct mediation analysis to explore the hypothesized mediating role of savings group participation in the association between financial security and CCU. A Sobel-Goodman test was conducted to determine whether and by how much savings group influenced the relationship between financial security and CCU. A likelihood ratio test was used to compare the goodness of fit of the two models – the null including financial security and CCU versus the alternative including financial security, CCU, and group participation. Moderation was also tested by creating an interaction term to assess any effect modification group participation may have on the relationship between financial security and CCU.

Qualitative research methods

Characteristics of the qualitative study sample

The qualitative sample used to address aims 2 and 3 of this study included 27 in-depth interviews (IDIs) with 15 FSW, 4 focus group discussions (FGDs) with 35 FSW in the Iringa region, and 10 key informant interviews (KII) with group collectors.

Women participating in savings groups were recruited using purposive sampling with attention to recruiting a diverse sample with regards to age and HIV status. Women who reported participating in a community savings group in a previous research project conducted by the study team were first recruited into the study to participate in IDIs. Then, using snowball sampling, participants were asked to recommend other sex workers that they know who also participated in savings groups for IDIs or, later in the study, for FGDs once all interviews were complete. Group collectors were recruited to participate in KIIs by asking women who participated in the FGDs to refer their group collectors to the study.

IDI and FGD participants ranged from 20-45 years old, with a mean age of 28.7 years. Among the sample, 80% (40/50) of the women were single, 9 women were married or reported a permanent partner and 1 woman was a widow. Nearly all (90%) of participants had children and over half (56%) had 2 or more. Education levels were low with 38% (19/50) having some secondary school, 60% (30/50) having primary-level education and 1 individual had no schooling. Of the 15 FSW who participated in IDIs, 11 of them were HIV-infected. HIV status of FGD participants was not collected to maintain confidentiality for those not wanting to disclose their status to the group. The 10 group collectors who participated in KII ranged in age from 22-32 years old, with a mean age of 27.6 years. Eight of the collectors had primary level education and 2 had some secondary schooling.

Qualitative data collection

Of the 15 FSW who initially participated in an IDI, 12 completed a follow-up interview 8-12 weeks later. The second interview provided an opportunity to revisit some of the topics discussed with the hope that existing rapport with the interviewer would facilitate further depth of information, particularly around sensitive topics such as sex work and personal finances. Interviews took place at or near the study participant’s work or home, based on her preference, and lasted approximately one hour. A semi-structured interview guide was used to gather information on key domains within financial security and participation in community savings groups.

Four FGDs were conducted with 35 FSW who participated in community savings groups. FGDs were intended to facilitate an understanding of norms, expectations and local construction of the concepts of interest in the study.[91,92] Exploring similar topics covered in the interviews with individuals, the group setting provided the opportunity to discover how FSW think and talk about these issues and offer insight into their shared understanding of their lives, culture, and world.[92] FGDs took place at centrally located meeting spaces that had a confidential area for group dialogue. Each group had between 7-11 women and lasted approximately 90 minutes. A focus group discussion guide was developed outlining key domains but the facilitator was encouraged to probe and explore related topics and experiences.

Ten women who serve as community savings group collectors were recruited to participate in KIIs by asking women who participated in the FGDs to refer their group collectors to the study. The intention of conducting interviews with women in a leadership role was to clarify operational aspects of the groups and obtain the perspectives of women who are more intimately involved in setting and managing group rules, dynamics, and challenges. An interview guide was developed to elicit responses to general questions about operations while allowing for the participant to also provide their perspective on the meaning and importance of the groups.

Debriefing sessions were conducted following each of the interviews and focus group discussions. These sessions facilitated an iterative process of data collection and analysis and provided guidance for topics to explore further in the follow-up interview with each participant and in subsequent FGDs. All data collection was conducted in Swahili by a local study staff member trained in qualitative research methods who had experience working with the FSW population in Iringa. All interviews and focus groups were audio recorded, transcribed, and translated into English. Oral informed consent was obtained from all women in the study. Upon session completion, participants were compensated 5,000 Tanzania Shillings ($2.50 USD) for their time.

Qualitative data analysis

Qualitative analysis was conducted using an iterative thematic analysis approach both drawing on *a priori* codes and allowing for emergent codes and themes.[93,94] Memos were developed from multiple readings of each transcript to assist in development of salient themes and used throughout data collection to document thoughts about the significance and relationships of codes to one another and note questions that arose from the coding process.[95] A codebook was developed based on the themes emerging from the data. Coding output was synthesized across key domains, categories were identified and codes were arranged hierarchically with sub-codes listed under major categories.

Analysis of the transcripts varied by method. IDIs were analyzed in the tradition of a narrative approach, placing value on the women's story telling of their lives in sex work and their financial realities, using this method as an opportunity to reveal cultural and social patterns through the lens of individual experiences.[94] Throughout analysis of the IDIs, attention was paid to age and HIV status in order to allow for emergent themes relating to a life course perspective (i.e. decreasing sex work income with increasing age) as well as how financial security and savings group participation may play out differently for HIV infected women (i.e. having resources to pay transport costs for HIV-related clinic visits). FGDs were analyzed as a collective dialogue in which the group itself was the unit of analysis and the group dynamics and interpretations and meaning of what participants shared was understood in the context of the larger group. Analysis focused on interpreting a collective view of participants' understanding of the world rather than treating them as a compilation of the views of different participants in the group.[92] Analysis of KIIs included coding for operational codes to identify key components and functions of the groups. All interview and focus group transcripts were coded using ATLAS.ti qualitative data management and analysis software.[96]

The student investigator spent a total of 13 weeks in Iringa over the course of 3 trips which afforded her the opportunity to conduct site observations at sex work venues, train the qualitative interviewer and provide oversight during piloting, observe 2 focus groups, and participate in on-sight debriefings of the first 5 IDIs with FSW and the first 5 KIIs with collectors.

Ethical considerations and protection of human subjects

This study received human subjects research approval from the Institutional Review Boards of the Johns Hopkins University Bloomberg School of Public Health, the

Muhimbili University of Health and Allied Sciences Directorate of Research and Publications, and the National Institute for Medical Research of Tanzania.

Issues around informed consent warrant special considerations in this study given the marginalized population participating in this research. Prior to conducting any study activities, staff read the consent form aloud to the participants and asked participants to summarize the study and explain the reasons why they wanted to participate to ensure a high level of understanding among individuals consenting to participate. The interviewers obtained oral informed consent from each study participant. Oral informed consent, rather than written consent, was obtained in an effort to protect confidentiality given that documenting signatures of study participants among this population can be off-putting and create additional possible risk for them. In lieu of participant signature, study staff signed the consent form documenting that oral consent was obtained. Research staff was trained extensively on the importance of ensuring the potential participant understood the material covered in the consent form and was capable of providing voluntary informed consent. Individuals were provided with a copy of their consent form if desired along with information on how to contact study staff to report adverse events associated with their participation in the research. All study personnel completed training in the ethical conduct of human subject research prior to participating in any research activities. To maintain participant confidentiality, only a coded participant ID number was used on all study data, laboratory specimens and forms. Access to all study databases was password protected and all data collection instruments, and sensitive study documents were stored in locked file cabinets.

As described, participant recruitment for IDIs was done with consideration to diversity in ages in the sample as well as a balance between women at risk of HIV and women living with HIV. Using snowball sampling, the interviewer asked women to recommend other women either like themselves or different with regard to HIV status and age in an effort to maintain that balance. The interviewer was trained on the importance of HIV status not serving as eligibility criteria but rather something to be conscious of during the recruitment and sampling process to try to achieve this balance.

The nature of Project Shikamana as a community-randomized trial involves one community receiving significantly more services than the other. The community randomized to receive standard of care services is receiving fixed or clinic-based HIV testing and counseling services while the intervention community receives the various services provided as part of the combination HIV prevention intervention. No prior study has established the effectiveness of such an intervention among FSW on HIV incidence in sub-Saharan Africa, the 3-year community randomized trial aims to determine its efficacy. If successful, this would benefit the FSW community at large and services could be expanded to the control community and surrounding area as part of a larger, future phase III trial or through programmatic efforts with organizational partners. This work explored where and how economic strengthening efforts may fit within future community-based approaches to address HIV among FSW in Iringa and beyond.

Paper 1: Financial security, community savings groups and HIV risk among female sex workers in Iringa, Tanzania

Abstract

This study assessed the association between community savings group participation and consistent condom use (CCU) with clients among female sex workers (FSW) in Iringa, Tanzania. Using data from a survey of venue-based FSW (n=496), logistic regression was used to examine the associations between financial indicators including savings group participation and CCU with clients. Multivariate results indicated that participating in a savings group was significantly associated with CCU with new clients in the last 30 days while controlling for other characteristics (aOR: 1.80; 95% CI: 1.08, 2.97). Mediation analysis suggested that savings group participation may partially mediate the relationship between financial security (i.e., monthly income) and CCU with new clients. Findings suggest that participating in community savings groups may play an important role in sexual risk behaviors between FSW and their clients and that community savings groups hold promise as part of comprehensive, rights-based HIV prevention strategies among FSW.

Background

Female sex workers (FSW) bear a disproportionately high burden of disease in the global distribution of HIV. FSW are globally estimated to have 13.5 times greater odds of having HIV than other adult women.[1] Sub-Saharan African countries have significantly higher HIV prevalence among FSW than other geographic regions, with an estimated pooled prevalence of 29.3%.[2] Iringa, Tanzania is a region characterized by high levels of trade, transport and migration of seasonal workers, dynamics that create and sustain demand for sex work.[3] Sex work in Iringa occurs mostly in venues such as bars, guesthouses and truck stops along the major transport and trucking route that traverses the region. HIV prevalence among FSW in Iringa is estimated to be 32.9%.[4]

There is a growing literature indicating the importance of financial insecurity as a driver of HIV risk behaviors such as unprotected sex among FSW.[5-10] For a sex worker facing financial insecurity, factors such as higher pay for sex without a condom may impede her ability to negotiate and demand condom use to protect herself from HIV.[5,11,12] The impact of condom use on FSW earnings has been quantified in multiple and diverse settings indicating marked price differences between sex with and without a condom.[13-19] Higher premiums for unprotected sex are particularly compelling when additional pay can help cover basic needs such as food and other needs such as housing or health care for one's family, underscoring the role of financial incentive in decision-making around condom use for economically vulnerable FSW.

Structural interventions such as microfinance programs have attempted to address the economic vulnerability that affects FSW condom negotiating capacities with clients,[20] however thus far these strategies have shown mixed results.[21,22] The more promising findings are from programs that have implemented economic interventions such as cooperative banking and group lending within the context of a broader community empowerment (CE) approach – one in which the community takes collective ownership of strategies to address structural barriers to their health.[23] Durbar (a.k.a., the Sonagachi

Project), a community empowerment program in Kolkata, India, operates a peer-run cooperative bank which has increased savings and reduced economic vulnerability and has reported reductions in HIV prevalence among brothel-based FSW.[24-27] The Avahan Initiative, operating through programs in multiple states throughout India, offers savings and credit mechanisms to FSW specifically aimed at enhancing financial security in the community and has shown that FSW participating in the savings activities are more likely to engage in condom use with clients.[28,29] Within Africa, the Survivor program in Kenya and Nikat in Ethiopia operate peer-run savings and loans mechanisms allowing FSW to securely save money and have access to loans for emergency funds.[30] Though not an entirely peer-run CE approach, a savings-focused microfinance intervention informed by and developed for FSW in Mongolia demonstrated that women receiving the savings component were more likely to report consistent condom use with clients at follow-up than those receiving the HIV prevention component alone.[31] While the literature provides models from a handful of settings, other examples and further evaluation of interventions aimed at improving the financial security of FSW are needed, particularly in the context of sub-Saharan Africa.

Prior formative work conducted in Iringa revealed organically formed community savings groups (locally called *mchezo*) among FSW. Similar to group lending strategies and informal local savings cooperatives seen in other parts of the world, the members of the community savings groups in Iringa regularly contribute a set amount and receive the lump sum of the members' contributions in a rotating payout. These groups may increase savings and potentially better position FSW to refuse unsafe sex and negotiate condom use. This study sought to assess the association between community savings group participation and consistent condom use with clients among a cohort of venue-based female sex workers in Iringa, Tanzania.

Methods

Study sample and recruitment

This analysis utilized baseline survey data from Project Shikamana, a Phase II community-based combination HIV prevention trial being conducted in Iringa. The study enrolled venue-based female sex workers who were consented, tested for HIV, and completed an interviewer-administered baseline survey. Eligibility criteria for the study included being 18 years or older, having exchanged sex for money in the last 30 days, and working at a sex work venue in one of the two study communities. The study communities were matched on demographics and HIV prevalence among the general population. The sample (n=496) recruited from the two communities included both HIV-uninfected (n=293) and HIV-infected (n=203) FSW. FSW were recruited from venues using venue-day-time (VDT) sampling in an effort to obtain a representative sample.

Measures

Demographic and sex work variables

Due to non-normal distribution of the data, dichotomous variables were created, using the median, for age, education (no schooling or some primary school versus some secondary school or higher) and marital status (married versus not married). Living situation was assessed by asking participants to report with whom they lived. Length of time in sex work was calculated by subtracting the age when first engaged in sex work from the respondent's age at the time of the survey. Participants were asked to report the type of establishment where they work, the number of sex work clients they had in the past week, and the average pay they received per sexual encounter with a client. Participant's recruitment community was also included. HIV status was determined through serological testing including parallel rapid HIV-1 antibody tests (Determine and Unigold), followed by ELISA in the case of discordant results.

Consistent condom use

The primary outcome measure was consistent condom use (CCU) in the last 30 days assessed by asking about CCU with new clients, regular clients and steady non-paying partners, respectively. Participants were asked if they had always, almost always, sometimes, almost never, or never used a condom during vaginal sex in the last 30 days with each partner type. This variable was then dichotomized into consistent (always) and non-consistent (less than always) condom use for each partner type. New clients were defined as clients the respondent had sex with only once or twice in her life, regular clients were defined as those whom she had sex with at least three times in her life and who pay her for sex, and steady non-paying partners were defined as partners she had sex with at least three times in her life and who do not pay her for sex acts.

Financial indicators

Community savings group participation was the primary independent variable of interest based on the study hypothesis that participating in a savings group may have a protective effect on HIV risk behaviors and was assessed by a survey question asking participants if they currently participate in *mchezo*. Financial indicators were chosen for inclusion in analysis as independent variables based on existing literature and conceptual relevance.

Monthly total income and monthly sex work income were each dichotomized using the median as the cut-point to create higher and lower income groups for analysis. Percentage of income from sex work was created by dividing sex work income by total income and multiplying by 100 and was then dichotomized at the median. Other financial indicators included in analysis were: having dependents she financially supports and having someone to help her cover basic needs at times when her income was not enough. Having experienced household food insecurity in the past 30 days was assessed by asking participants four questions from the Household Food Insecurity Access Scale (HFIAS) and summing a composite score that was then dichotomized into having answered yes to any question reflecting food insecurity in the last 30 days versus not having answered yes to any of them.[32] Saving any amount of money on a monthly basis and participants' self-perceived financial security (poor, fair, good, or very good) were also included in the analysis.

Data Analysis

Data was examined for outliers and missing values and any inconsistencies were brought to the field team for investigation to ensure integrity of the data. Exploratory data analysis was conducted to examine frequencies and percentages for the sample, specifically demographics, financial security indicators and sex work and sexual risk behavior characteristics. Chi-square tests were calculated for each association between independent variables and the outcomes. Bivariate logistic regression was conducted to determine odds ratios and confidence intervals for each independent variable against the outcomes. Independent variables that had a p-value of <0.10 in bivariate analysis were included in multivariate logistic regression models. Multivariate analysis was conducted through an iterative backward stepwise process dropping the least significant variable with each iteration. Generalized estimating equation (GEE)[33] approach was used to adjust for intra-class correlation among venues from which participants were recruited. Akaike Information Criterion (AIC) was used to compare the nested models and determine model selection, multi-collinearity was assessed by examining variance inflation factors (VIFs) of the predictor variables, and a Hosmer-Lemeshow goodness of fit test was conducted on the final model. Baron and Kenny's multiple regression mediation methods[34] were used to conduct mediation analysis. A Sobel-Goodman test was conducted to test the significance of the mediation effect. All analyses were conducted using Stata® version 13.1.[35]

Ethics

This study received human subjects research approval from the Institutional Review Boards of the Johns Hopkins University Bloomberg School of Public Health, Muhimbili University of Health and Allied Sciences, and the National Institute for Medical Research of Tanzania.

Results

Demographic and sex work characteristics

Table 1 shows demographic, sex work, and financial characteristics of the study sample. The cohort had a median age of 25 years (range: 18-55) and the median number of children among the participants was 2. The majority of participants were unmarried (82.1%) and had primary level schooling or no education (71%). Roughly a quarter of the sample each lived with fellow workers (27.2%); a sexual partner or spouse (23.7%); their children, parents, extended family or others (26.4%); and alone (22.5%). A total of 203 women (40.9%) were HIV-infected. The median number of years in sex work among the sample was 5, median number of clients per week was 2, and median pay per sexual encounter was $15,000 Tanzanian shillings (approximately $7 USD). More than half of the women (60%) worked in modern or traditional bars while another 28% worked in guesthouses and the remainder worked in restaurants, hotels, other venues or independently. CCU in the past 30 days among the sample was 40.2% with new clients, 34% with regular clients, and 21.2% with steady, non-paying partners.

Financial characteristics

Median monthly income from sex work and other sources was 120,000 Tanzanian shillings (approximately $55 USD), median monthly income from sex work alone was 50,000 Tanzanian shillings (approximately $23 USD) and median percentage of income from sex work was 50%. Roughly 65% of the women reported working in a bar or kilabu (informal bar where local brew is sold) and 10% reported working as a food vendor. The majority of participants (71.2%) had one or more dependents; over one third (38.3%) reported having someone to help cover basic needs in a month when their own income was not enough and 37.3% had experienced household food insecurity in the past 30 days. Two thirds of the participants (66%) reported saving money on a monthly basis, but only 7.5% had a bank account. The majority of participants (87.7%) perceived their own financial security as fair or poor. Over one third of the sample (35.3%) participated in a community savings group.

Table 2 shows characteristics associated with participating in community savings groups. In terms of demographic characteristics, older women (OR: 1.54; 95% CI: 1.07-2.24) and married women (OR: 1.84; 1.16-2.93) were more likely to be in community savings group. We also found statistically significant associations between the following financial indicators and group participation: higher pay per sexual encounter (OR: 1.86; 95% CI: 1.27-2.72), having higher total income (OR: 2.40; 95% CI: 1.64-3.51) and higher sex work income (OR: 1.81; 95% CI: 1.24-2.74), having one or more dependents (OR: 2.03; 95% CI: 1.31-3.14), having someone who can help in a financial emergency (OR: 1.74; 95% CI: 1.19-2.53), and saving money on a monthly basis (OR: 2.07; 95% CI: 1.37-3.13).

Bivariate logistic regression results examining factors associated with CCU are shown in Table 3. Factors significantly associated with CCU with new clients in the last 30 days at $p<0.1$ significance level include higher age (OR: 0.70; 95% CI: 0.46, 1.06), longer time in sex work (OR: 0.55; 95% CI: 0.36, 0.84), higher pay per sex act (OR: 2.67; 95% CI: 1.71-4.15), higher total income (OR: 2.31; 95% CI: 1.50, 3.55), higher sex work income (OR: 2.81; 95% CI: 1.82-4.34), having dependents (OR: 2.52; 95% CI: 1.55, 4.21), saving money on a month basis (OR: 2.18; 95% CI: 1.36, 3.49), and higher self-perceived high financial security (OR: 1.71; 95% CI: 0.92, 3.19).Community savings group participation was significantly associated with CCU with new clients (OR: 2.43; 95% CI: 1.56, 3.79) and regular clients (OR: 1.65; 95% CI: 1.07, 2.54).

Findings from multivariate logistic regression related to CCU are presented in adjusted odds ratios (aORs) with associated 95% confidence intervals (CIs) in Table 4. When controlling for other characteristics, participating in a community savings group was significantly associated at the $p<0.05$ level with CCU with new clients in the past 30 days (aOR: 1.80; 95% CI: 1.08, 2.97). Other factors associated with CCU with new clients at the $p<0.10$ level were higher monthly income (aOR: 1.54; 95% CI: 0.94, 2.53), having dependents (aOR: 2.12; 95% CI: 1.20, 3.76), saving on a monthly basis (aOR: 1.56; 95% CI: 0.92, 2.63), and higher pay per sex act (aOR: 1.58; 95% CI: 0.92, 2.70).

In multiple regression mediation analysis, the relationship between financial security, as measured by monthly income, and CCU was partially mediated by savings group participation (Figure 2). The standardized regression coefficient between monthly income and savings group participation was statistically significant (OR: 2.31; p-value=0.000), as was the standardized regression coefficient between savings group participation and CCU (OR: 2.45; p-value=0.000). The strength of the relationship between monthly income and CCU with new clients was reduced after controlling for savings group participation in the model, and the standardized regression coefficient of the indirect effect was statistically significant (OR: 1.94; p=.004), indicating that savings groups may partially mediate the relationship between income and CCU. A Sobel-Goodman test determined that the mediation effect of savings group participation was statistically significant with approximately 23% of the total effect of financial security on CCU being mediated. A likelihood ratio test was used to compare the goodness of fit of the two models – the null including financial security and CCU versus the alternative including financial security, CCU, and group participation. With a statistically significant likelihood ratio test (p-value = 0.002), the null model can be rejected in favor of the alternative providing evidence that the extended model including the mediating variable is a better fit for the data.

Discussion

This study found that FSW in Iringa, Tanzania who participate in community savings groups had nearly two times greater odds of consistent condom use with new clients in the last 30 days compared to their peers who do not participate in the groups. Our finding that savings group participation may partially mediate the relationship between financial security and condom use with clients suggests that such groups may be able to intervene on economic vulnerability, a critical structural barrier impeding condom use among FSW. These findings are consistent with studies from other setting indicating that access to savings can address economic vulnerability to engage in unsafe sex among FSW.[24,31]

In considering the study's findings, it is critical to note the dynamics of sex work in this setting. Half of study participants count on sex work for approximately half of their income but the median number of clients per week was found to be relatively low. Women may rely heavily on a small number of sexual encounters per week to supplement other income making unprotected sex for higher pay in these encounters more compelling to ensure basic needs can be met. Unreliable sex work income due to scarcity of clients during seasonal fluctuations throughout the year and inconsistent client flow from week to week may additionally compound this vulnerability influencing FSW decisions to engage in unprotected sex.[9]

Examining characteristics associated with savings group participation among the sample allowed us to understand demographic characteristics of group members. However, with regards to the associated financial indicators (e.g. higher income associated with community savings group participation), it is unclear from this cross-sectional analysis whether these characteristics are the effects of being in the groups or factors facilitating women being able to join and participate in the groups. Longitudinal research is needed to address the issue of temporality and further our understanding of the underlying mechanisms at play in these relationships.

Noting our finding that FSW participating in the savings groups tend to be older, future studies should consider examining the role of savings in condom use behavior with clients from a life-course perspective. Research in other settings indicates that younger FSW may have less power to engage in condom negotiation with clients, but older FSW may have fewer clients leaving them more financially insecure and thus, inhibit their ability to negotiate effectively.[37,38] FSW who are newer to sex work may be more likely to use condoms than more experienced FSW perhaps because younger FSW who are newer to sex work have more clients compared to their older peers[39] or because FSW who have worked for many years receive fewer clients and are more likely to accept sex without a condom in order to retain them as regular clients.[40] These dynamics suggest in turn that the earlier in their sex work careers FSW join savings groups, the more effective the groups can be as a strategy for preventing HIV.

Our finding that the relationship between group participation and CCU is strongest with new clients is particularly important given that new clients are often “gateway clients”, meaning that a future regular client or steady partner often begins as a new client.[41] Hence, establishing a norm of consistent condom use with new clients may allow for greater CCU with these other partner types over time, if such transitions occur. Our findings that savings group participation was not associated with CCU with regular clients or steady non-paying partners in multivariate analysis are consistent with prior research showing that relationship intimacy between FSW and their sexual partners impacts safer sex decision-making; specifically, condom use decreases with increasing relationship intimacy.[41-44] Reliable income from regular clients and financial support from steady partners also complicates condom negotiations as requesting condom use could mean losing a client who regularly provides income or losing financial support from a partner. Interventions intended to impact condom use among FSW must acknowledge the various factors at play in safer sex negotiations with different partner types and attempt to understand the socio-economic dynamics of those relationships.

There are several limitations to this study. Our primary study outcome of condom use and financial indicators such as income were self-reported which are subject to both recall bias and social desirability bias.[45] The use of cross-sectional data limits our ability to make causal inferences regarding the relationship between participating in a community savings group and condom use with clients. Additionally, the mediation analysis should be considered preliminary; while a mediating relationship can be hypothesized, these methods essentially only test for confounding in cross-sectional data. The mechanisms through which savings group participation may impact safer sex practices with clients remain unknown. Future analysis should further investigate mediation and explore pathways among these relationships. Prospective research is also needed to help further our understanding of the role of savings groups in HIV risk reduction. Future research should include utilizing longitudinal data to allow for observation prior to and following FSW joining and participating in savings groups and the groups' effects on sexual risk behaviors.

Conclusions

Programmatic strategies for HIV prevention with FSW must address the economic realities of sex workers' lives that impede safer sex behaviors. Community savings groups may serve as an HIV prevention intervention to support a basic level of economic security for FSW better positioning them to engage in condom negotiation with clients. Our study findings suggest the promising role of community savings groups as a structural intervention to promote financial security and reduce HIV risk among FSW. As a community-led effort, savings groups are most appropriately situated within a community-empowerment approach to HIV prevention through which FSW design and implement programs to address structural barriers to their health within their own community. Further research on this topic and in other settings will enhance our understanding of how savings groups can best be implemented and utilized in comprehensive, rights-based HIV prevention efforts among FSW.

Table 1. Demographic, sex work, and financial characteristics of venue-based FSW in Iringa, Tanzania

		Median [range] or N (%)
Demographic characteristics (n=496)		
Age (years)		25 [18, 55]
Education		
	Some primary school or no education	352 (71.0)
	Some secondary school or higher	144 (29.0)
Marital status		
	Married (legal, traditional or common law)	89 (17.9)
	Not married (single, separated, divorced, widowed)	407 (82.1)
Number of children		2 [0,10]
	No children	81 (16.3)
	1-2 children	259 (50.2)
	3 or more children	166 (33.5)
Living situation (lives with)		
	Fellow workers	135 (27.2)
	Sexual partner/spouse	118 (23.7)
	Children/parents/extended family/other	131 (26.4)
	Alone	112 (22.5)
HIV infected		203 (40.9)
Sex work characteristics (n=496)		
Length of time in sex work (years) (n=490)		5 [0,31]
Type of establishment where she works		
	Modern or traditional bar	301 (60.7)
	Guesthouse	139 (28.0)
	Restaurant, Hotel, or other	16 (3.23)
	Independently	40 (8.06)
Number of clients per week (n=493)		2 [0, 40]
Pay received per sexual encounter		15,000 Tsh [2,000, 250,000 Tsh] (~$7 USD)
CCU with new clients in last 30 days (n=366)		147 (40.2%)
CCU with regular clients in last 30 days (n=385)		131 (34.0%)
CCU with steady non-paying partners in last 30 days (n=415)		88 (21.2%)
Financial security characteristics (n=496)		
Monthly income (sex work and other sources)		120,000 Tsh [0, 3,500,000] (~$55 USD)
Sex work income (n=493)		50,000 Tsh [0, 620,000] (~$23 USD)
Percentage of income that is sex work income (n=492)		50 [0.5, 100]
Has financial dependents		
	No dependents	143 (28.8)
	One or more dependents	353 (71.2)
Has help covering basic needs when income is not enough		190 (38.3)
Experienced household food insecurity in last 30 days		185 (37.3)
Reports saving on a monthly basis		328 (66.1)
Has a bank account		37 (7.5)

Self-perceived financial security		
	Poor/Fair	435 (87.7)
	Good/Very good	61 (12.3)
Participates in a community savings group		175 (35.3)

Table 2. Characteristics Associated with Participating in a Community Savings Group (N=496)

	OR	95% CI	p-value
Older age	1.54	1.07-2.24	**0.022**
Married	1.84	1.16-2.93	**0.010**
Higher education	1.15	0.77-1.71	0.508
HIV positive status	1.05	0.72-1.52	0.804
Recruitment community	1.28	0.89-1.84	0.183
Venue type where she works	1.17	0.96-1.43	0.126
Longer time in sex work	0.98	0.68-1.41	0.902
More clients per week	1.25	0.85-1.82	0.257
Higher pay per sex act	1.86	1.27-2.72	**0.001**
Higher total income	2.40	1.64-3.51	**0.000**
Higher sex work income	1.81	1.24-2.74	**0.002**
>50% of income is from sex work	1.00	0.69-1.45	0.992
Has one or more dependents	2.03	1.31-3.14	**0.002**
Has emergency financial help	1.74	1.19-2.53	**0.004**
Experiences food insecurity	0.95	0.65-1.40	0.810
Saves money monthly	2.07	1.37-3.13	**0.001**
Self-perceived high financial security	1.32	0.76-2.28	0.320

Table 3. Bivariate analysis of savings group participation and financial security indicators and consistent condom use (CCU) in last 30 days by partner type

	Consistent Condom Use NEW clients			Consistent Condom Use REGULAR clients			Consistent Condom Use NON-PAYING partners		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Age	0.70	0.46-1.06	**0.095**	0.69	0.45-1.06	**0.091**	0.77	0.48-1.23	0.278
Marital status	0.63	0.33-1.23	0.178	1.16	0.67-2.01	0.603	0.73	0.40-1.35	0.317
Education level	1.15	0.74-1.81	0.540	1.02	0.65-1.62	0.929	0.88	0.52-1.51	0.650
HIV status	1.21	0.79-1.86	0.374	1.05	0.69-1.61	0.807	1.09	0.67-1.75	0.735
Recruitment community	1.40	0.92-2.12	0.117	1.65	1.10-2.48	**0.015**	0.82	0.52-1.30	0.401
Length of time in sex work	0.55	0.36-0.84	**0.006**	0.60	0.39-0.91	**0.018**	0.57	0.35-0.91	**0.019**
Higher number of clients per week	1.08	0.71-1.65	0.717	0.90	0.59-1.39	0.643	0.85	0.52-1.39	0.514
Higher pay per sex act	2.67	1.71-4.15	**0.000**	2.58	1.68-3.96	**0.000**	1.49	0.93-2.39	**0.099**
Higher total income	2.31	1.50-3.55	**0.000**	1.54	1.01-2.37	**0.046**	1.40	0.87-2.24	0.164
Higher sex work income	2.81	1.82-4.34	**0.000**	2.11	1.38-3.22	**0.001**	1.56	0.98-2.49	**0.060**
Higher percentage of income from sex work	1.39	0.91-2.12	0.127	0.97	0.64-1.49	0.894	1.40	0.87-2.24	0.170
Has financial dependents	2.52	1.51-4.21	**0.000**	1.82	1.10-3.02	**0.020**	1.53	0.87-2.67	0.138
Has help in financial emergency	1.25	0.811-1.92	0.314	1.69	1.10-2.58	**0.016**	1.05	0.65-1.70	0.836
Has experienced food insecurity	0.84	0.54-1.30	0.434	0.62	0.39-0.96	**0.033**	0.95	0.58-1.54	0.827
Saves on a monthly basis	2.18	1.36-3.49	**0.001**	1.39	0.88-2.19	0.162	1.23	0.73-2.08	0.435
Self-perceived high financial security	1.71	0.92-3.19	**0.090**	1.36	0.73-2.54	0.335	1.79	0.94-3.40	**0.076**
Participates in a community savings group	2.43	1.56-3.79	**0.000**	1.65	1.07-2.54	**0.023**	1.42	0.88-2.29	0.155

Table 4. Multivariate logistic regression models of characteristics associated with consistent condom use (CCU) in past 30 days by partner type

	Consistent Condom Use NEW clients			Consistent Condom Use REGULAR clients			Consistent Condom Use NON-PAYING partners		
	AOR*	95% CI	p-value	AOR*	95% CI	p-value	AOR*	95% CI	p-value
Age	0.79	0.46-1.35	0.385	0.74	0.44-1.24	0.253	0.87	0.48-1.58	0.650
Marital status	0.54	0.25-1.14	0.103	1.78	0.94-3.34	0.075	0.86	0.44-1.69	0.661
Education	0.92	0.55-1.53	0.737	0.80	0.48-1.34	0.402	0.79	0.44-1.40	0.416
HIV status	1.38	0.85-2.24	0.196	1.25	0.78-1.99	0.361	1.33	0.78-2.28	0.297
Recruitment community	0.79	0.48-1.28	0.341	1.13	0.74-1.74	0.565	0.62	0.38-1.02	0.058
Length of time in sex work	0.67	0.39-1.14	0.142	0.76	0.44-1.29	0.303	0.55	0.30-1.01	0.053
Higher pay per sex act	1.58	0.92-2.70	**0.097**	2.63	1.52-4.58	**0.001**	1.25	0.69-2.27	0.465
Higher monthly income	1.54	0.94-2.53	**0.083**	1.04	0.64-1.69	0.879	1.16	0.68-1.99	0.593
Higher percentage of income from sex work	1.05	0.65-1.69	0.856	0.76	0.47-1.22	0.263	1.10	0.65-1.86	0.714
Financially supports others besides self	2.12	1.20-3.76	**0.010**	1.73	0.99-3.02	0.056	1.47	0.79-2.72	0.225
Saves on a monthly basis	1.56	0.92-2.63	**0.097**	0.94	0.56-1.56	0.806	1.04	0.59-1.83	0.881
Community savings group participation	1.80	1.08-2.97	**0.024**	1.41	0.87-2.27	0.162	1.37	0.81-2.31	0.243

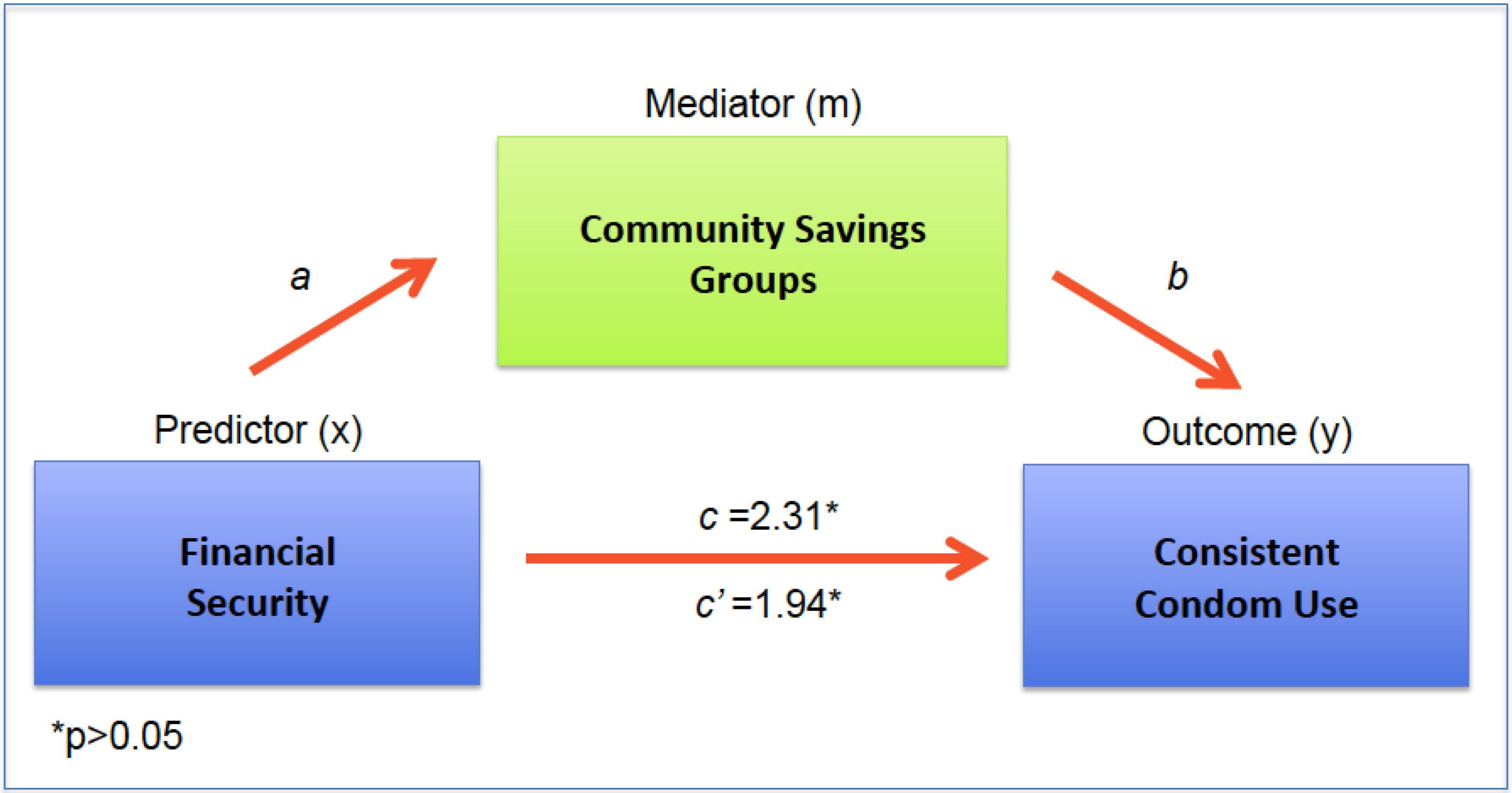

Figure 2. Mediation Analysis

References

1. Baral S, Beyrer C, Muessig K, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet Infectious diseases* 2012; **12**(7): 538-49.

2. Beyrer C, Crago AL, Bekker LG, et al. An action agenda for HIV and sex workers. *Lancet* 2015; **385**(9964): 287-301.

3. Search UP. Strategic Assessment to Define a Comprehensive Response to HIV in Iringa, Tanzania Research Brief: Female Sex Workers, 2013.

4. Tanzania National AIDS Control Program, PSI Tanzania. HIV Biological and Behavioral Surveys: Tanzania 2013. Female Sex Workers in Seven Regions: Dar es Salaam, Iringa, Mbeya, Mwanza, Tabora, Shinyanga and Mara., 2013.

5. Tsai LC, Witte SS, Aira T, Riedel M, Hwang HG, Ssewamala F. "There is no other option; we have to feed our families...who else would do it?": The financial lives of women engaging in sex work in Ulaanbaatar, Mongolia. *Global journal of health science* 2013; **5**(5): 41-50.

6. Odek WO, Busza J, Morris CN, Cleland J, Ngugi EN, Ferguson AG. Effects of micro-enterprise services on HIV risk behaviour among female sex workers in Kenya's urban slums. *AIDS and behavior* 2009; **13**(3): 449-61.

7. Kim J, Pronyk P, Barnett T, Watts C. Exploring the role of economic empowerment in HIV prevention. *AIDS (London, England)* 2008; **22 Suppl 4**: S57-71.

8. Wojcicki JM, Malala J. Condom use, power and HIV/AIDS risk: sex-workers bargain for survival in Hillbrow/Joubert Park/Berea, Johannesburg. *Social science & medicine* 2001; **53**(1): 99-121.

9. Fehrenbacher AE, Chowdhury D, Ghose T, Swendeman D. Consistent Condom Use by Female Sex Workers in Kolkata, India: Testing Theories of Economic Insecurity, Behavior Change, Life Course Vulnerability and Empowerment. *AIDS and behavior* 2016.

10. Fitzgerald-Husek A, Martiniuk AL, Hinchcliff R, Aochamus CE, Lee RB. "I do what I have to do to survive": an investigation into the perceptions, experiences and economic considerations of women engaged in sex work in Northern Namibia. *BMC women's health* 2011; **11**: 35.

11. Urada LA, Morisky DE, Pimentel-Simbulan N, Silverman JG, Strathdee SA. Condom negotiations among female sex workers in the Philippines: environmental influences. *PloS one* 2012; **7**(3): e33282.

12. Sherman SG, German D, Cheng Y, Marks M, Bailey-Kloche M. The evaluation of the JEWEL project: an innovative economic enhancement and HIV prevention intervention study targeting drug using women involved in prostitution. *AIDS care* 2006; **18**(1): 1-11.

13. Rao V, Gupta I, Lokshin M, Jana S. Sex Workers and the Cost of Safe Sex: The Compensating Differential for Condom Use among Calcutta Prostitutes. *Journal of Development Economics* 2003; **vol. 71**(iss. 2): 585-603.

14. Elmes J, Nhongo K, Ward H, et al. The price of sex: condom use and the determinants of the price of sex among female sex workers in eastern Zimbabwe. *The Journal of infectious diseases* 2014; **210 Suppl 2**: S569-78.

15. Gertler P, Shah M, Bertozzi S. Sex sells, but risky sex sell for more. 2003.

16. Agha S, Chulu Nchima M. Life-circumstances, working conditions and HIV risk among street and nightclub-based sex workers in Lusaka, Zambia. *Culture, health & sexuality* 2004; **6**(4): 283-99.

17. Ntumbanzondo M, Dubrow R, Niccolai LM, Mwandagalirwa K, Merson MH. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of Congo. *AIDS care* 2006; **18**(7): 777-85.

18. Adu-Oppong A, Grimes RM, Ross MW, Risser J, Kessie G. Social and behavioral determinants of consistent condom use among female commercial sex workers in Ghana. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2007; **19**(2): 160-72.

19. Umar US, Adekunle AO, Bakare RA. Pattern of condom use among commercial sex workers in Ibadan, Nigeria. *African journal of medicine and medical sciences* 2001; **30**(4): 285-90.

20. Blankenship KM, Friedman SR, Dworkin S, Mantell JE. Structural Interventions: Concepts, Challenges and Opportunities for Research. *JURH* 2006; **83**(1): 59-72.

21. Dworkin S, Blankenship K. Microfinance and HIV/AIDS Prevention: Assessing its Promise and Limitations. *AIDS and behavior* 2009; **13**(3): 462-9.

22. Kennedy CE, Fonner VA, O'Reilly KR, Sweat MD. A systematic review of income generation interventions, including microfinance and vocational skills training, for HIV prevention. *AIDS care* 2014; **26**(6): 659-73.

23. Kerrigan D, Kennedy CE, Morgan-Thomas R, et al. A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *Lancet* 2015.

24. Swendeman D, Basu I, Das S, Jana S, Rotheram-Borus MJ. Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases. *Social science & medicine (1982)* 2009; **69**(8): 1157-66.

25. Jana S, Basu I, Rotheram-Borus MJ, Newman PA. The Sonagachi Project: a sustainable community intervention program. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2004; **16**(5): 405-14.

26. Jana S, Chakraborty AK, Das A, Khodakevich L, Chakraborty MS, Pal NK. Community based survey of STD/HIV infection among commercial sex-workers in Calcutta (India). Part II. Sexual behaviour, knowledge and attitude towards STD. *The Journal of communicable diseases* 1994; **26**(3): 168-71.

27. Cohen J. HIV/AIDS in India. Sonagachi sex workers stymie HIV. *Science (New York, NY)* 2004; **304**(5670): 506.

28. Patel SK, Prabhakar P, Jain AK, Saggurti N, Adhikary R. Relationship between Community Collectivization and Financial Vulnerability of Female Sex Workers in Southern India. *PloS one* 2016; **11**(5): e0156060.

29. Pillai P, Bhattacharjee P, Ramesh BM, S I. Impact of two vulnerability reduction strategies - collectivisation and participation in savings activities - on HIV risk reduction among female sex workers, KHPT 2012.

30. NSWP. Economic Empowerment Programmes for Sex Workers; Regional Report: Africa.

31. Witte SS, Aira T, Tsai LC, et al. Efficacy of a savings-led microfinance intervention to reduce sexual risk for HIV among women engaged in sex work: a randomized clinical trial. *American journal of public health* 2015; **105**(3): e95-102.

32. Coates J, Swindale A, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). . Washington, D.C.: FHI 360/FANTA, 2007.

33. Zeger S, Liang K, Albert PS. Models for Longitudinal Data: A Generalized Estimating Equation Approach. *Biometrics* 1988; **Vol. 44**(No. 4): 1049-60.

34. Baron R, Kenny D. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology* 1986; **51**: 1173-82.

35. StataCorp. Stata Statistical Software. Release 13. College Station, TX: StataCorp LP; 2013.

36. Blankenship KM, West BS, Kershaw TS, Biradavolu MR. Power, community mobilization, and condom use practices among female sex workers in Andhra Pradesh, India. *AIDS (London, England)* 2008; **22 Suppl 5**: S109-16.

37. Choi SY, Holroyd E. The influence of power, poverty and agency in the negotiation of condom use for female sex workers in mainland China. *Culture, health & sexuality* 2007; **9**(5): 489-503.

38. Swendeman D, Fehrenbacher AE, Ali S, et al. "Whatever I have, I have made by coming into this profession": the intersection of resources, agency, and achievements in pathways to sex work in Kolkata, India. *Archives of sexual behavior* 2015; **44**(4): 1011-23.

39. Sarkar K, Bal B, Mukherjee R, et al. Young age is a risk factor for HIV among female sex workers--an experience from India. *The Journal of infection* 2006; **53**(4): 255-9.

40. Tran TN, Detels R, Lan HP. Condom use and its correlates among female sex workers in Hanoi, Vietnam. *AIDS and behavior* 2006; **10**(2): 159-67.

41. Robertson AM, Syvertsen JL, Amaro H, et al. Can't buy my love: a typology of female sex workers' commercial relationships in the Mexico-U.S. Border Region. *Journal of sex research* 2014; **51**(6): 711-20.

42. Murray L, Moreno L, Rosario S, Ellen J, Sweat M, Kerrigan D. The role of relationship intimacy in consistent condom use among female sex workers and their regular paying partners in the Dominican Republic. *AIDS and behavior* 2007; **11**(3): 463-70.

43. Andrews CH, Faxelid E, Sychaerun V, Phrasisombath K. Determinants of consistent condom use among female sex workers in Savannakhet, Lao PDR. *BMC women's health* 2015; **15**: 63.

44. Le MN, D'Onofrio CN, Rogers JD. HIV risk behaviors among three classes of female sex workers in Vietnam. *Journal of sex research* 2010; **47**(1): 38-48.

45. Hanck SE, Blankenship KM, Irwin KS, West BS, Kershaw T. Assessment of self-reported sexual behavior and condom use among female sex workers in India using a polling box approach: a preliminary report. *Sexually transmitted diseases* 2008; **35**(5): 489-94.

Paper 2: *When you don't have money, he controls you*: the dynamics of financial security, community saving groups and HIV risk among female sex workers in Iringa, Tanzania

Abstract

Female sex workers (FSW) are a socially and economically marginalized population. Limited access to basic resources can impede FSW's ability to negotiate condom use with clients. This study sought to qualitatively explore the potential role of community savings groups in promoting financial security and reducing HIV risk among FSW in Iringa, Tanzania. Between April 2015 and February 2016, 27 in-depth interviews (IDIs) with 15 FSW and 4 focus group discussions (FGDs) with 35 FSW participating in community savings groups were conducted in the Iringa region. Content analysis was conducted to identify salient themes including those related to the dynamic nature of participants' sex work and financial realities and the meaning and importance of community savings groups in their lives and work. Participants described tensions and complexities around money and condom use and the reality that financial need inhibited their ability to refuse unprotected sex with clients. Community savings groups were described as providing a safety net women utilized in times of financial need, making them less likely to engage in high-risk sex with clients. Women described a sense of agency resulting from group participation playing out in their ability to negotiate condom use and be selective about clients. Savings groups helped participants afford health care and HIV positive participants described saving from the groups enabled them to cover the costs of eating healthfully, medications, and transportation for clinic appointments. Study findings indicate that financial security plays a role in safer sex negotiation with clients and that community savings group participation may improve financial security and

enhance individual agency in decision-making influencing sexual risk behaviors of FSW in Iringa. Beyond implications for HIV risk reduction, savings group participation may impact the overall health and well being of FSW and help HIV-positive FSW achieve improved HIV treatment and care outcomes.

Background

Female sex workers (FSW) bear a disproportionately high burden of disease in the global distribution of HIV.[1] A meta-analysis to assess the burden of HIV among FSW in low- and middle-income countries found that FSW were globally estimated to have 13.5 times greater odds of having HIV than other adult women.[2] Regional analysis found a combined HIV prevalence of 29.3% among FSW in sub-Saharan Africa (SSA), significantly higher than any other geographic region.[3]

In Tanzania, the national HIV prevalence is 5.1% among 15-49 year olds. However, the Iringa region in the southwest highlands has a notably higher HIV prevalence of 9.1% and a pronounced gender disparity with 11% of adult women HIV-infected compared to 6.9% of adult men.[4] Prior formative work suggests that the higher HIV prevalence and more pronounced gender disparity in Iringa could be partly due to its geographic location along the TanZam highway, a major transport and trucking route that bifurcates the region, and which along with migration of seasonal workers to nearby agricultural plantations, create and sustain demand for sex work.[4,5] The literature indicates that within sub-Saharan Africa, areas of high mobility and those along main transport routes are particularly heavily affected by HIV.[6-8]

Most sex work in Iringa is venue-based, taking place in bars, guesthouses, and truck stops.[9,10] The Tanzanian government estimates that HIV prevalence among FSW working in bars is between 32% and 50% and that among FSW working at truck stops along major highways and transport routes, the prevalence is as high as 60%.[11] The most current data from the National AIDS Control Program's HIV biological and behavioral survey in 2013 identified a 32.9% HIV prevalence among female sex workers in Iringa.[12]

FSW are an economically marginalized population, often living in poverty and balancing competing financial priorities such as food, housing, children's expenses, and medical costs. [13-16] Economic realities for FSW often include low education and lack of skills for formal employment, scarcity of jobs, and low pay, all of which leave them with few livelihood options.[17,18] For many women living and working near truck stops and along main transport routes, selling food and liquor and exchanging sex for money allows them a livelihood to support their family.[19]

Studies from various settings provide evidence that financial insecurity places sex workers in a position of limited power to negotiate condom use and to refuse unsafe sex with clients. Prior research in Vietnam, India, and the Philippines shows that the need to make more money and being in debt inhibit condom use negotiations and that sex workers reporting economic hardships are more likely to report unsafe sex practices.[20-23] Additional studies in India and Swaziland have demonstrated that having another income source in addition to money earned from sex work better positions FSW to negotiate condom use and to refuse sex without a condom.[5,24] Condom negotiation was also found to be more difficult in the case that the client provides regular economic support or offers more money for sex without a condom.[5,24] While these studies conducted in other settings support the importance of the relationship between financial insecurity and HIV risk, the literature in sub-Saharan Africa is relatively limited.

We situate our discussion of sex workers' economic vulnerability to HIV within the theoretical framing of structure and agency. Sociologist Anthony Giddens offers an account of the interplay between individual agency and social structures which recognizes that people are purposive actors making decision in their lives but that their actions are embedded in the context of the social structures that constrain them.[25] Through this lens, we recognize the role of contextual factors of sex workers' lived experiences and the critical role structure plays in determining their health choices.[26] The context in which sex work occurs is shaped by the socioeconomic status of sex workers and socially ingrained patriarchal power relationships which constrain FSW ability to negotiate safer sex practices.[27] Giddens' structuration theory proposes a duality in which an individual's agency is influenced by structure and at the same time structures are maintained and adapted through the exercise of agency.[25] In this paradigm, agents can modify social structures by acting outside the constraints structures place on them. When FSW gain agency, they are empowered to act independently, to make strategic choices that affect their lives and work and ultimately, in doing so, are able to intervene on the norms and structures inhibiting their ability to protect themselves from HIV. As we explore community savings groups among FSW in this paper, we consider the potential of the groups to reshape structure and agency. By exercising agency in creating a financial institution, FSW can transform the systems that economically marginalize and oppress them. In turn, by reshaping structure, FSW opportunities and agency to think and act autonomously are transformed.

Qualitative research previously conducted in the Iringa region revealed organically formed community savings groups (locally called *mchezo*) among FSW. This study explores the meaning and importance of membership in these groups in terms of how they influence FSW work and lives. We sought to better understand the potential role of community savings groups in reducing economic vulnerability and HIV risk among FSW in Iringa. This qualitative research served as formative work for an economic empowerment initiative within an ongoing Phase II community-based combination HIV prevention trial called Project Shikamana (Stick Together) being conducted among Tanzanian women at heightened risk in Iringa.

Methods

We conducted 27 in-depth interviews (IDIs) with 15 FSW and 4 focus group discussions (FGDs) with 35 FSW in the Iringa region. We purposively sampled for women participating in savings groups and sought a diverse sample with regards to age and HIV status. Women who reported participating in a community savings group in a previous research project conducted by the study team were first recruited into the study to participate in IDIs. Then, using snowball sampling, participants were asked to recommend other sex workers that they know who also participated in savings groups for IDIs or, later in the study, for FGDs once all interviews were complete.

Participants ranged from 20-45 years old, with a mean age of 28.7 years. Among the sample, 80% (40/50) of the women were single, 9 women were married or reported a permanent partner and 1 woman was a widow. Nearly all (90%) of participants had children and over half (56%) had 2 or more. Education levels were low with 38% (19/50) having some secondary school, 60% (30/50) having primary-level education and 1 individual had no schooling. Of the 15 FSW who participated in IDIs, 11 of them were HIV-infected. HIV status of FGD participants was not collected to maintain confidentiality for those not wanting to disclose their status to the group.

Of the 15 FSW who initially participated in an IDI, 12 completed a follow-up interview 8-12 weeks later. The second interview provided an opportunity to revisit some of the topics discussed with the hope that existing rapport with the interviewer would facilitate further depth of information, particularly around sensitive topics such as sex work and personal finances. Interviews took place at or near the study participant's work or home, based on her preference, and lasted approximately one hour. A semi-structured interview guide was used to gather information on key domains within financial security and participation in community savings groups.

Four FGDs were conducted with 35 FSW who participated in community savings groups. FGDs were intended to facilitate an understanding of norms, expectations and local construction of the concepts of interest in the study.[28,29] Exploring similar topics covered in the interviews with individuals, the group setting afforded us the opportunity to discover how FSW think and talk about these issues and provided insight into their shared understanding of their lives, culture, and world.[29] FGDs took place at centrally located meeting spaces that had a confidential area for group dialogue. Each group had between 7-11 women and lasted approximately 90 minutes. A focus group discussion guide was developed outlining key domains but the facilitator was encouraged to probe and explore related topics and experiences.

Debriefing sessions were conducted following each of the interviews and focus group discussions. These sessions facilitated an iterative process of data collection and analysis and provided guidance for topics to explore further in the follow-up interview with each participant and in subsequent FGDs. All data collection was conducted in Swahili by a local study staff member trained in qualitative research methods who had experience working with the FSW population in Iringa. All interviews and focus groups were audio recorded, transcribed, and translated into English. Oral informed consent was obtained from all women in the study. Upon session completion, participants were compensated 5,000 Tanzania Shillings ($2.50 USD) for their time.

This study received human subjects research approval from the Institutional Review Boards of the Johns Hopkins University Bloomberg School of Public Health, Muhimbili University of Health and Allied Sciences, and the National Institute for Medical Research of Tanzania.

Qualitative analysis was conducted using an iterative thematic analysis approach both drawing on *a priori* codes and allowing for emergent codes and themes.[30,31] Memos were developed from multiple readings of each transcript to assist in development of salient themes and used throughout data collection to document thoughts about the significance and relationships of codes to one another and note questions that arose from the coding process.[32] A codebook was developed based on the themes emerging from the data. Coding output was synthesized across key domains, categories were identified and codes were arranged hierarchically with sub-codes listed under major categories. Major categories under which codes were arranged included stigma, solidarity, trust, and decision-making, among others.

Analysis of the transcripts varied by method. IDIs were analyzed in the tradition of a narrative approach, placing value on the women's story telling of their lives in sex work and their financial realities, used as an opportunity to reveal cultural and social patterns through the lens of individual experiences.[31] Throughout analysis of the IDIs, attention was paid to age and HIV status in order to allow for emergent themes relating to a life course perspective (i.e. decreasing sex work income with increasing age) as well as how financial security and savings group participation may play out differently for HIV infected women (i.e. having resources to pay transport costs for HIV-related clinic visits). FGDs were analyzed as a collective dialogue in which the group itself was the unit of analysis and the group dynamics and interpretations and meaning of what participants shared was understood in the context of the larger group. Analysis focused on interpreting a collective view of participants' understanding of the world rather than treating them as a compilation of the views of different participants in the group.[29] All interview and focus group transcripts were coded using ATLAS.ti qualitative data management and analysis software.[33]

Key themes addressed in this paper include financial need and high-risk sex; savings groups and financial security; savings groups and HIV risk; and savings groups and broader health.

Results

Participants described instability of their sex work income due to both day-to-day variability in the number of clients they had and seasonal fluctuations in demand driven by migration of plantation workers into and out of the region throughout the year. As a result of insufficient and unsteady income, participants reported struggling to afford basic needs such as rent and food for themselves and their families as well as expenses such as school fees and clothes for their children and home items such as mattresses and roofing.

Financial need and high-risk sex

Participants described that immediate financial need often inhibited their ability to refuse high-risk sexual behaviors with clients such as sex without a condom. Women felt they had little or no power to negotiate the terms of sex with clients when they knew they had no money at home to meet their basic needs. One participant stated the following regarding what happens when she cannot afford daily essentials like food for herself and her family:

> *That is when I find myself getting into unsafe sex, I have to get into that in order to fulfill what I need; I can't accept my child going to sleep hungry while someone has called me telling me 'come get five thousand [shillings].' Will I refuse? I have to accept so I can fulfill the needs of my child to get food"* - IDI participant, age 31

Highlighting the difference in her decision-making around sex work when she has money compared to when she does not, another participant explains: *"If you have money at home you will not accept, you will not accept at all to have sex without a condom with a stranger" (*IDI participant, age 29). In addition to unprotected sex, participants also explained how financial security impacts refusing higher risk sexual acts such as anal sex. As one participant describes:

> *He may tell you you're going to have sex. Before you get there, you agree that 'I will do sex this way, alright?' Then it happens that he enters you the other way (anal sex) and you have not agreed. So he has to add money, because you have not agreed [to do it] that way, you had agreed on another way. [When I have money at home], I will refuse; I cannot accept anal sex while he has little money while my money at home is sufficient.*
>
> – IDI participant, age 31

Despite general efforts to engage in safer sex with clients, such as outlining terms of the agreement to include condom use in advance and bringing condoms when meeting clients, participants explained that the offer of additional pay for unprotected sex was compelling when they knew that income would be enough cover their expenses. One participant captured the dynamic between financial insecurity and sex work consistently described in the women's narratives by saying: "when you don't have money, he controls you" (IDI participant, age 24).

Savings groups and financial security

In light of the challenges presented by unsteady income, participants saw community savings groups (locally called *mchezo*) as necessary to being able to support themselves and their families. The savings groups were described as involving a rotating payout in which each member receives the total amount pooled from all members' contributions. The group payouts were considered a necessary supplement to sex work income that allowed participants to be able to afford daily basic needs. Highlighting its role in covering basic needs, one participant said, "*when I get money from mchezo, it makes me feel secure; I am sure that I can have food every day. Now you will be able to afford eating, eating healthy, you will be able to afford buying medication"* (IDI participant, age 38).

Many participants reported using their payouts for daily food staples, soap, kerosene, electricity bills, rent, school fees, clothing for their children, and items for their homes.

Others saw money from *mchezo* as a way to save for large purchases or investments to help further an individual's economic growth. Many participants spoke about saving money to purchase a plot of land or build a new home, longer-term plans they spoke of in the context of financial aspirations for the future which they felt could only be attained with the help of *mchezo.* Speaking about the role of *mchezo* in the lives of sex workers and more broadly, the potential for improving ones living conditions, another participant said:

> *The advantage of mchezo is that you can improve your financial stability very fast compared to when you save money yourself. I cannot live without mchezo; any sex worker cannot live without mchezo…Mchezo can help you afford to do a lot of things, big things. When you look at female sex workers who are not in mchezo, it's very difficult for them to improve their living standard; they will never improve.* – IDI participant, age 30

Another participant described how she uses her payout from *mchezo* to invest in her business now that she has reduced her engagement in sex work as a result of learning she is HIV positive:

> *Mchezo helps me add capital to my small business of selling tomatoes, onions, and vegetables. Due to my health [HIV positive status] now I have reduced sex work, so I use most of the money that I get from mchezo investing in my small business. When I'm in mchezo, the little money I get I will invest it in mchezo so that it will*

help me top up my business capital or pay for rent or pay for my children's school fees.

- IDI participant, age 34

Participating in *mchezo* was also described as providing an insurance mechanism in a time of need, which left women feeling less vulnerable to financial crises. Participants described that they can ask to swap places in the rotation with another member when facing immediate financial hardship and the group's collector will allow them to receive the payout at that time instead. In the following quote, the participant captures both the inadequacy of her income to cover immediate financial need and how *mchezo* works to fill that gap for members when in crisis.

Maybe today you haven't sold anything and you just think maybe tomorrow I will sell. And again tomorrow you haven't sold again. At the same time your child is sick, then you just think how will I go to the hospital while I don't even have some money, how will I even enter the hospital. But if you are in mchezo, you just inform your fellows that my child is sick and I do not have any other way, so if it was X who was supposed to take the money, then she will give it to you and you take your child to the hospital. – FGD participant

Nearly all participants talked about utilizing and being grateful for this option within the groups.

Savings groups and HIV risk

As participants described the sense of improved financial security they felt from participating in the groups, they described changes in their risk behaviors with clients as a result. Women unanimously reported that participating in *mchezo* creates a safety net they can utilize when they have immediate financial need, thus safeguarding them against HIV risks. Many women articulated that they felt in control of being able to have safer sex with clients. They described a sense of agency to participate in decision-making and control over their interactions with clients which allowed them to choose when, with whom and for how much they would provide their services. Thinking specifically about implications for supporting her family and her ability to decide whether or not to go out with a client, one participant described:

> *If you're at work and you know you have mchezo that will give you money to support your family for two or three days, and a clients seduces me, I can decide to go or not because I'm sure my children will have food. You have a choice either to agree or refuse*.
>
> – FGD participant

One focus group participant articulated the way *mchezo* enables her to refuse unsafe sex with a client who refuses condom use in the following way:

> *Mchezo has helped me a lot, for example you might get a client, he will refuse using a condom, but I can decide to refuse because I know even though he doesn't pay me*

> *I have money at home from mchezo. It's different from when you're not in mchezo, you might just go without a condom because you want money. But now I make my own decisions.*
>
> – FGD participant

Another focus group participant described how *mchezo* impacts her ability to face condom negotiation challenges with clients:

> *He will tell you 'I cannot have sex with you using condoms, I want without a condom.' Mchezo helps you avoid these kinds of challenges in our work; you will be able to tell a client, 'if you cannot use a condom, I'm sorry I will have to leave.' But if you don't have money and you don't know where else you will get money for food, you will agree to have sex even without a condom.* – FGD participant

A number of women reported that when they had money from *mchezo*, they engaged in price negotiations with clients. One participant described, "when I have money, I put on a high pride and raise the negotiations to my advantage. Let's say I tell the customer we can only do business with 100,000Tsh on the table" (FGD participant). Another focus group participant asserted to the group:

> *I will tell the customer that 30,000Tsh is the price for the service and I mean it, because I know I have money at home. For instance if am used to having sexual intercourse without a condom and on that day I tell him we should use a condom, if*

he disagrees then that's going to be end of story (laughs). – FGD participant

Another participant reported providing clients with a set of terms of her services when she knew she was not dependent on them for money:

> *When my customer arrives I start negotiations at a higher price. Let's say the normal price is 20,000 to 50,000Tsh, then I start with 100,000Tsh, just because I have money (laughs). He will ask himself why is this person different today? And that's where I give him my rules. So when he agrees with my terms then we can get to business.*
>
> - FGD participant

Savings groups and broader health

In addition to the role of community saving groups on HIV risk reduction dynamics, many participants discussed their use of money from the savings groups to buy medications and seek health care when needed. Participants described that without financial resources to go to the hospital or see a doctor, one might try different medications from the pharmacy with the hopes they will treat their sickness. Money from the savings groups allows women to go to a doctor or visit the hospital without fear they will not be able to pay for treatment or medical care. HIV positive participants spoke about the important role savings group participation plays in their ability to get health services, afford food to maintain a healthy diet and cover transportation costs for getting to HIV care and treatment appointments. As described by one HIV-positive interview participant:

> *Being in mchezo helps me eat a balanced diet, they usually insist that you eat a balanced diet to help maintain [healthy] status. And sometimes it helps me get to the clinic early by taking transport to the clinic for example getting a daladala (minibus) or getting a bodaboda (motorcycle)…when you're not in mchezo you might not be able to cover those costs because you don't have a reliable source of income. Some times you have money sometimes you don't have money so you might not be able to manage the expenses*. – IDI participant, age 34

Another participant also described relying on *mchezo* money to facilitate her visit to the HIV care and treatment center (CTC) she attends:

> *When you go to the clinic if it's the day of CD4, you can use that money from the group for transport…the day of CD4 we stay for a long time. You must eat there; you cannot stay without eating. For drinking water you will use the same money. For food, water, transport, you use that same money.* – IDI participant, age 30

One HIV positive participant described that *mchezo* helps her afford care at the private hospital which saves her time:

> *[Mchezo] helps because I may decide which hospital can help me fast so that I can get better. If I don't have money like this, they say there is a government hospital where I can get services for free. I will be late because if I go to that one, when I get there I will have to join the queue. I will not be attended as I will be attended in the private hospital when I have my money…Honestly they help me fast…different from the government hospital…When I go to that [government] hospital, I have gone there at 8am and I come back at 4pm while if I have money on hand, my money from mchezo, I can go the private hospital not the government hospital. When I get there, I maybe have left here at 8am. At 10am, I will be home already served well and I got the medication.* – IDI participant, age 20

Women described that *mchezo* not only helped them afford expenses related to their own health care needs but also to help cover health care related costs for their children and family members, which was described as financially and emotionally stressful, particularly in the case of a sick child.

Discussion

This qualitative study explored the economic context of FSW lives in Iringa and the meaning and importance of community savings groups in their lives and work. Participants described how immediate financial need inhibited their ability to refuse high-risk sexual behaviors with clients, such as sex without a condom, underscoring the importance of financial security in sexual risk decision making with clients. This finding is supported by the literature indicating that economic vulnerability impedes FSW ability to engage in condom negotiation with clients[21-23,34,35] and adds to the small but growing body of research examining this in the context of sub-Saharan Africa.[5,36,37] In previous quantitative work, we established an association between savings group participation and consistent condom use with clients among FSW in Iringa. The qualitative findings presented here complement this work by providing a look at the economic context, real-life tensions between financial realities and FSW ability to protect themselves from HIV, and the ways in which group participation influences members and their safer sex behaviors.

The women in this study described how participating in community savings groups enabled them to negotiate condom use and refuse requests from clients for unprotected sex. Due to their participation in savings groups, the need to earn money quickly from sex work was reduced and participants felt a sense of agency in their interactions with clients. There was consensus among study participants that participating in savings groups allowed them to be selective about their clients and the terms of their work. These findings echo research from other settings indicating that having access to secure savings better positions sex workers to refuse unsafe sex and negotiate condom use and specifically that sex worker collectives can empower women to more actively negotiate the terms of their work.[35,38,39] Having the economic independence of not relying entirely on income from a given sex act makes it easier for FSW to negotiate safer sex while facing the risk of losing financial support from their clients.[40] Supported by this prior research, our study findings suggest that community savings groups promote individual agency and facilitate empowered decision-making to negotiate condom use and refuse high-risk sex with clients.

The sense of individual agency cultivated by participating in community savings groups allows women to develop *voice* in decision-making and gain the ability to have and make life choices.[41]

For a group whose ability to exercise meaningful choices is confined by the structural context of their marginalized status, developing agency allows FSW to act against the status quo and begin to reshape the very structures that constrain them. Individual and furthermore, collective agency can challenge social order and create new norms and relationships.[25] Returning to the duality of structure Giddens proposes, community savings groups among FSW in Iringa exemplify the dynamic relationship between structure and agency. Agency among FSW in Iringa has enabled them to reshape social structure by establishing their own financial institution and changing the norms of the systems in which they operate. The transformation of structure affords them agency in expanding their autonomy and opportunities. The savings groups thus provide an example of the reshaping of structure and agency for and by FSW in Iringa.

These findings are relevant to the conceptualization of public health programming. Often in HIV prevention efforts, self-efficacy and agency become blurred and the role of intentionality is overlooked. Public health intends to help people use condoms and works to convince people to protect themselves however people's intentions are based on the goals that resonate with their lived experiences and needs. In forming community savings groups, FSW in Iringa are trying to build financial security and create economic stability for themselves and have exercised agency to reshape the structures that constrain them. Their increased agency around HIV decision-making is a result and additional benefit of that process. The savings groups explored here underscore the need for the process of embracing protective behaviors to be stimulated and supported by people and driven by their intentions to have their identified needs met. This requires a paradigm shift for public health programs to recognize that individuals know what can work best for them to improve their conditions and lives. The role of public health should be to support them in their efforts and the adoption of protective behaviors will follow.

Beyond implications for HIV risk reduction, our findings suggest that the groups may have effects on the overall health and well being of FSW and HIV outcomes for HIV-positive FSW through improved access to care. Study participants described that savings from the groups helped them afford health care costs including clinic visits, hospital stays and medications they could not pay for otherwise. Importantly, HIV positive participants spoke specifically about money from the groups allowing them to afford to eat a healthy diet and providing them with sufficient money for transport to attend regular clinic visits. A number of recent studies reveal that savings groups can play a role in promoting better HIV treatment and care outcomes for HIV positive individuals. Research conducted in Cambodia,[42] Colombia,[43] Peru,[44] and Cote d'Ivoire[45] point to improved adherence to ART for HIV positive individuals engaged in interventions that include a savings group component. A study of group savings activities among FSW in Karnataka, India showed that members of savings group were more likely to have visited a local NGO sexual health/STI clinic than non-members, adding support to our findings that saving groups may influence both HIV related care and access to healthcare more broadly among this population.[46] Our findings contribute to this small but growing body of literature by adding findings from the sub-Saharan context. Further attention should be given to examining the role of savings groups in improving HIV outcomes specifically among FSW as there remains a research gap around this potentially effective strategy for this critical population.

Women's inability to afford food came up organically in the course of all four focus group discussions and with nearly all women interviewed. Participants spoke about their vulnerability to agreeing to unsafe sex with clients when they needed money for food. Prior studies from India, Nigeria, and one from Botswana and Swaziland indicate that food insufficiency is an important risk factor for increased sexual risk-taking among FSW.[16,47,48] Echoing the literature, women in this study cited food insufficiency playing out in their decisions to agree to unsafe sex. However, participants also relayed that the money they receive from savings groups was often used to purchase food for themselves and their families, indicating that savings group participation can address issues of food insufficiency by ensuring women have adequate financial resources to buy food. This is consistent with research indicating savings groups can improve food access though we did not find studies on this conducted among FSW populations.[49] Our study findings suggest that participating in a savings group may alleviate this very concrete element of economic vulnerability that places FSW at increased risk of unsafe sex with clients. Moving forward, further research is needed to explore how and to what extent community savings groups can lead to improved health outcomes for FSW including addressing food insufficiency and in the case of HIV infected FSW, the important implications savings group participation may have on improved HIV treatment and care outcomes.

Limitations of this study include the potential bias introduced by using snowball sampling for participant recruitment and that participants were limited to women with experience in community savings groups. Three of the women who participated in initial IDIs were unavailable for a second interview thus we were not able to pursue follow-up questions and additional exploration of topics with those participants. Because of insufficient language skills and cultural limitations, the primary researcher did not conduct the interviews and focus group discussions and thus may have missed nuanced dynamics.

Conclusions

This study attempts to present a dynamic picture of the tensions and complexities around condom use and financial security as well as a nuanced look at the role of savings groups in the lives of FSW in Iringa. The community savings groups explored in this study serve as an economic and potentially psychosocial resource enabling FSW to achieve financial security and empowered decision-making to more effectively navigate condom negotiation and safer sex with clients. Furthermore, groups may have a role in improved overall health and HIV outcomes by facilitating access to treatment and care. Aligning with the goals of a combination prevention approach to prevent HIV acquisition among uninfected individuals and curtail forward transmission among those infected, community savings groups hold promise as an economic intervention that may achieve both HIV risk reduction and improved HIV treatment outcomes among FSW.

REFERENCES

1. WHO., UNFPA., UNAIDS., NSWP. Prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries: recommendations for a public health approach, 2012.

2. Baral S, Beyrer C, Muessig K, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet Infectious diseases* 2012; **12**(7): 538-49.

3. Beyrer C, Crago AL, Bekker LG, et al. An action agenda for HIV and sex workers. *Lancet* 2015.

4. Tanzania Commission for AIDS (TACAIDS), Zanzibar AIDS Commission (ZAC), National Bureau of Statistics (NBS), Office of Chief Government Statistician (OCGS), ICF International. Tanzania HIV/AIDS and Malaria Indicator Survey 2011-12. Dar es Salaam, 2013.

5. USAID Project Search, Research to Prevention. HIV among Female Sex Workers and men who have sex wIth men In SwazIland. Baltimore, MD: USAID | Project Search: Research to Prevention, 2013.

6. Ferguson AG, Morris CN. Mapping transactional sex on the Northern Corridor highway in Kenya. *Health & place* 2007; **13**(2): 504-19.

7. Riedner G, Rusizoka M, Hoffmann O, et al. Baseline survey of sexually transmitted infections in a cohort of female bar workers in Mbeya Region, Tanzania. *Sex Transm Infect* 2003; **79**(5): 382-7.

8. Karim QA, Karim SS, Soldan K, Zondi M. Reducing the risk of HIV infection among South African sex workers: socioeconomic and gender barriers. *American journal of public health* 1995; **85**(11): 1521-5.

9. Tanzania National AIDS Control Program, PSI Tanzania. HIV Biological and Behavioral Surveys: Tanzania 2013. Female Sex Workers in Seven Regions: Dar es Salaam, Iringa, Mbeya, Mwanza, Tabora, Shinyanga and Mara. Draft Report, 2013.

10. Search UP. Strategic Assessment to Define a Comprehensive Response to HIV in Iringa, Tanzania Research Brief: Female Sex Workers, 2013.

11. National AIDS Control Program. HIV/AIDS/STI Surveillance Report Dar es Salaam, Tanzania, 2004.

12. Tanzania National AIDS Control Program, PSI Tanzania. HIV Biological and Behavioral Surveys: Tanzania 2013. Female Sex Workers in Seven Regions: Dar es Salaam, Iringa, Mbeya, Mwanza, Tabora, Shinyanga and Mara., 2013.

13. Tsai LC, Witte SS, Aira T, Altantsetseg B, Riedel M. Piloting a Savings-Led Microfinance Intervention with Women Engaging in Sex Work in Mongolia: Further Innovation for HIV Risk Reduction. *The open women's health journal* 2011; **5**: 26-32.

14. Gurnani V, Beattie TS, Bhattacharjee P, et al. An integrated structural intervention to reduce vulnerability to HIV and sexually transmitted infections among female sex workers in Karnataka state, south India. *BMC public health* 2011; **11**: 755.

15. Bikaako-Kajura W. AIDS and transport: The experience of Ugandan road and rail
transport workers and their unions. *International Transport Workers' Federation* 2000.

16. Oyefara JL. Food insecurity, HIV/AIDS pandemic and sexual behaviour of female commercial sex workers in Lagos metropolis, Nigeria. *SAHARA J : journal of Social Aspects of HIV/AIDS Research Alliance / SAHARA , Human Sciences Research Council* 2007; **4**(2): 626-35.

17. Scorgie F, Chersich MF, Ntaganira I, Gerbase A, Lule F, Lo YR. Socio-demographic characteristics and behavioral risk factors of female sex workers in sub-saharan Africa: a systematic review. *AIDS and behavior* 2012; **16**(4): 920-33.

18. Research TSPUoWCfHEa. Room for change: preventing HIV transmission in brothels, 2000.

19. Preston-Whyte E, Varga C, Oosthuizen H, Roberts R, Blose F. Survival sex and HIV/AIDS in an African City. Framing the Sexual Subject: The Politics of Gender, Sexuality and Power. Berkeley, Los Angeles and London: University of California Press; 2000: 165-90.

20. Reed E, Gupta J, Biradavolu M, Devireddy V, Blankenship KM. The context of economic insecurity and its relation to violence and risk factors for HIV among female sex workers in Andhra Pradesh, India. *Public health reports* 2010; **125 Suppl 4**: 81-9.

21. Ngo AD, McCurdy SA, Ross MW, Markham C, Ratliff EA, Pham HT. The lives of female sex workers in Vietnam: Findings from a qualitative study. *Culture, health & sexuality* 2007; **9**(6): 555-70.

22. Urada LA, Morisky DE, Pimentel-Simbulan N, Silverman JG, Strathdee SA. Condom negotiations among female sex workers in the Philippines: environmental influences. *PloS one* 2012; **7**(3): e33282.

23. Saggurti N, Jain AK, Sebastian MP, et al. Indicators of mobility, socio-economic vulnerabilities and HIV risk behaviours among mobile female sex workers in India. *AIDS Behav* 2012; **16**(4): 952-9.

24. Bharat S, Mahapatra B, Roy S, Saggurti N. Are female sex workers able to negotiate condom use with male clients? The case of mobile FSW in four high HIV prevalence states of India. *PloS one* 2013; **8**(6): e68043.

25. Giddens A. Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis Berkeley and Los Angeles: University of California Press; 1979.

26. Seidel G. The competing discourses of HIV/AIDS in sub-Saharan Africa: discourses of rights and empowerment vs discourses of control and exclusion. *Social science & medicine (1982)* 1993; **36**(3): 175-94.

27. Choi SY, Holroyd E. The influence of power, poverty and agency in the negotiation of condom use for female sex workers in mainland China. *Culture, health & sexuality* 2007; **9**(5): 489-503.

28. Morgan DL. Qualitative Research Methods Series: Vol. 16. Focus groups as qualitative research (2nd ed.). Thousand Oaks, CA: Sage Publications; 1997.

29. Ivanoff SD, Hultberg J. Understanding the multiple realities of everyday life: basic assumptions in focus-group methodology. *Scandinavian journal of occupational therapy* 2006; **13**(2): 125-32.

30. Pope C, Ziebland S, Mays N. Analysing qualitative data. *BMJ : British Medical Journal* 2000; **320**(7227): 114-6.

31. Patton MQ. Qualitative Research and Evaluation Methods (3rd Edition). United States Sage Publications; 2002.

32. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Thousand Oaks, Calif: Sage Publications; 2006.

33. ATLAS.ti. Scientific Software Development GmbH In: MN SSDG, editor. version 1.0.50 ed. Eden Prairie.

34. Reed E, Gupta J, Biradavolu M, Devireddy V, Blankenship KM. The Context of Economic Insecurity and Its Relation to Violence and Risk Factors for HIV Among Female Sex Workers in Andhra Pradesh, India. *Public Health Reports* 2010; **125**(Suppl 4): 81-9.

35. Fehrenbacher AE, Chowdhury D, Ghose T, Swendeman D. Consistent Condom Use by Female Sex Workers in Kolkata, India: Testing Theories of Economic Insecurity, Behavior Change, Life Course Vulnerability and Empowerment. *AIDS and behavior* 2016; **20**(10): 2332-45.

36. Gysels M, Pool R, Nnalusiba B. Women who sell sex in a Ugandan trading town: life histories, survival strategies and risk. *Social science & medicine (1982)* 2002; **54**(2): 179-92.

37. Fitzgerald-Husek A, Martiniuk AL, Hinchcliff R, Aochamus CE, Lee RB. "I do what I have to do to survive": an investigation into the perceptions, experiences and economic considerations of women engaged in sex work in Northern Namibia. *BMC women's health* 2011; **11**: 35.

38. Blanchard JF, O'Neil J, Ramesh BM, Bhattacharjee P, Orchard T, Moses S. Understanding the social and cultural contexts of female sex workers in Karnataka, India: implications for prevention of HIV infection. *The Journal of infectious diseases* 2005; **191 Suppl 1**: S139-46.

39. Ghose T, Swendeman D, George S, Chowdhury D. Mobilizing collective identity to reduce HIV risk among sex workers in Sonagachi, India: the boundaries, consciousness, negotiation framework. *Social science & medicine (1982)* 2008; **67**(2): 311-20.

40. Greig FE, Koopman C. Multilevel analysis of women's empowerment and HIV prevention: quantitative survey Results from a preliminary study in Botswana. *AIDS and behavior* 2003; **7**(2): 195-208.

41. Kabeer N. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. In: Studies IoS, ed. Development and Change. Oxford, UK: Blackwell Publishers Ltd; 1999: 435-64.

42. Daigle GT, Jolly PE, Chamot EA, et al. System-level factors as predictors of adherence to clinical appointment schedules in antiretroviral therapy in Cambodia. *AIDS care* 2015; **27**(7): 836-43.

43. Arrivillaga M, Salcedo JP, Perez M. The IMEA project: an intervention based on microfinance, entrepreneurship, and adherence to treatment for women with HIV/AIDS living in poverty. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2014; **26**(5): 398-410.

44. Munoz M, Bayona J, Sanchez E, et al. Matching social support to individual needs: a community-based intervention to improve HIV treatment adherence in a resource-poor setting. *AIDS and behavior* 2011; **15**(7): 1454-64.

45. Holmes K, Winskell K. Understanding and mitigating HIV-related resource-based stigma in the era of antiretroviral therapy. *AIDS care* 2013; **25**(11): 1349-55.

46. Pillai P, Bhattacharjee P, Ramesh BM, S I. Impact of two vulnerability reduction strategies - collectivisation and participation in savings activities - on HIV risk reduction among female sex workers, KHPT 2012.

47. Patel SK, Battala M, Adhikary R. Food Insufficiency, Violence and HIV Risk Behaviors among Female Sex Workers in India. *Journal of Food Security* 2016; **4**(5): 104-11.

48. Weiser SD, Leiter K, Bangsberg DR, et al. Food Insufficiency Is Associated with High-Risk Sexual Behavior among Women in Botswana and Swaziland. *PLoS Medicine* 2007; **4**(10): e260.

49. Brunie A, Fumagalli L, Martin T, Field S, Rutherford D. Can village savings and loan groups be a potential tool in the malnutrition fight? Mixed method findings from Mozambique. *Children and Youth Services Review* 2014; **47**(2): 113-20.

Paper 3: Where do community savings groups fit within a community-empowerment approach to HIV prevention with female sex workers?

Abstract

Community empowerment (CE) approaches for addressing HIV among female sex workers (FSW) aim to reduce HIV vulnerability by confronting the social and structural barriers FSW face to engaging in protective sexual behaviors. This study explores the potential of organically formed community savings groups among FSW in Iringa, Tanzania as a model for economic empowerment within a CE framework to address structural sources of HIV vulnerability and ultimately achieve socioeconomic inclusion. Between April 2015 and February 2016, 27 in-depth interviews (IDIs) with 15 FSW and 4 focus group discussions (FGDs) with 35 FSW participating in community savings groups, were conducted in the Iringa region. Participants were asked about the dynamics of financial security and sex work in their lives, their experiences participating in the groups, and how group participation influenced their lives and work. Ten key informant interviews (KIIs) were conducted with group collectors to explore group functioning, challenges, and visions for the future of the group. Participants described community savings groups as providing them with material and socio-emotional support and promoting a sense of solidarity and collective identity within the FSW community. Women had rich accounts of the ways in which group participation promoted these social components within their groups and fostered a sense of collective agency. Group collectors and members were eager to formally register their groups with the government and become recognized by the broader community. Findings indicate that savings groups

among FSW in Iringa, Tanzania promote social components that serve as mechanisms through which community empowerment is achieved, and though at a nascent stage, are primed to mobilized for collective action towards social and economic inclusion. The groups hold potential as an economic empowerment strategy to enable sex workers to intervene on the structural factors contributing to their HIV risk and vulnerability and ultimately to gain access to resources and equity.

Background

Female sex workers (FSW) bear a disproportionately high burden of disease in the global distribution of HIV.[1] A meta-analysis to assess the burden of HIV among FSW in low- and middle-income countries found that FSW were globally estimated to have 13.5 times greater odds of having HIV than other adult women.[2] Regional analysis found a combined HIV prevalence of 29.3% among FSW in sub-Saharan Africa, significantly higher than any other geographic region.[3] Tanzania has a national HIV prevalence of 5.1% however, the Iringa region in the southwest highlands has a notably higher prevalence of 9.1% and a pronounced gender disparity with 11% of adult women HIV-infected compared with 6.9% of adult men.[4] Prior formative work suggests that the higher HIV prevalence and more pronounced gender disparity in Iringa could be partly due to its geographic location along the TanZam highway, a major transport and trucking route that bifurcates the region, and which, along with migration of seasonal workers to nearby agricultural plantations, create and sustain demand for sex work.[5] Most sex work in Iringa is venue-based, taking place at bars, guesthouses, and truck stops.[5,6] The Tanzanian government estimates that HIV prevalence among FSW working in bars is between 32% and 50% and that prevalence among FSW working at truck stops along major highways and transport routes is as high as 60%.[7] The most recent national data identified a 32.9% HIV prevalence among FSW in the Iringa region.[6]

Community empowerment-based approaches that are designed, implemented, and led by sex workers are now recognized as having a vital role in HIV prevention efforts with FSW.[8] With a focus on the broader context of social and structural barriers, a community empowerment (CE) framework is one in which the community takes collective ownership of strategies to address structural barriers to their health and human rights.[9] A recent systematic review and meta-analysis of the effectiveness of community empowerment approaches addressing HIV among sex workers found that these approaches were significantly associated with reductions in HIV and increases in consistent condom use with clients.[10] CE approaches focus on reducing HIV vulnerability for sex workers by confronting the social and structural barriers they face to engaging in protective sexual behaviors. The literature indicates CE programs promote solidarity, social cohesion, mutual trust, and collective identity, which serve as mechanisms through which individual and collective empowerment are achieved.[11-15] The ultimate goal of CE is to empower FSW to gain voice and visibility outside of the sex worker community, partnering with other actors and groups to gain access to resources and address the structural barriers that contribute to their HIV risk and vulnerability.[9]

Given the growing literature indicating the importance of financial insecurity as a driver of HIV risk behaviors such as unprotected sex among FSW,[16-22] structural interventions for addressing economic issues facing FSW have gained traction.[23] Within the context of community empowerment initiatives, some programs have incorporated economic components, which work to both address the economic conditions of sex worker's lives that contribute to HIV risk and promote FSW economic empowerment at the community level. Durbar (The Sonagachi Project), a multi-component CE program among FSW in Kolkata, India, was among the first to do so with its peer-led savings and lending cooperative.[24] In addition to reporting increases in consistent condom use and reductions in HIV prevalence among brothel-based FSW,[25-27] Durbar demonstrated increased collective agency and improved economic status among program participants.[11,28] Studies examining projects within the Avahan Initiative operating in multiple districts of India which include savings and credit mechanisms for FSW specifically aimed at enhancing financial security in the community have also identified associations between community mobilization, reported levels of individual and collective empowerment and improved health, social and economic outcomes.[13,29,30] These programs model how economic empowerment within a community empowerment framework can occur within the context of forming social cohesion among FSW communities and allow FSW to address economic issues alongside and as part of empowerment strategies to address other structural vulnerabilities.

We have situated our research within the theoretical orientation of social and economic exclusion. Social exclusion refers to a lack of opportunities, isolation, discrimination, and marginalization from decision-making**¡Error! Referencia de hipervínculo no válida.** while economic exclusion can be broadly defined as "non-participation in or blocked access to the labor market, public services, finance, and the housing, educational and health sector."[32] Beyond an individual not having sufficient material resources, economic exclusion entails being outside of a group that has access to resources. Economic exclusion is a group-level phenomenon that can be understood as a form of discrimination based on group or non-group status and can be applied to any vulnerable or marginalized group in society.[32] FSW face multiple and multifaceted forms of stigma and discrimination as women, as sex workers, in some cases as poor members of society and in other cases as persons at risk for or living with HIV. Their marginalized and stigmatized social status coupled with low education and literacy levels present significant barriers to their ability to access traditional banking services, economic activities and the labor market. They are often excluded from educational opportunities, job opportunities, and traditional financial institutions.[33] For a marginalized group like sex workers, the interaction of social and economic exclusion limits their access to critical resources necessary to protect their health and human rights. Specifically in the case of HIV among FSW, economic exclusion plays into financial security and economic vulnerability to HIV infection. From this orientation, community empowerment and economic empowerment within that process introduce promising strategies for overcoming the complex interaction between social and economic exclusion that FSW face.

A model for achieving economic inclusion of FSW is provided by Durbar's community-led Usha Multi-purpose Cooperative Society. In their efforts to establish USHA as a registered savings and lending cooperative, FSW in Kolkata's red-light district faced significant push back from government officials refusing to permit a sex worker group to form a cooperative on the grounds of a "morality" clause. The women began a lobbying and advocacy campaign to garner support for their cooperative and succeeded in getting the controversial clause abolished and becoming the first formally recognized cooperative of sex workers in India. In the process, sex work became formally acknowledged by the State as an occupation, the sex worker community gained voice and presence in the political, social and business sectors, and social norms and perceptions of sex work were changed.[34] Sonagachi successfully redefined the status of the sex worker community "from socially and economically excluded to an empowered workforce."[24]

At the root of strategies to achieve economic inclusion is empowerment theory which focuses on enhancing individual and collective agency and seeking to alter power relations between marginalized and dominant groups in society.[23,35,36] Through the community empowerment process, FSW gain collective agency to effectively address power imbalances and the social and structural sources of their HIV vulnerability.[13,15,35-38] As demonstrated by the USHA cooperative, membership in collectives and groups can foster development of social capital for FSW helping them create a bridge from their status as an excluded group to the broader community where they can partner with allies and groups to collaboratively address their exclusion. Empowerment strategies that politicize the actions of sex workers advocating for their rights, as modeled by USHA, help FSW gain visibility outside their own community. This process reframes others perceptions of FSW and transforms FSW self-perceptions as a disadvantaged groups who may be "habituated to inequality" and "unaware of possibilities of social change,"[36] Qualitative research previously conducted in the Iringa region revealed organically formed community savings groups (locally called mchezo) among FSW. This study explores the potential role of these groups as a community empowerment-based intervention to enable FSW in Iringa to develop social cohesion and take collective action to ultimately achieve economic inclusion. This qualitative research served as formative work for the development of an economic empowerment intervention component within an ongoing Phase II community-based combination HIV prevention trial called Project Shikamana (Stick Together) being conducted among Tanzanian women at heightened risk for HIV in Iringa.

Methods

We conducted 27 in-depth interviews (IDIs) with 15 FSW, 4 focus group discussions (FGDs) with 35 FSW in the Iringa region, and key informant interviews (KII) with 10 group collectors. We purposively sampled for women participating in savings groups and sought a diverse sample with regards to age and HIV status. Women who reported participating in a community savings group in a previous research project conducted by the study team were first recruited into the study to participate in IDIs. Then, using snowball sampling, participants were asked to recommend other sex workers that they know who also participated in savings groups for IDIs or, later in the study, for FGDs once all interviews were complete.

IDI and FGD participants ranged from 20-45 years old, with a mean age of 28.7 years. Among the sample, 80% (40/50) of the women were single, 9 women were married or reported a permanent partner and 1 woman was a widow. Nearly all (90%) of participants had children and over half (56%) had 2 or more. Education levels were low with 38% (19/50) having some secondary school, 60% (30/50) having primary-level education and 1 individual had no schooling. Of the 15 FSW who participated in IDIs, 11 of them were HIV-infected. HIV status of FGD participants was not collected to maintain confidentiality for those not wanting to disclose their status to the group. The 10 group collectors who participated in KII ranged in age from 22-32 years old, with a mean age of 27.6 years. Eight of the collectors had primary level education and 2 had some secondary schooling.

Of the 15 FSW who initially participated in an IDI, 12 completed a follow-up interview 8-12 weeks later. The second interview provided an opportunity to revisit some of the topics discussed with the hope that existing rapport with the interviewer would facilitate further depth of information, particularly around sensitive topics such as sex work and personal finances. Interviews took place at or near the study participant's work or home, based on her preference, and lasted approximately one hour. A semi-structured interview guide was used to gather information on key domains within financial security and participation in community savings groups.

Four FGDs were conducted with 35 FSW who participated in community savings groups. FGDs were intended to facilitate an understanding of norms, expectations and local construction of the concepts of interest in the study.[39,40] Exploring similar topics covered in the interviews with individuals, the group setting afforded us the opportunity to discover how FSW think and talk about these issues and provided insight into their shared understanding of their lives, culture, and world.[40] FGDs took place at centrally located meeting spaces that had a confidential area for group dialogue. Each group had between 7-11 women and lasted approximately 90 minutes. A focus group discussion guide was developed outlining key domains but the facilitator was encouraged to probe and explore related topics and experiences.

Ten women who serve as community savings group collectors were recruited to participate in KIIs by asking women who participated in the FGDs to refer their group collectors to the study. The intention of conducting interviews with women in leadership roles was to clarify operational aspects of the groups and obtain the perspectives of women who are more intimately involved in setting and managing group rules, dynamics, and challenges. An interview guide was developed to elicit responses to questions about general group operations while allowing for the participant to also provide their perspective on the meaning and importance of the groups.

Debriefing sessions were conducted following each of the interviews and focus group discussions. These sessions facilitated an iterative process of data collection and analysis and provided guidance for topics to explore further in the follow-up interview with each participant and in subsequent FGDs. All data collection was conducted in Swahili by a local study staff member trained in qualitative research methods who had experience working with the FSW population in Iringa. All interviews and focus groups were audio recorded, transcribed, and translated into English. Oral informed consent was obtained from all women in the study. Upon session completion, participants were compensated 5,000 Tanzania Shillings ($2.50 USD) for their time.

This study received human subjects research approval from the Institutional Review Boards of the Johns Hopkins University Bloomberg School of Public Health, Muhimbili University of Health and Allied Sciences, and the National Institute for Medical Research of Tanzania.

Qualitative analysis was conducted using an iterative thematic analysis approach both drawing on a priori codes and allowing for emergent codes and themes.[41,42] Memos were developed from multiple readings of each transcript to assist in development of salient themes and used throughout data collection to document thoughts about the significance and relationships of codes to one another and note questions that arose from the coding process.[43] A codebook was developed based on the themes emerging from the data. Coding output was synthesized across key domains, categories were identified and codes were arranged hierarchically with sub-codes listed under major categories. Major categories under which codes were arranged included stigma, solidarity, trust, and decision-making, among others.

Analysis of the transcripts varied by method. IDIs were analyzed in the tradition of a narrative approach, placing value on the women's story telling of their lives in sex work and their financial realities, used as an opportunity to reveal cultural and social patterns through the lens of individual experiences.[42] Throughout analysis of the IDIs, attention was paid to age and HIV status in order to allow for emergent themes relating to a life course perspective (i.e. decreasing sex work income with increasing age) as well as how financial security and savings group participation may play out differently for HIV infected women (i.e. having resources to pay transport costs for HIV-related clinic visits). FGDs were analyzed as a collective dialogue in which the group itself was the unit of analysis and the group dynamics and interpretations and meaning of what participants shared was understood in the context of the larger group. Analysis focused on interpreting a collective view of participants' understanding of the world rather than treating them as a compilation of the views of different participants in the group.[40] Analysis of KIIs included coding for operational codes to identify key components and functions of the groups. All interview and focus group transcripts were coded using ATLAS.ti qualitative data management and analysis software.[44]

Key themes addressed in this paper include: community group formation, group solidarity and types of support, involvement in decision-making, and desire to be recognized and move towards inclusion.

Results

Community established and led

Participants described community savings groups as forming organically when need was identified among individuals who either knew each other or had a common acquaintance who served as the group's collector. The groups varied in their make-up – some included women only, some were exclusively FSW often organized within sex work venues among colleagues, others were mixed community members including men and women. Participants explained, however, that when FSW joined savings groups of mixed community members, it often became clear they were not welcome. Other members insulted them or in other ways let them know that they did not want women who exchange sex for money in their groups. This led many participants to join or form FSW-only groups. These groups were formed with the intention of not letting women join who were not FSW for fear they would disclose to others in the community that the women in the group were sex workers. Participants described the sex worker-only groups as secret, or operating covertly due to fear of stigma from the non-FSW community. One participant said, "We will keep it to ourselves that it's *mchezo* for dada poa [FSW] only; it will only be known in our community…we will give it a different name...but deep inside we know that it's a sex workers only group." (IDI participant, age 39) Another participant described:

> *It's true we can never invite someone from the general population because they will expose us. We are very good at keeping secrets. If we get someone else from the general population automatically she will know we are sex workers. They will sit down and discuss us; she will expose how we run our business; that can bring problems in the streets. That's why we chose ourselves because we know we can keep our secrets.* - IDI participant, age 30

Participants spoke specifically about the unique challenges they face as sex workers and the benefit of coming together as a community to support their future livelihoods. Recognizing the occupational realities of HIV risk and aging out of sex work, one woman who started a group with her colleagues explained:

> *I called them [her fellow FSW] and we sat at the table, I told them these jobs have an end. Where we are going to get men, there is AIDS, it may reach a point when you lose all the power to work. It may reach a point when you will be worn out, even the men won't desire to sleep with you. In that sense, if we participate in mchezo you can get money. You may get money and do something meaningful; you may even buy a plot and build a small house of one room. Why don't we participate in mchezo? They all saw this was a good idea.*
>
> - IDI participant, age 30

Group support and solidarity

A prominent theme across interviews and focus groups was the dynamic of mutual aid and support, which came in the form of economic, material, and socio-emotional support. Under normal circumstances, the groups involved a rotating payout in which each member received the total amount pooled from all members' contributions. However, inherent to the groups was a support network to help members absorb economic shock or offer other types of support in times of need from additional monetary collections to cover the cost of unexpected hospital bills and medication to cooking for her when she or someone in her family falls ill.

One participant described it as fundamental to how problems are handled in the community saying, “It means when you get a problem, the group is obligated to help you because you are one of them…we live by cooperating with each other” (IDI participant, age 35). An important feature of the groups was that, if agreed upon, the order of the rotating payout could be adjusted to assist a member in need. At the start of the cycle, members chose a number that dictated when in the cycle they would receive the payout however when in crisis, members could ask the group collector to switch places in the rotation with another member because she was in particular need at that time. In addition to the value of being able to receive monetary support in times of financial crisis, many participants described that this was tied to a sense of emotional support they felt from other members assisting them with their problems. As one participant described:

> *That’s how we help each other, not because it’s your turn then and you want to just take the money without caring about your friends and their problems, we listen to each other, and we listen to our friends problems, how big their problems are and how we can help them.* – IDI participant, age 30

Another participant spoke about how group members swapping places with one another can foster a sense of camaraderie and solidarity:

> *So they understood me, they gave it to me though it was not my turn. The other member took my turn and I took hers. It was like two weeks to go [to reach my*

> *turn]. She just thought what if it was her having a problem, that I would help her the same way that is why she helped me too… I felt good because she helped me, she cared for me and that's why she agreed.* – IDI participant, age 28

Some women described that the savings groups created bonds between group members providing a network in which people took care of one another. As one participant described:

> *To tell the truth, this mchezo has created friendship and closer relations. You get to know each other and if someone is sick, you know it. If someone hasn't brought the contribution money, you know definitely that X hasn't brought money or maybe she has a certain problem so other mchezo members must unite with you to help; in the mchezo we play like if we are relatives.* – IDI participant, age 24

Participants made it clear that camaraderie within the sex worker community over their shared experiences fueled a sense of solidarity and support within the savings groups. One collector spoke about the need for such groups within the community for FSW to be able to help each other through some of the challenges they face in their work:

> *In our group we sat and thought because we all do our activities differently. And it happens someone may go to her activities and face problems. You find she comes back with no money at all. There is this and that problem, so we help her…we help each other as a group member who has a problem; we need to do*

something to help her. We know the whereabouts of one another. So if I go any place and I am harmed, then I just get in touch with my fellows. One will come or maybe send a motorcycle. It's like a certain type of union. We decided to form our own mchezo because of this business that we are doing. In the union there are times that you get along with each other and there are times you don't. We don't have any rules but it's just faithfulness and union and loving one another.

- Group collector, age 30

Many participants spoke about the importance of having a common understanding of shared experiences among FSW within the savings groups. This was evident in their ability to relate to and support each other through common challenges they faced in their work, such as clients who refused to pay for services. One woman highlighted this in a scenario of supporting each other through experiencing violence from a client:

> *Maybe you went with a client and he hit you pretty hard, then you're just sick at home, very sick at home, you have nowhere to go, no one to talk to. You don't know where to go, you don't have money. Therefore, because we know each other, we can take her to the hospital to get treatment.* - IDI participant, age 39

Not all savings groups had regularly scheduled meetings but for those that did, the meetings were described as fostering social cohesion and providing practical support. Participants described the meetings as opportunities for information sharing, exchanging advice and addressing group dynamics and community issues. One collector shared that she had begun providing her group members with advice on how to manage and spend money. Another collector described that sexual health advice was shared between members during meetings including encouraging condom use with clients and HIV testing. One group member spoke about the challenge of sex work clients seeking lower prices at different venues in the area and reported that it was during savings group meetings that members would discuss and set prices that they thought should be used by FSW across local venues.

Involvement in decision-making

Participants described egalitarian decision-making in various parts of group operations. One group member recounted when her group decided to increase their regular contributions to meet their increasing needs saying, "I was part of that decision. Our collector involved all of us in it, we discussed and decided to increase the amount from 1,000 to 2,000 because life has changed and now people have a lot more needs" (IDI participant, age 34).

A group collector spoke about the scenario in which a member comes to ask her to change places in the rotation and the importance of opening up that discussion to the members involved saying, "I can't make the decision alone because everyone knows her day, that will bring quarrels. You must involve the two so they can agree together and know that I will take his round and she will take my round" (Group collector, age 31).

Another group collector discussed the need for the groups to maintain a flexible structure in which the members should be able to decide if and when the group needs to attend to different needs of its members:

> *If a problem has happened, we members should focus and change, days are moving forward and life changes. Therefore when we change the form of mchezo we have to assess what do we do as a group...If we get problems, we must cooperate. If someone is sick, we have to go together. It is like we build team cooperation. We have to change and become something else.*
>
> – Group collector, age 25

Moving towards inclusion

As participants described exclusion from formal banking due to insufficient income, they explained that savings groups provided with them a mechanism within the community that allowed them to safely save money. However, the vision expressed by group members and collectors alike was to move their groups into a more formal capacity. Study participants spoke of their desire to gain recognition, register their savings groups with the government, and achieve social inclusion in the broader non-FSW community. One participant said, “my vision, what I see, is being recognized by the community and media…we are not known anywhere, everything we are doing has to be done secretly” (IDI participant, age 30).

Many of the women wanted to register their groups with the government because they believed it would help them enforce when payments are due by members who evade them. One collector said that when someone doesn't pay, "there is nothing to do because these groups are still small, we can't take any legal measure because these groups are not registered which makes it difficult to take someone before the law" (Group collector, age 27). While many women thought this would improve group functioning by introducing more formal accountability, others were optimistic that this would help them be recognized and respected by society. One focus group participant spoke of wanting to "do something in society so I can be seen as if I am somebody." Another participant said:

> *Sex work is work like any other work. It's just that we are not recognized. Maybe on social media like radio, for example here in Ilula we're not recognized at all. And here in Ilula for example I think nobody knows that I am a sex worker. I don't even think people know that we are playing mchezo and we are really helping each other.* – IDI participant, age 30

Many women spoke with optimism about the future of their groups. Participants reflected on how much their groups had already grown in size and contribution amount. They had clear ambitions for continuing to strengthen and grow the groups and conveyed that registering with the government and becoming formally recognized was a natural next step for them.

Discussion

This qualitative study sought to explore the potential of community savings groups as part of a community empowerment based-response to HIV among FSW in Iringa, Tanzania. Our findings indicate that these organically formed groups are community established and led, promote the social components that serve as mechanisms through which community empowerment is achieved, and though at a nascent stage, are primed to mobilized for collective action towards social and economic inclusion. The groups thus align directly with the community empowerment process by which FSW develop social cohesion and mobilize to design and act upon solutions to tackle the structural barriers they face.[9] In previous qualitative work, we found that participating in community savings groups promoted individual agency and empowered decision-making among FSW in Iringa enabling them to more effectively navigate condom negotiation and safer sex with clients, thus reducing their sexual risk behaviors. The findings presented here complement and build upon that work by indicating that, within a community empowerment perspective, these groups go beyond fostering agency at the individual level to make sex work safer to, in fact, empowering FSW to collectively address their social and economic exclusion.

Our findings indicate that savings group participation fosters social cohesion, solidarity, mutual aid, and collective identity among FSW in Iringa, key components identified by previous studies of CE approaches as the mechanisms through which empowerment of FSW can occur.[11,12,14,29] The solidarity and mutual support participants described in times of crises – through experiences of economic shock, violence from clients, illness – is consistent with prior research indicating that FSW peer groups can be integral in providing support and fostering a sense of solidarity in coping with crises.[30,33] Participants also described involvement in group decision-making in their savings groups, a critical component of the empowerment process. Participating in collective decision-making can strengthen FSW individual and collective capacity to exercise 'voice.'[45] Development of a collective voice was further evident in participants describing that savings group meetings were used to set local prices for sex with a condom enabling them to form a unified front in response to the challenge of clients pitting FSW and venues against each other in their search for the lowest prices. By using their collective voice in this way, FSW in Iringa have begun to actively change condom use norms to protect themselves from HIV. The solidarity and formation of collective identity that participants in this study described experiencing from savings group participation foster social cohesion providing them with the collective agency to counter their social and economic exclusion vis a vis group status.

Findings indicate that the women were eager to achieve social and economic inclusion. Women in the study described group-based stigma they experienced as FSW and how it led them to hide their identity from the broader community. Many participants expressed they did not want to remain hidden and unrecognized by the non-FSW community. They expressed strong interest in formally registering their groups to ensure that regulations could be enforced in their groups' operations but also conveyed their readiness to integrate into the non-sex work community and demand respect for their groups and their profession. Membership in collectives and groups has been shown to change the public and self-perception of women's power.[29,46] By encouraging women to openly organize themselves to advocate for and protect their community's interests in a public way, CE approaches promote a more open recognition of sex work as a profession.[37] Collective solidarity in the public arena is critical to empowerment of FSW as a community and their ability to access resources and social entitlements from which they are excluded.[13,35] The desires of FSW in Iringa to have their groups registered and their profession recognized reveals the empowerment process underway within this community and their commitment to working towards inclusion.

In this paper we pursued the question of how community savings groups among FSW in Iringa, Tanzania can be positioned within a CE framework for addressing HIV. Findings speak to their appropriateness as a community-based empowerment strategy. The next question is then how the groups can best be supported and strengthened as part of a comprehensive response to HIV within this community. Funding to support capacity building at various levels of group operations would help strengthen the groups and could widen their reach allowing more groups and more FSW in the community to benefit from participation. Because addressing social and economic exclusion requires changing the attitudes of those responsible for policy and in control of resources, programmatic focus should be placed on efforts to assist and support FSW communities in the step of engagement with policy makers and political processes.

Limitations of this study include the potential bias introduced by using snowball sampling for participant recruitment and that participants were limited to women with experience in community savings groups. Three of the women who participated in initial IDIs were unavailable for a second interview, so we were not able to pursue follow-up questions and additional exploration of topics with those participants. Because of insufficient language skills and cultural limitations, the primary researcher did not conduct the interviews or focus group discussions and thus may have missed nuanced dynamics.

Conclusions

Study findings indicate that organically formed community savings groups among FSW in Iringa, Tanzania are at a nascent stage of the community-empowerment process and hold promise as an important component of a comprehensive empowerment-based approach to addressing HIV within this community. The groups appear to foster social cohesion providing FSW with the collective agency to counter their social and economic exclusion. Community savings groups as an economic empowerment strategy for FSW communities may enable sex workers to intervene on structural factors contributing to their HIV risk and vulnerability and ultimately to gain access to resources and equity.

References

1. WHO WHO. WHO Guidelines: prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries. Geneva; 2012.

2. Baral S, Beyrer C, Muessig K, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet Infectious diseases* 2012; **12**(7): 538-49.

3. Beyrer C, Crago AL, Bekker LG, et al. An action agenda for HIV and sex workers. *Lancet* 2015.

4. Tanzania Commission for AIDS (TACAIDS), Zanzibar AIDS Commission (ZAC), National Bureau of Statistics (NBS), Office of Chief Government Statistician (OCGS), ICF International. Tanzania HIV/AIDS and Malaria Indicator Survey 2011-12. Dar es Salaam, 2013.

5. Search UP. Strategic Assessment to Define a Comprehensive Response to HIV in Iringa, Tanzania Research Brief: Female Sex Workers, 2013.

6. Tanzania National AIDS Control Program, PSI Tanzania. HIV Biological and Behavioral Surveys: Tanzania 2013. Female Sex Workers in Seven Regions: Dar es Salaam, Iringa, Mbeya, Mwanza, Tabora, Shinyanga and Mara., 2013.

7. National AIDS Control Program. HIV/AIDS/STI Surveillance Report Dar es Salaam, Tanzania, 2004.

8. WHO., UNFPA., UNAIDS., NSWP. Prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries: recommendations for a public health approach, 2012.

9. WHO, UNFPA, UNAIDS, NSWP, Bank W. Implementing comprehensive HIV/STI programmes with sex workers: practical approaches from collaborative interventions. Geneva: World Health Organization, 2013.

10. Kerrigan D, Kennedy CE, Morgan-Thomas R, et al. A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *Lancet* 2015.

11. Swendeman D, Basu I, Das S, Jana S, Rotheram-Borus MJ. Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases. *Social science & medicine (1982)* 2009; **69**(8): 1157-66.

12. Blankenship KM, West BS, Kershaw TS, Biradavolu MR. Power, community mobilization, and condom use practices among female sex workers in Andhra Pradesh, India. *AIDS (London, England)* 2008; **22 Suppl 5**: S109-16.

13. Blanchard AK, Mohan HL, Shahmanesh M, et al. Community mobilization, empowerment and HIV prevention among female sex workers in south India. *BMC public health* 2013; **13**: 234.

14. Reza-Paul S, Beattie T, Syed HU, et al. Declines in risk behaviour and sexually transmitted infection prevalence following a community-led HIV preventive intervention among female sex workers in Mysore, India. *AIDS (London, England)* 2008; **22 Suppl 5**: S91-100.

15. Cornish F, Shukla A, Banerji R. Persuading, protesting and exchanging favours: strategies used by Indian sex workers to win local support for their HIV prevention programmes. *AIDS care* 2010; **22 Suppl 2**: 1670-8.

16. Tsai LC, Witte SS, Aira T, Riedel M, Hwang HG, Ssewamala F. "There is no other option; we have to feed our families...who else would do it?": The financial lives of women engaging in sex work in Ulaanbaatar, Mongolia. *Global journal of health science* 2013; **5**(5): 41-50.
17. Odek WO, Busza J, Morris CN, Cleland J, Ngugi EN, Ferguson AG. Effects of micro-enterprise services on HIV risk behaviour among female sex workers in Kenya's urban slums. *AIDS and behavior* 2009; **13**(3): 449-61.
18. Kim J, Pronyk P, Barnett T, Watts C. Exploring the role of economic empowerment in HIV prevention. *AIDS (London, England)* 2008; **22 Suppl 4**: S57-71.
19. Wojcicki JM, Malala J. Condom use, power and HIV/AIDS risk: sex-workers bargain for survival in Hillbrow/Joubert Park/Berea, Johannesburg. *Social science & medicine* 2001; **53**(1): 99-121.
20. Gysels M, Pool R, Nnalusiba B. Women who sell sex in a Ugandan trading town: life histories, survival strategies and risk. *Social science & medicine (1982)* 2002; **54**(2): 179-92.
21. Ntumbanzondo M, Dubrow R, Niccolai LM, Mwandagalirwa K, Merson MH. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of Congo. *AIDS care* 2006; **18**(7): 777-85.
22. Reed E, Gupta J, Biradavolu M, Devireddy V, Blankenship KM. The Context of Economic Insecurity and Its Relation to Violence and Risk Factors for HIV Among Female Sex Workers in Andhra Pradesh, India. *Public Health Reports* 2010; **125**(Suppl 4): 81-9.
23. Blankenship KM, Friedman SR, Dworkin S, Mantell JE. Structural Interventions: Concepts, Challenges and Opportunities for Research. *JURH* 2006; **83**(1): 59-72.
24. Jana S, Basu I, Rotheram-Borus MJ, Newman PA. The Sonagachi Project: a sustainable community intervention program. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2004; **16**(5): 405-14.
25. Basu I, Jana S, Rotheram-Borus MJ, et al. HIV Prevention Among Sex Workers in India. *Journal of acquired immune deficiency syndromes (1999)* 2004; **36**(3): 845-52.
26. Jana S, Chakraborty AK, Das A, Khodakevich L, Chakraborty MS, Pal NK. Community based survey of STD/HIV infection among commercial sex-workers in Calcutta (India). Part II. Sexual behaviour, knowledge and attitude towards STD. *The Journal of communicable diseases* 1994; **26**(3): 168-71.
27. Cohen J. HIV/AIDS in India. Sonagachi sex workers stymie HIV. *Science (New York, NY)* 2004; **304**(5670): 506.
28. Ghose T, Swendeman D, George S, Chowdhury D. Mobilizing collective identity to reduce HIV risk among sex workers in Sonagachi, India: the boundaries, consciousness, negotiation framework. *Social science & medicine (1982)* 2008; **67**(2): 311-20.
29. Bhattacharjee P, Prakash R, Pillai P, et al. Understanding the role of peer group membership in reducing HIV-related risk and vulnerability among female sex workers in Karnataka, India. *AIDS care* 2013; **25 Suppl 1**: S46-54.

30. Pillai P, Bhattacharjee P, Ramesh BM, S I. Impact of two vulnerability reduction strategies - collectivisation and participation in savings activities - on HIV risk reduction among female sex workers, KHPT 2012.
31. O'Hara P. Action on the ground: models of rural development practice. Galway: Irish Rural Link, 1998.
32. Dertwinkel T. Economic Exclusion of Ethnic Minorities: On the Importance of Concept Specification. *European Centre for Minority Issues* November 2008; **19**(ECMI Issue Brief).
33. Dworkin S, Blankenship K. Microfinance and HIV/AIDS Prevention: Assessing its Promise and Limitations. *AIDS and behavior* 2009; **13**(3): 462-9.
34. Durbar. Durbar Mahila Samanwaya Committee. http://durbar.org/html/micro_credit.aspx (accessed October 1, 2016.
35. Kabeer N. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. In: Studies IoS, ed. Development and Change. Oxford, UK: Blackwell Publishers Ltd; 1999: 435-64.
36. Sen A. Gender equality and cooperative conflicts. Persistent inequalities: Women and world development New York Oxford University Press; 1990: 123–49.
37. Campbell C. Selling sex in the time of AIDS: the psycho-social context of condom use by sex workers on a Southern African mine. *Social science & medicine (1982)* 2000; **50**(4): 479-94.
38. Cornish F, Ghosh R. The necessary contradictions of 'community-led' health promotion: a case study of HIV prevention in an Indian red light district. *Social science & medicine (1982)* 2007; **64**(2): 496-507.
39. Morgan DL. Qualitative Research Methods Series: Vol. 16. Focus groups as qualitative research (2nd ed.). Thousand Oaks, CA: Sage Publications; 1997.
40. Ivanoff SD, Hultberg J. Understanding the multiple realities of everyday life: basic assumptions in focus-group methodology. *Scandinavian journal of occupational therapy* 2006; **13**(2): 125-32.
41. Pope C, Ziebland S, Mays N. Analysing qualitative data. *BMJ : British Medical Journal* 2000; **320**(7227): 114-6.
42. Patton MQ. Qualitative Research and Evaluation Methods (3rd Edition). United States Sage Publications; 2002.
43. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Thousand Oaks, Calif: Sage Publications; 2006.
44. ATLAS.ti. Scientific Software Development GmbH In: MN SSDG, editor. version 1.0.50 ed. Eden Prairie.
45. Sen A. Women's Agecny and Social Change. Development as Freedom. New York: Anchor Books; 1999.
46. Halli SS, Ramesh BM, O'Neil J, Moses S, Blanchard JF. The role of collectives in STI and HIV/AIDS prevention among female sex workers in Karnataka, India. *AIDS care* 2006; **18**(7): 739-49.

General discussion

The overall aim of this dissertation was to examine the role of community savings groups in addressing financial security and HIV risk among female sex workers (FSW) in Iringa, Tanzania. Using both quantitative and qualitative methods, this study assessed the relationship between the groups and HIV-related risk among FSW, explored the meaning and importance of the groups in the lives of FSW, and examined the potential the groups hold as a mechanism for community mobilization towards taking collective action for social and structural change.

Manuscript 1 determined the relationship between community savings group participation and consistent condom use (CCU) with clients among FSW in Iringa. Quantitative analysis found that FSW with higher financial security had greater odds of CCU with new clients, FSW who participated in community savings group had nearly twice the odds of CCU with new clients than women not in the groups, and the potential for savings group participation to mediate the relationship between financial security and CCU was established. Findings contribute to the literature in suggesting that such groups may be able to intervene on economic vulnerability, a critical structural barrier impeding condom use among FSW, better positioning FSW to engage in condom negotiation with clients. Manuscript 1 answers the question of whether savings groups are associated with HIV risk behaviors among FSW in Iringa. The question posed by these findings is then to explore how and why savings group participation may influence HIV risk behaviors.

Manuscript 2 builds on manuscript 1 by providing an understanding of how group participation influences FSW financial security and sexual risk decision-making with clients. The qualitative findings presented in this manuscript complement the quantitative analysis presented in manuscript 1 by providing a look at the economic context, real-life tensions between financial realities and FSW's ability to protect themselves from HIV, and the ways in which group participation influences members and their safer sex behaviors. Findings contribute to the literature by indicating that community savings group participation enhances individual agency in decision-making influencing sexual risk behaviors of FSW in Iringa. This analysis also suggests that beyond implications for HIV risk reduction, savings group participation may impact the overall health and well-being of FSW and help HIV-positive FSW achieve improved HIV treatment and care outcomes, adding to a small but growing literature on the potential role of savings groups in improved health outcomes for HIV positive individuals. Manuscript 2 provides insight into the question posed by manuscript 1 of how and why savings group participation may influence HIV risk behaviors. The question posed by these findings is then beyond individual agency fostered by community savings groups among FSW in Iringa, what is the community level impact of the groups and what potential might the groups have to promote collective agency mobilizing FSW to confront structural barriers to engaging in HIV-protective behaviors and more broadly to their health and human rights.

Manuscript 3 explored where and how economic strengthening efforts may fit within future community-based approaches to address HIV among FSW in Iringa and beyond. This manuscript builds on manuscripts 1 and 2 by indicating that savings groups among

FSW in Iringa promote social components that serve as mechanisms through which community empowerment is achieved. Findings indicate that the groups foster social cohesion and collective agency, and though at a nascent stage, the groups are primed to mobilize for collective action towards social and economic inclusion. The groups hold potential as an economic empowerment strategy to enable sex workers to intervene on the structural factors contributing to their HIV risk and vulnerability and ultimately to gain access to resources and equity. These findings contribute to the literature by providing insight into the community empowerment process among organically formed FSW-led groups in the sub-Saharan Africa context, a region for which there is a dearth of literature on community empowerment among FSW. Manuscript 3 poses the question then of how public health can support and help strengthen these groups and their impact and further facilitate FSW integration into societal participation and political presence.

Implications for research and programs

This study has a number of implications for future research. In order to assess the efficacy of community savings groups and their impact on both financial security and HIV risk behaviors among FSW, following a cohort longitudinally through a randomized controlled trial would be necessary. Future research to evaluate economic interventions within a CE approach need to consider the various and complex ways in which the empowerment process can take place and utilize reliable aggregate measures for assessing economic strengthening along with social components such as social cohesion, collective action, and advocacy, and health-related outcomes like condoms use and clinic utilization. Studies of the Avahan CE programs in Karnataka, India model the kind of comprehensive research approach that should be employed to fully understand the outcomes of CE including evaluating FSW membership in community-based organizations, obtaining government-sponsored social entitlements, accessing health services, reporting of violence, as well as monitoring news stories and perceptions of FSW represented in media.[26] The lens through which economic empowerment should be assessed as part of a larger evaluation of CE includes both individual level economic strengthening, such as increased savings and access to formal banking, as well as community level evaluation of progress towards formal recognition of a sex workers' group in a political forum, such as USHA cooperative did through registering their collective with the government.[58] Of equal importance would be ethnographic and qualitative research documenting the experiences of women involved in the groups and their perspectives on the complex processes of empowerment and the transformation they see in their lives, their work, and their community.

Moving forward, further research is also needed to explore how and to what extent community savings groups can lead to improved health outcomes for FSW and, in the case of HIV infected FSW, the important implications savings group participation may have for HIV care and treatment outcomes. Additional research on this could assess the potential of the groups to be utilized as HIV combination prevention serving to both prevent HIV acquisition among uninfected individuals and curtail forward transmission among those infected.

This research indicates the need for better and more nuanced measurement tools for financial security. Qualitative findings revealed the complexity of the economic context of FSW lives in Iringa. Measures to capture the financial realities of sex workers lives beyond income alone are needed. Further research is needed on the mechanisms and complex social processes of community empowerment occurring through savings group participation using reliable aggregate measures of the community empowerment process and further exploring the various pathways through which it could lead to social and structural change.[5] Qualitative and ethnographic research methods should be employed to garner a better understanding of context-specific opportunities and challenges to the implementation of community empowerment-based approaches.[5]

There are a number of important implications of this work for public health programming. Based on study findings, HIV prevention efforts should promote and support community savings groups as a strategy for community mobilization of FSW to advocate for their health and human rights and tackle the structural barriers they face to adopting HIV protective behaviors. Funding to support capacity building at various levels of group operations would help strengthen the groups and could widen their reach allowing more groups and more FSW in the community to benefit from participation. Increased financial and political support is needed from donors, governments, partner organizations, and other allies if FSW communities are to advance in their efforts to effectively and sustainably overcome barriers to their social and economic inclusion.

Because addressing social and economic exclusion requires changing the attitudes of those responsible for policy and in control of resources, programmatic focus should be placed on efforts to assist and support FSW communities in the step of engagement with policy makers and political processes. Supporting FSW in building alliances with other organizations provides a bottom-up way of strengthening FSW capacity to exercise voice and to ensure their needs and priorities are addressed by policy and political processes.[97] In Iringa, a first step would be supporting the FSW community in registering their savings groups with the government and supporting advocacy efforts for their inclusion in the financial sector, as that is their identified interest. In other settings, it would be important to assess at what stage the FSW community is working to mobilize and then support efforts towards advocacy and social change from that starting point.

As was seen in the fight for government registration of sex worker collectives by FSW in Kolkata, achieving recognition of sex worker savings groups by the government would be an important first step for FSW in Iringa. The USHA cooperative demonstrated that this led to sex workers increasingly being able to take loans and deal with financial institutions independently as citizens and workers.[66] Furthermore, it brought about changes in social norms around sex work as evidenced by the willingness of banks and vendors to do business with sex workers. [66] As was modeled by the Karnataka Health Promotion Trust (KHTP) in six states in India, holding trainings and workshops with heads of government departments, the police and other stakeholders begins the sensitization process to move towards integration of FSW into participatory roles in various societal sectors.[26] A programmatic focus on supporting and promoting the advancement of FSW objectives in Iringa should include facilitating such workshops and trainings. FSW in Iringa must be supported in their desire expressed throughout the qualitative research conducted in this study to be recognized by the non-FSW community. As modeled by the Nikat program in Ethiopia, FSW in Iringa could begin working on public sensitization by using broadcast media such as a weekly radio programs or local newspapers to detail the lives and rights of sex workers to directly address their desire for recognition of their work and their groups by the non-FSW community.[98]

Considering this study's findings on economic empowerment at the individual level, programs must adopt a rights-based approach which focuses on giving sex workers the economic power to make informed choices about their lives and protect their sexual health.[98] Our findings indicate that savings groups hold potential for intervening on economic conditions affecting HIV risk among this population but it is important that this be achieved in ways that facilitate FSW agency for empowered decision-making around their work, finances, and savings. This research, however, makes a strong case for the need to look beyond individual level economic empowerment. In a context where cultural values and socio-structural barriers constrain women's ability to make strategic life choices, structural inequalities cannot be addressed by individuals alone.[79] While being cognizant of the importance of promoting economic empowerment of individual FSW, focus must be placed on community-empowerment based approaches given their implications for bringing about social and structural change for the broader FSW community.

Among the key principles and processes of community-empowerment based approaches are the recognition of sex work as work and the creation of a safe space for sex workers to gather and organize.[99] Study participants articulated their desire to have sex work recognized as work and spoke of the safe spaces created during savings group meetings, providing further evidence that many of the elements of community empowerment have organically come about and are underway among FSW in Iringa. However it seems essential that HIV prevention programing for FSW include facilitating the development of a critical consciousness enabling FSW to understand the structural causes of their vulnerability and marginalization and which will assist the process of mobilizing for collective action.[5] Programs that facilitate critical consciousness and the agency to take up collective action can promote mobilization of FSW communities to bring about structural change.[71] Programming for FSW in Iringa could include promoting dialogue around sex worker rights through trained peer facilitators utilizing the savings group meetings as environments in which critical consciousness could be cultivated, given that they have been established as safe spaces.

A unique aspect of this research is the fact that the groups of interest are organically formed which slightly shifts the way the findings can be interpreted from those of FSW economic empowerment programs and reconfigures the role of public health in such efforts. In forming community savings groups, which have been shown through this study to be associated with reduced HIV risk, FSW in Iringa have designed a strategy for accomplishing their goals of improved financial security and for which reduced HIV risk is a secondary benefit. This signals the need for a paradigm shift in HIV prevention programming placing public health in a supporting rather than leading role. This research suggests that supporting FSW in achieving the goals they identify as a community for improving their lives and conditions is a more appropriate, and in the end, effective role for public health in realizing desired health outcomes alongside the social and economic inclusion this marginalized population is working to achieve.

This presents an important role for public health research as well. Public health researchers should assume the role of determining the effectiveness and strengths of community initiatives and work to disseminate those strategies to others, sharing best practices across networks of sex worker communities and encouraging the exchange of ideas and lessons learned. A CE framework places value on FSW involvement in research and capacity building within the community to serve various roles within the research process.[57] As illustrated by this study, research should begin by examining what the community sees as the primary problem and study what strategies they have developed for themselves. Researchers can begin by looking at what people are doing and be guided by them and include members of FSW communities in setting the research goals and conducting the research itself.

Finally, this work responds to a call from sex worker advocates arguing for a research focus on and programmatic planning for addressing the economic realities faced by FSW.[75] In response to their call, this research provides evidence on the effectiveness of a community-empowerment based approaches to economic empowerment of FSW communities. The CE paradigm is the appropriate framework for promoting the health and human rights of FSW to social and economic inclusion and facilitating an environment of critical consciousness and advocacy to fight for social justice and access to resources and equity.

Strengths and limitations

There were several limitations to this study. In the quantitative analysis, the primary study outcome of condom use and financial indicators such as income were self-reported which are subject to both recall bias and social desirability bias. The use of cross-sectional data limited the ability to make causal inferences regarding the relationship between participating in a community savings group and condom use with clients. Additionally, the mediation analysis should be considered preliminary due to the cross-sectional nature of the data. In the qualitative components, limitations include the potential bias introduced by using snowball sampling for participant recruitment and that participants were limited to women with experience in community savings groups. Three of the women who participated in initial IDIs were unavailable for a second interview thus we were not able to pursue follow-up questions and additional exploration of topics with those participants. Because of insufficient language skills and cultural limitations, the primary researcher did not conduct the interviews and focus group discussions and thus may have missed nuanced dynamics.

One of the strengths of this study is the use of both qualitative and quantitative methods. The qualitative data contributed nuanced information to understanding the associations identified in the quantitative analysis. Findings from the qualitative interviews and focus groups provided insight into how community savings groups operate and how they affect the lives of sex workers in Iringa. An additional strength of this project was the ability of the student researcher to be in-country to train the qualitative interviewer and work closely with her on revising the instruments to include additional relevant themes following pilot interviews and focus groups sessions and to provide her with feedback on areas for further probing. Additionally, the student investigator had the opportunity to be involved in the preparation and rollout of the parent study including design of survey instrument, design of study materials and study staff trainings. Being in the field during community engagement and for the training of the study team provided an additional layer of understanding to her work on this project.

General conclusions

The community savings groups explored in this study serve as an economic and psychosocial resource enabling FSW to achieve financial security and empowered decision-making to more effectively navigate condom negotiation and safer sex with clients. Furthermore, the groups foster social cohesion and collective agency for the sex worker community in Iringa to mobilize for collective action confronting the structural barriers they face to HIV protective behaviors and advocating for broader access to resources and equity. This study reveals that the community empowerment process is underway among organically formed groups of FSW and through these groups, formed with the intention of confronting economic exclusion, HIV risk-reduction and possibly improved treatment outcomes can be achieved. HIV prevention efforts have a necessary role in supporting and fostering the growth of community savings groups as part of a rights-based comprehensive approach to addressing HIV among FSW.

Bibliography

1. Baral S, Beyrer C, Muessig K, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis* 2012; **12**(7): 538-49.
2. Beyrer C, Crago AL, Bekker LG, et al. An action agenda for HIV and sex workers. *Lancet* 2015; **385**(9964): 287-301.
3. Vandepitte J, Lyerla R, Dallabetta G, Crabbé F, Alary M, Buvé A. Estimates of the number of female sex workers in different regions of the world. *Sex Transm Infect* 2006; **82**(Suppl 3): iii18–iii25.
4. Kerrigan D, Wirtz A, Baral S, et al. Review of the Epidemiology of HIV among Sex Workers. The Global HIV Epidemics among Sex Workers: The World Bank; 2012: 5-32.
5. Kerrigan D, Kennedy CE, Morgan-Thomas R, et al. A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *Lancet* 2015.
6. Lippman SA, Donini A, Diaz J, Chinaglia M, Reingold A, Kerrigan D. Social-environmental factors and protective sexual behavior among sex workers: the Encontros intervention in Brazil. *Am J Public Health* 2010; **100 Suppl 1**: S216-23.
7. Park M, Yi H. HIV prevention support ties determine access to HIV testing among migrant female sex workers in Beijing, China. . *American Journal of Epidemiology* 2011.
8. Reed E, Gupta J, Biradavolu M, Devireddy V, Blankenship KM. The context of economic insecurity and its relation to violence and risk factors for HIV among female sex workers in Andhra Pradesh, India. *Public health reports* 2010; **125 Suppl 4**: 81-9.
9. Shannon K, Strathdee SA, Goldenberg SM, et al. Global epidemiology of HIV among female sex workers: influence of structural determinants. *Lancet* 2015.
10. Decker MR, Crago A-L, Chu SKH, et al. Human rights violations against sex workers: burden and effect on HIV. *The Lancet* 2015; **385**(9963): 186-99.
11. ILO. Recommendation concerning HIV and AIDS and the world of work, 2010 (No. 200). Geneva: International Labour Office, 2010.
12. NSWP. Global Network of Sex Work Projects: Promoting Health and Human Rights. http://www.nswp.org/.
13. Tanzania Commission for AIDS (TACAIDS), Zanzibar AIDS Commission (ZAC), National Bureau of Statistics (NBS), Office of Chief Government Statistician (OCGS), ICF International. Tanzania HIV/AIDS and Malaria Indicator Survey 2011-12. Dar es Salaam, 2013.
14. Tomori C, Francisco LV, Kennedy CE, et al. The changing cultural and economic dynamics of polygyny and concurrent sexual partnerships in Iringa, Tanzania. *Global public health* 2013; **8**(7): 857-70.
15. Kennedy CE, Brahmbhatt H, Likindikoki S, Beckham SW, Mbwambo JK, Kerrigan D. Exploring the potential of a conditional cash transfer intervention to

reduce HIV risk among young women in Iringa, Tanzania. *AIDS care* 2014; **26**(3): 275-81.
16. Brahmbhatt H, Yasutake S, Kerrigan D, et al. Determinants of high HIV prevalence among individuals in Iringa, Tanzania: THMIS Survey Data, 2007–2008. XIX International AIDS Conference. Washington, D.C.; 2012.
17. Beckham S, Shembilu C, Kennedy CE, et al. "Where's Your Husband?": Secrecy and Discrimination in Female Sex Workers' Healthcare Seeking Experiences in Iringa, Tanzania. 1st African Conference on Key Populations in the HIV Epidemic. Dar es Salaam, Tanzania; 2013.
18. Search UP. Strategic Assessment to Define a Comprehensive Response to HIV in Iringa, Tanzania Research Brief: Female Sex Workers, 2013.
19. National AIDS Control Program. HIV/AIDS/STI Surveillance Report Dar es Salaam, Tanzania, 2004.
20. Riedner G, Hoffmann O, Rusizoka M, et al. Decline in sexually transmitted infection prevalence and HIV incidence in female barworkers attending prevention and care services in Mbeya Region, Tanzania. *AIDS (London, England)* 2006; **20**(4): 609-15.
21. Tanzania National AIDS Control Program, PSI Tanzania. HIV Biological and Behavioral Surveys: Tanzania 2013. Female Sex Workers in Seven Regions: Dar es Salaam, Iringa, Mbeya, Mwanza, Tabora, Shinyanga and Mara., 2013.
22. Edwards DM. Matetereka : Tanzania's last Ujamaa village. Edinburgh: University of Edinburgh, Centre of African Studies; 1998.
23. Nyerere JK. Freedom and development: Uhuru na Maendeleo. A selection from writings and speeches 1968-1973. Dar Es Salaam: Oxford University Press; 1973.
24. Massoi A. Development-Tanzania: The Legacy Of Nyerere's Ujamaa Policy. Inter Press Service News Agency. 1999 Oct 22.
25. Tsai LC, Witte SS, Aira T, Altantsetseg B, Riedel M. Piloting a Savings-Led Microfinance Intervention with Women Engaging in Sex Work in Mongolia: Further Innovation for HIV Risk Reduction. *The open women's health journal* 2011; **5**: 26-32.
26. Gurnani V, Beattie TS, Bhattacharjee P, et al. An integrated structural intervention to reduce vulnerability to HIV and sexually transmitted infections among female sex workers in Karnataka state, south India. *BMC public health* 2011; **11**: 755.
27. Bikaako-Kajura W. AIDS and transport: The experience of Ugandan road and rail
transport workers and their unions. *International Transport Workers' Federation* 2000.
28. Oyefara JL. Food insecurity, HIV/AIDS pandemic and sexual behaviour of female commercial sex workers in Lagos metropolis, Nigeria. *SAHARA J : journal of Social Aspects of HIV/AIDS Research Alliance / SAHARA , Human Sciences Research Council* 2007; **4**(2): 626-35.
29. Scorgie F, Chersich MF, Ntaganira I, Gerbase A, Lule F, Lo YR. Socio-demographic characteristics and behavioral risk factors of female sex workers in sub-saharan Africa: a systematic review. *AIDS and behavior* 2012; **16**(4): 920-33.

30. Research TSPUoWCfHEa. Room for change: preventing HIV transmission in brothels, 2000.
31. Agha S, Chulu Nchima M. Life-circumstances, working conditions and HIV risk among street and nightclub-based sex workers in Lusaka, Zambia. *Culture, health & sexuality* 2004; **6**(4): 283-99.
32. Preston-Whyte E, Varga C, Oosthuizen H, Roberts R, Blose F. Survival sex and HIV/AIDS in an African City. Framing the Sexual Subject: The Politics of Gender, Sexuality and Power. Berkeley, Los Angeles and London: University of California Press; 2000: 165-90.
33. Project TS. Putting on the brakes: preventing HIV transmission along truck routes, 2002.
34. Tsai LC, Witte SS, Aira T, Riedel M, Hwang HG, Ssewamala F. "There is no other option; we have to feed our families...who else would do it?": The financial lives of women engaging in sex work in Ulaanbaatar, Mongolia. *Global journal of health science* 2013; **5**(5): 41-50.
35. Odek WO, Busza J, Morris CN, Cleland J, Ngugi EN, Ferguson AG. Effects of micro-enterprise services on HIV risk behaviour among female sex workers in Kenya's urban slums. *AIDS and behavior* 2009; **13**(3): 449-61.
36. Kim J, Pronyk P, Barnett T, Watts C. Exploring the role of economic empowerment in HIV prevention. *AIDS (London, England)* 2008; **22 Suppl 4**: S57-71.
37. Wojcicki JM, Malala J. Condom use, power and HIV/AIDS risk: sex-workers bargain for survival in Hillbrow/Joubert Park/Berea, Johannesburg. *Social science & medicine* 2001; **53**(1): 99-121.
38. Fehrenbacher AE, Chowdhury D, Ghose T, Swendeman D. Consistent Condom Use by Female Sex Workers in Kolkata, India: Testing Theories of Economic Insecurity, Behavior Change, Life Course Vulnerability and Empowerment. *AIDS and behavior* 2016.
39. Fitzgerald-Husek A, Martiniuk AL, Hinchcliff R, Aochamus CE, Lee RB. "I do what I have to do to survive": an investigation into the perceptions, experiences and economic considerations of women engaged in sex work in Northern Namibia. *BMC women's health* 2011; **11**: 35.
40. Urada LA, Morisky DE, Pimentel-Simbulan N, Silverman JG, Strathdee SA. Condom negotiations among female sex workers in the Philippines: environmental influences. *PloS one* 2012; **7**(3): e33282.
41. Sherman SG, German D, Cheng Y, Marks M, Bailey-Kloche M. The evaluation of the JEWEL project: an innovative economic enhancement and HIV prevention intervention study targeting drug using women involved in prostitution. *AIDS care* 2006; **18**(1): 1-11.
42. Rao V, Gupta I, Lokshin M, Jana S. Sex Workers and the Cost of Safe Sex: The Compensating Differential for Condom Use among Calcutta Prostitutes. *Journal of Development Economics* 2003; **vol. 71**(iss. 2): 585-603.
43. Elmes J, Nhongo K, Ward H, et al. The price of sex: condom use and the determinants of the price of sex among female sex workers in eastern Zimbabwe. *The Journal of infectious diseases* 2014; **210 Suppl 2**: S569-78.
44. Gertler P, Shah M, Bertozzi S. Sex sells, but risky sex sell for more. 2003.

45. Ntumbanzondo M, Dubrow R, Niccolai LM, Mwandagalirwa K, Merson MH. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of Congo. *AIDS care* 2006; **18**(7): 777-85.
46. Adu-Oppong A, Grimes RM, Ross MW, Risser J, Kessie G. Social and behavioral determinants of consistent condom use among female commercial sex workers in Ghana. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2007; **19**(2): 160-72.
47. Umar US, Adekunle AO, Bakare RA. Pattern of condom use among commercial sex workers in Ibadan, Nigeria. *African journal of medicine and medical sciences* 2001; **30**(4): 285-90.
48. Ngo AD, McCurdy SA, Ross MW, Markham C, Ratliff EA, Pham HT. The lives of female sex workers in Vietnam: Findings from a qualitative study. *Culture, health & sexuality* 2007; **9**(6): 555-70.
49. Saggurti N, Jain AK, Sebastian MP, et al. Indicators of mobility, socio-economic vulnerabilities and HIV risk behaviours among mobile female sex workers in India. *AIDS and behavior* 2012; **16**(4): 952-9.
50. Bharat S, Mahapatra B, Roy S, Saggurti N. Are female sex workers able to negotiate condom use with male clients? The case of mobile FSW in four high HIV prevalence states of India. *PloS one* 2013; **8**(6): e68043.
51. USAID Project Search, Research to Prevention. HIV among Female Sex Workers and men who have sex wIth men In SwazIland. Baltimore, MD: USAID | Project Search: Research to Prevention, 2013.
52. Shahmanesh M, Patel V, Mabey D, Cowan F. Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: a systematic review. *Tropical medicine & international health : TM & IH* 2008; **13**(5): 659-79.
53. Foss AM, Hossain M, Vickerman PT, Watts CH. A systematic review of published evidence on intervention impact on condom use in sub-Saharan Africa and Asia. *Sex Transm Infect* 2007; **83**(7): 510-6.
54. Gupta GR, Parkhurst JO, Ogden JA, Aggleton P, Mahal A. Structural approaches to HIV prevention. *Lancet* 2008; **372**(9640): 764-75.
55. Coates TJ, Richter L, Caceres C. Behavioural strategies to reduce HIV transmission: how to make them work better. *Lancet* 2008; **372**(9639): 669-84.
56. WHO., UNFPA., UNAIDS., NSWP. Prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries: recommendations for a public health approach, 2012.
57. WHO, UNFPA, UNAIDS, NSWP, Bank W. Implementing comprehensive HIV/STI programmes with sex workers: practical approaches from collaborative interventions. Geneva: World Health Organization, 2013.
58. Swendeman D, Basu I, Das S, Jana S, Rotheram-Borus MJ. Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases. *Social science & medicine (1982)* 2009; **69**(8): 1157-66.
59. Blankenship KM, West BS, Kershaw TS, Biradavolu MR. Power, community mobilization, and condom use practices among female sex workers in Andhra Pradesh, India. *AIDS (London, England)* 2008; **22 Suppl 5**: S109-16.

60. Blanchard AK, Mohan HL, Shahmanesh M, et al. Community mobilization, empowerment and HIV prevention among female sex workers in south India. *BMC public health* 2013; **13**: 234.
61. Reza-Paul S, Beattie T, Syed HU, et al. Declines in risk behaviour and sexually transmitted infection prevalence following a community-led HIV preventive intervention among female sex workers in Mysore, India. *AIDS (London, England)* 2008; **22 Suppl 5**: S91-100.
62. Cornish F, Shukla A, Banerji R. Persuading, protesting and exchanging favours: strategies used by Indian sex workers to win local support for their HIV prevention programmes. *AIDS care* 2010; **22 Suppl 2**: 1670-8.
63. Bhattacharjee P, Prakash R, Pillai P, et al. Understanding the role of peer group membership in reducing HIV-related risk and vulnerability among female sex workers in Karnataka, India. *AIDS care* 2013; **25 Suppl 1**: S46-54.
64. Ghose T, Swendeman D, George S, Chowdhury D. Mobilizing collective identity to reduce HIV risk among sex workers in Sonagachi, India: the boundaries, consciousness, negotiation framework. *Social science & medicine (1982)* 2008; **67**(2): 311-20.
65. Jana S, Basu I, Rotheram-Borus MJ, Newman PA. The Sonagachi Project: a sustainable community intervention program. *AIDS education and prevention : official publication of the International Society for AIDS Education* 2004; **16**(5): 405-14.
66. Durbar. Durbar Mahila Samanwaya Committee. http://durbar.org/html/micro_credit.aspx (accessed October 1, 2016.
67. Basu I, Jana S, Rotheram-Borus MJ, et al. HIV Prevention Among Sex Workers in India. *Journal of acquired immune deficiency syndromes (1999)* 2004; **36**(3): 845-52.
68. Jana S, Chakraborty AK, Das A, Khodakevich L, Chakraborty MS, Pal NK. Community based survey of STD/HIV infection among commercial sex-workers in Calcutta (India). Part II. Sexual behaviour, knowledge and attitude towards STD. *The Journal of communicable diseases* 1994; **26**(3): 168-71.
69. Cohen J. HIV/AIDS in India. Sonagachi sex workers stymie HIV. *Science (New York, NY)* 2004; **304**(5670): 506.
70. Patel SK, Prabhakar P, Jain AK, Saggurti N, Adhikary R. Relationship between Community Collectivization and Financial Vulnerability of Female Sex Workers in Southern India. *PloS one* 2016; **11**(5): e0156060.
71. Pillai P, Bhattacharjee P, Ramesh BM, S I. Impact of two vulnerability reduction strategies - collectivisation and participation in savings activities - on HIV risk reduction among female sex workers, KHPT 2012.
72. NSWP. Economic Empowerment Programmes for Sex Workers; Regional Report: Africa.
73. Witte SS, Aira T, Tsai LC, et al. Efficacy of a savings-led microfinance intervention to reduce sexual risk for HIV among women engaged in sex work: a randomized clinical trial. *American journal of public health* 2015; **105**(3): e95-102.
74. Basnyat I. Lived experiences of street-based female sex workers in Kathmandu: implications for health intervention strategies. *Culture, health & sexuality* 2014; **16**(9): 1040-51.

75. Network of Sex Worker Projects (NSWP). Sex Work and Money. *Research for Sex Work* 2006; **9**.
76. O'Hara P. Action on the ground: models of rural development practice. Galway: Irish Rural Link, 1998.
77. Dertwinkel T. Economic Exclusion of Ethnic Minorities: On the Importance of Concept Specification. *European Centre for Minority Issues* November 2008; **19**(ECMI Issue Brief).
78. Dworkin S, Blankenship K. Microfinance and HIV/AIDS Prevention: Assessing its Promise and Limitations. *AIDS and behavior* 2009; **13**(3): 462-9.
79. Kabeer N. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. In: Studies IoS, ed. Development and Change. Oxford, UK: Blackwell Publishers Ltd; 1999: 435-64.
80. Sen A. Gender equality and cooperative conflicts. Persistent inequalities: Women and world development New York Oxford University Press; 1990: 123–49.
81. Blankenship KM, Friedman SR, Dworkin S, Mantell JE. Structural Interventions: Concepts, Challenges and Opportunities for Research. *JURH* 2006; **83**(1): 59-72.
82. Campbell C. Selling sex in the time of AIDS: the psycho-social context of condom use by sex workers on a Southern African mine. *Social science & medicine (1982)* 2000; **50**(4): 479-94.
83. Cornish F, Ghosh R. The necessary contradictions of 'community-led' health promotion: a case study of HIV prevention in an Indian red light district. *Social science & medicine (1982)* 2007; **64**(2): 496-507.
84. Giddens A. Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis Berkeley and Los Angeles: University of California Press; 1979.
85. Seidel G. The competing discourses of HIV/AIDS in sub-Saharan Africa: discourses of rights and empowerment vs discourses of control and exclusion. *Social science & medicine (1982)* 1993; **36**(3): 175-94.
86. Choi SY, Holroyd E. The influence of power, poverty and agency in the negotiation of condom use for female sex workers in mainland China. *Culture, health & sexuality* 2007; **9**(5): 489-503.
87. Coates J, Swindale A, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). . Washington, D.C.: FHI 360/FANTA, 2007.
88. StataCorp. Stata Statistical Software. Release 13. College Station, TX: StataCorp LP; 2013.
89. Zeger S, Liang K, Albert PS. Models for Longitudinal Data: A Generalized Estimating Equation Approach. *Biometrics* 1988; **Vol. 44**(No. 4): 1049-60.
90. Baron R, Kenny D. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology* 1986; **51**: 1173-82.
91. Morgan DL. Qualitative Research Methods Series: Vol. 16. Focus groups as qualitative research (2nd ed.). Thousand Oaks, CA: Sage Publications; 1997.

92. Ivanoff SD, Hultberg J. Understanding the multiple realities of everyday life: basic assumptions in focus-group methodology. *Scandinavian journal of occupational therapy* 2006; **13**(2): 125-32.
93. Pope C, Ziebland S, Mays N. Analysing qualitative data. *BMJ : British Medical Journal* 2000; **320**(7227): 114-6.
94. Patton MQ. Qualitative Research and Evaluation Methods (3rd Edition). United States Sage Publications; 2002.
95. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Thousand Oaks, Calif: Sage Publications; 2006.
96. ATLAS.ti. Scientific Software Development GmbH In: MN SSDG, editor. version 1.0.50 ed. Eden Prairie.
97. Kabeer N. Social Exclusion: Concepts, Findings and Implications for the MDGs. London: Department for International Development (DFID), 2005.
98. NSWP. Economic Empowerment Programmes for Sex Workers - Regional Report: Africa, 2015.
99. Kerrigan DL, Fonner VA, Stromdahl S, Kennedy CE. Community empowerment among female sex workers is an effective HIV prevention intervention: a systematic review of the peer-reviewed evidence from low- and middle-income countries. *AIDS and behavior* 2013; **17**(6): 1926-40.

Curriculum vitae

ANDREA ROSA MANTSIOS
85 Eighth Avenue | New York, NY 10011
phone: (917) 376-7776 | e-mail: amantsios@jhu.edu

EDUCATION

Dec 2016	**Doctor of Philosophy (PhD)** The Johns Hopkins University Bloomberg School of Public Health Department of Health, Behavior and Society Baltimore, Maryland
May 2006	**Master of Health Science (MHS)** The Johns Hopkins University Bloomberg School of Public Health Department of International Health Social and Behavioral Interventions Baltimore, Maryland
May 2002	**Bachelor of Arts (BA), *magna cum laude*** Connecticut College Department of Sociology New London, Connecticut *Major*: Sociology-based Human Relations *Minor*: Music

EXPERIENCE

Johns Hopkins Bloomberg School of Public Health
Department of Health, Behavior and Society Baltimore, MD
Research Assistant, multiple projects 09/13 – Present

- Formative Research on long acting injectable (LAI) anti-retroviral therapy (ART) & pre-exposure prophylaxis (PrEP)
    - Conduct qualitative interviews with study participants
    - Prepare study materials and documents for use in the field
    - Contribute to development of in-depth interview guides
- Community-Based Combination HIV Prevention in Tanzanian Women at Heightened Risk
    - Develop protocols and trainings for study intervention components, tracking forms for program monitoring, and didactic materials for participants

    - Develop and pilot in-depth interview guides and related materials for qualitative research project, including participant consents and eligibility screening forms
    - Train qualitative interviewer and conduct trainings with research study staff
    - Prepare human subjects protocols for institutional review boards
    - Prepare for and participate in advisory board meetings to engage local stakeholders in the study region
- UNAIDS Tanzania Investment Case Scenario
    - Conducted literature review on HIV service delivery modalities and potential efficiencies in the programmatic response to HIV, globally and nationally in Tanzania
    - Contributed to synthesis of global and national programmatic literature in report presented to Tanzanian national government and stakeholders
    - Prepared presentations for and facilitated session at stakeholder meeting in Dar es Salaam to solicit feedback on draft report

Johns Hopkins School of Medicine
Center for Child and Community Health Research (CCHR) Baltimore, MD
Consultant, Public Health Detailing for Routine HIV Screening 09/13 – 03/14

- Provided review and feedback on HIV Action Kit content and design
- Advised on detailer activities prior to and throughout campaign
- Assisted with training plan and development of procedural protocol for public health detailing staff
- Conducted half-day training on HIV billing and reimbursement for detailing staff
- Provided ongoing guidance and trouble shooting as campaign evolved
- Contributed to manuscript writing and preparation

New York City Department of Health & Mental Hygiene
Bureau of HIV/AIDS Prevention & Control New York, NY
Director, Jurisdictional HIV Testing Initiatives 01/10 – 05/13

- Led borough-specific campaigns and city-wide initiatives to increase HIV testing among New Yorkers
- Oversaw provision of technical assistance to healthcare facilities and community organizations
- Developed social marketing campaigns and press/media strategies to promote HIV testing
- Created clinician tools and coordinated conferences on routine HIV screening in healthcare settings
- Planned large-scale HIV awareness events to bring HIV testing to community settings
- Compiled lessons learned, produced reports, and facilitated sharing of best practices among partners

- Oversaw data collection and monitoring; contributed to development of evaluation plans
- Tracked program spending and maintained annual budgets
- Strategized and coordinated dissemination of information about HIV testing state legislation and federal guidelines
- Wrote grants for special projects; managed budgets, oversaw implementation and reporting
- Liaised between Health Department leadership and medical and community partners
- Represented the Health Department at local and national conferences, at public events, and in the media
- Provided guidance to other jurisdictions interested in implementing similar municipal scale-up of HIV testing
- Supervised four full-time staff members

The City University of New York, Lehman College
Department of Health Sciences Bronx, NY
Adjunct Professor, Global Health 06/09 – 08/12

- Developed syllabus, selected course readings, created class assignments and taught class session lectures

New York City Department of Health and Mental Hygiene
Bureau of HIV/AIDS Prevention and Control Bronx, NY
HIV Prevention Specialist, Bronx District Public Health Office 09/07 – 01/10

- Oversaw HIV prevention activities for the Bronx District Public Health Office
- Launched and managed New York City's first borough-wide HIV testing initiative, *The Bronx Knows*
- Provided technical assistance to hospitals and community health centers on routine HIV screening
- Worked with community and faith-based organizations to implement or expand HIV testing programs
- Assisted with development of social marketing campaign aimed at de-stigmatizing HIV testing
- Developed clinical and public education materials on HIV testing
- Trained hospital and health center billing departments on appropriate billing for reimbursement of HIV services
- Contributed to press releases and coordinated media coverage of HIV testing initiative
- Led HIV/AIDS awareness and prevention trainings in schools, churches, and other venues in the Bronx
- Supervised two full-time staff members and two interns

University of California San Diego School of Medicine
Division of Global Health La Jolla, CA
Research Study Coordinator, Proyecto El Cuete 07/05 – 08/07

- Managed multi-site research study on risks for HIV, tuberculosis, and syphilis among injection drug users in Tijuana, Mexico
- Hired, supervised, and trained study staff, professional interviewers/counselors, and student aides
- Managed all aspects of data collection and maintained study database
- Supervised structured interviews and screening of eligible study participants
- Prepared and maintained human subjects protocols for institutional review boards
- Wrote grants in English and Spanish for US and Mexican funding agencies
- Hosted prospective funders on study site visits and created a bi-national network of collaborators and supporters
- Designed, formatted, and programmed computer-administered study questionnaire
- Managed specimen processing and storage and produced manuals on laboratory protocols
- Conducted qualitative research using focus groups and in-depth interviews; designed and piloted research instruments and analyzed data using content analysis and thematic coding

Global Service Corps HIV/AIDS Prevention Program Arusha, Tanzania
Public Health Intern 10/03 – 12/03

- Led HIV/AIDS prevention trainings for students, teachers, and community members in urban and rural settings
- Worked in local health clinics and a government hospital, shadowing health professionals and treating patients
- Assisted clinicians providing prenatal care, monitoring baby weight, counseling on nutrition, and conducting obstetric ultra-sound scans at a maternal and child health clinic
- Accompanied psychiatric outreach team visiting children with mental health needs in rural villages

Mount Sinai Medical Center
Department of Child and Adolescent Psychiatry New York, NY
Case Manager, Integrated After-Care Program 09/02 – 09/03

- Coordinated transition from inpatient hospital stay to home for Severely Emotionally Disturbed (SED) children and adolescents being discharged from hospital settings for a primarily Spanish-speaking client population living in East Harlem
- Collaborated with social worker to develop treatment plans and met regularly with medical director to monitor patients’ medications

- Made home and school visits to assess patient and family needs and link them with appropriate community resources such as outpatient mental health clinics, primary health care providers, schools, legal aid services, foster care agencies and recreational programs
- Assisted clients with navigating housing and immigration issues and government entitlements

PUBLICATIONS, ABSTRACTS AND PRESENTATIONS

Publications:

Kerrigan, D, Mbwambo J, Likindikoki S, Beckham S, Mwampashi A, Shembilu C, **Mantsios A,** Leddy A, Davis, W, Galai N. Project Shikamana: Baseline findings from a community empowerment based combination HIV prevention trial among female sex workers in Iringa, Tanzania. JAIDS. In press.

Greiner Safi AM, Perin J, **Mantsios A**, Schumacher C, Chaulk P, Jennings J. The Protect Baltimore Campaign: A public health detailing program increases routine HIV screening. American Journal of Public Health. In press.

Kerrigan D, Kennedy CE, Morgan-Thomas R, Reza-Paul S, Mwangi P, Win KT, McFall A, Fonner VA, **Mantsios A**, Butler J. "Female, Male and Transgender Sex Workers, Epidemiology of HIV/AIDS " in Encyclopedia of AIDS (T.J. Hope, M. Stevenson, and D. Richman, eds.), Springer. In press.

Myers JE, Braunstein SL, Shepard CW, Cutler BH, **Mantsios AR**, Sweeney MM, Tsoi BW. Assessing the impact of a community-wide HIV testing scale-up initiative in a major urban epidemic." *Journal of Acquired Immune Deficiency Syndrome*, Sept 2012; 61 (1):23-31.

Philbin M, **Mantsios A**, Lozada R, Pollini RA, Alvelais J, Case P, Latkin CA, Rodriguez CM, Strathdee SA. "Exploring Stakeholder Perceptions of Acceptability and Feasibility of Needle Exchange Programs, Syringe Vending Machines and Safe Injection Facilities in Tijuana, Mexico." *International Journal of Drug Policy.* Sept 2009;20(5):409-12.

Philbin M, Lozada R, Zúñiga ML, **Mantsios A**, Magis-Rodriguez C, Case P, Latkin CA, Strathdee SA. **"**A Qualitative Assessment of Stakeholder Perceptions and Socio-Cultural Influence in Acceptability of Harm Reduction Programs in Tijuana, Mexico." *Harm Reduction Journal*. 2008 Nov: 5:36.

Strathdee SA, Lozada R, Pollini RA, Brouwer KC, **Mantsios A**, Abramovitz DA, Rhodes T, Latkin CA, Patterson TL. "Individual, Social and Environmental Influences associated with HIV Infection among Injection Drug Users in Tijuana, Mexico." *Journal of Acquired Immune Deficiency Syndromes*. 2008 Mar 1;47(3):369-76.

Strathdee SA, Case P, Lozada R, **Mantsios A**, Alvelais J, Pu M, Brouwer KC, Miller CL, Patterson TL. "The Color of Meth: Is it Related to Adverse Health Outcomes? An Exploratory Study in Tijuana, Mexico." *American Journal of Addictions*. 2008 Mar-Apr;17(2):111-5.

Firestone M, **Mantsios A**, Ramos R, Lozada R, Brouwer KC, Case P, Miller C, Latkin CA, Strathdee SA. "Gender Differences in Drug Use Behaviors in two Mexican-U.S. Border Cities." *AIDS and Behavior*. 2007 Mar;11(2):253-62.

Mantsios, A. "International Health: Practicing Rural Medicine in Tanzania." *Abroad View Magazine*. September, 2004.

Peer-reviewed abstracts and poster presentations at scholarly meeting (* indicates oral presentation):

*__Mantsios A__, Shembilu C, Mbwambo, J, Likindikoki, S, Beckham, S, Mwampashi, A, Leddy A, Davis, W, Galai, N, Kerrigan, D. "When you don't have money, he controls you": financial security, community savings groups, and HIV risk among female sex workers in Iringa, Tanzania. 21st International AIDS Conference. Durban, South Africa (Oral Presentation).

Kerrigan, D, Likindikoki S, Galai N, Beckham S, Mwampashi A, Shembilu C, **Mantsios A**, Leddy A, Davis, W, Mbwambo J. Project Shikamana (Sticking Together): Community empowerment based combination HIV prevention among female sex workers in the Iringa Region of Tanzania. 21st International AIDS Conference. Durban, South Africa.

Leddy, A, Mbwambo, J, Likindikoki, S, Shembilu, C, Beckham, S, Mwampashi, A, **Mantsios, A,** Davis, W, Galai, N, Kerrigan, D. Association between alcohol consumption and gender-based violence (GBV) among female sex workers (FSW) in Iringa, Tanzania. 21st International AIDS Conference. Durban, South Africa.

Beckham, S.W., Likindikoki, S.,Galai, N., Mwampashi, A., Shembilu, C., **Mantsios, A.,** Leddy, A., Davis, W., Mbwambo, J., Kerrigan, D. Pregnancy, HIV, and access to antenatal care among female sex workers in Southern Tanzania: Implications for elimination of vertical transmission. Tanzania. 21st International AIDS Conference. Durban, South Africa.

Kerrigan D, **Mantsios A**, Margolis D, Murray M. Experiences with long acting injectable ART: a qualitative study among PLHIV participating in a Phase II study of Cabotegravir + Rilpivirine (LATTE-2) in the United States and Spain. 21st International AIDS Conference. Durban, South Africa.

Kerrigan D, **Mantsios A**, Grant, R, Markowitz M, Defechereux P, La Mar M, Hudson K, Margolis D and Murray M. Experiences with long acting injectable (LAI) cabotegravir (CAB) as PrEP: a qualitative study among men participating in a Phase II study (ECLAIR) in New York. 21st International AIDS Conference. Durban, South Africa.

Mantsios A, King A, Cutler B, Sweeney M, Tsoi B, "The Bronx Knows: A Staged Approach to Tailoring Technical Assistance." *2011 National HIV Prevention Conference*, Atlanta, Georgia, August, 2011.

***Mantsios A**, Tsoi B, Futterman D, Stafford S, Sweeney M, Cutler B, "Preliminary Findings from a Borough-wide Initiative to Scale up HIV Screening in New York City." *2009 National HIV Prevention Conference*, Atlanta, Georgia, August, 2009.

Garfein RS, Lui L, Lozada R, Rodwell TC, Catanzaro A, Laniado-Laborin R, **Mantsios A**, Chiles PG, Diess R, Strathdee SA. "Prevalence and correlates of mycobacterium tuberculosis infection by Quantiferon TB Gold In-Tube assay among injection drug users in Tijuana, Mexico." *17th International AIDS Conference*, Mexico City, Mexico, August, 2008.

Garfein RS, Rodwell T, Brouwer K, Catanzaro A, Laniado-Laborin R, Pu M, Lozada R, **Mantsios A**, Chiles P, Strathdee S. "Prevalence and Correlates of M. Tuberculosis Infection among Injection Drug Users at Risk for HIV in Tijuana, Mexico." *6th International Conference on Urban Health*. Baltimore, Maryland, October, 2007.

Philbin M, **Mantsios A**, Lozada R, Pollini RA, Alvelais J, Case P, Latkin CA, Rhodes T, Strathdee SA. "Stakeholder Attitudes Towards and Feasibility of Interventions to Reduce Drug-related Harms in Tijuana, Mexico." *6th International Conference on Urban Health*. Baltimore, Maryland, October, 2007.

Strathdee SA, Lozada R, Brouwer KC, **Mantsios A**, Pollini RA, Alvelais J, Abramovitz D, Garfein R, Loza O, Rodriguez-Magis C, Patterson TL. "Prevalence and Correlates of HIV among Injection Drug Users in Tijuana, Mexico: Individual, Social and Environmental Vulnerabilities." *6th International Conference on Urban Health*. Baltimore, Maryland, October, 2007.

Pollini R, Lozada R, Brouwer KC, **Mantsios AR**, Alvelais J, Magis-Rodriguez C, Latkin CA, Strathdee SA. "Early Injection Initiation in Tijuana, Mexico: Family Influences and Associated Harms." *Annual College on Problems of Drug Dependence (CPDD) Conference*. Montreal, Canada, June, 2007.

Pollini R, Lozada R, Miller C, Brouwer K, **Mantsios A**, Strathdee S. "IDU Experiences with Policing in a Mexican-U.S. Border City and their Effects on HIV Risk Behaviors." *Annual College on Problems of Drug Dependence (CPDD) Conference*. Montreal, Canada, June, 2007.

Strathdee SA, Case P, Lozada R, **Mantsios AR**, Pu M, Brouwer KC, Alvelais J, Patterson T. "The Color of Meth: Is it Related to Adverse Outcomes? An Exploratory Study in Tijuana, Mexico." *Annual College on Problems of Drug Dependence (CPDD) Conference*. Montreal, Canada, June, 2007.

Pollini R, Lozada R, Brouwer K, **Mantsios A**, Burris S, Magis-Rodriguez C, Rhodes T, Strathdee SA. "Locked Up and Locked Out: Understanding the Influence of the Criminal Justice System on IDUs' HIV Risk Behaviors in Tijuana, Mexico." *18th International Conference on the Reduction of Drug Related Harm*. Warsaw, Poland, May, 2007.

Garfein R, Strathdee SA, Lozada R, Laniado-Laborin R, Rodwell T, **Mantsios A**, Chiles P, Brouwer K, Catanzaro A. "High Prevalence of Tuberculosis Infection among Injection Drug Users in the U.S. / Mexico Border Region." *14th Conference on Retroviruses and Opportunistic Infections*. Los Angeles, CA, February, 2007.

Lozada R, Pollini R, Patterson TL, Brouwer KC, Firestone M, **Mantsios A**, Case P, Strathdee SA. "Meth Moves South: Factors Associated With an Emerging Epidemic of Methamphetamine Injection in the Mexican-U.S. Border City of Tijuana." *XVI International AIDS Conference*. Toronto, Canada, August, 2006.

Case P, Ramos R, Brouwer KC, Firestone M, Patterson TL, Fraga M, **Mantsios A**, Strathdee SA. "On the Edge: Methamphetamine in Two Mexican-U.S. Border Cities." *17th International Conference on the Reduction of Drug Related Harm*. Vancouver, Canada, March, 2006.

Mantsios A, Firestone M, Ramos R, Lozada R, Brouwer KC, Case P, Miller C, Latkin CA, Strathdee SA. "Gender Differences in Drug Use Behaviors in two Mexican-U.S. Border Cities." *17th International Conference on the Reduction of Drug Related Harm*. Vancouver, Canada, March, 2006.

Invited Presentations:

Routine HIV Screening in Hospital Settings, "Experiences with Billing and Reimbursement for HIV services in NYC." Washington D.C. Department of Health, July 27, 2011

Forum for Collaborative HIV Research, Municipal Scale-up of HIV Testing in the U.S. Roundtable, "Resources Needed for Sustainability of Programs." Arlington, Virginia, May 18, 2010.

Community Health Center Association of New York State Annual Statewide Conference, “Efforts to Expand HIV Testing: Spotlight on the NYC DOH Bronx-wide HIV Testing Initiative.” White Plains, New York, October 27, 2008.

Community Health Center Association of New York State Annual Statewide Conference, “Finance and Operations: Current HIV Billing.” White Plains, New York, October 27, 2008.

Simposio Binacional de VIH/SIDA e ITS: Promoviendo la Salud en la Frontera, “Prevalencia de VIH e ITS en Poblaciones Vulnerables” [Prevalence of HIV and STIs in Vulnerable Populations]. Tijuana, Mexico, November 18, 2006.

Jornada Sobre Prescripción de Metadona como parte de la Política de Reducción del Danos contra el VIH/SIDA, “Proyecto El Cuete: Una Mirada de un Programa de Reducción de Daño” [The El Cuete Project: A Look at a Harm Reduction Program]. Tijuana, Mexico, October 5, 2006.

Lecturer, USAID TIES Bi-National HIV Certification Program, “La Epidemiología y Prevención de VIH/SIDA entre Usuarios de Drogas Inyectables” [Epidemiology and Prevention of HIV/AIDS among IDUs]. Tijuana, Mexico, July 22, 2006.

Conferencia Binacional de VIH/SIDA: Alto al SIDA, Sigamos con las Promesas, “Estudios de VIH y Conducta Riesgosa entre UDIs de las Ciudades Fronterizas de México,” [Studies of HIV and risk behaviors among IDUs in the border cities of Mexico]. Tijuana, Mexico, November 25, 2005.

SKILLS & ADDITIONAL EXPERIENCE

Languages: Fluent Spanish; Basic Swahili, Greek, and French

Computer Skills: Word, Excel, PowerPoint, Access, Publisher, Stata, Atlas.ti

Honors/Awards:

2015 Department of Health, Behavior and Society Doctoral Distinguished Research Award
2015 NIAID Sexually Transmitted Infections (STI) Pre-doctoral Training Grant (T32) *(renewed)*
2014 Department of Health, Behavior and Society Doctoral Special Projects Funding Award
2014 NIAID Sexually Transmitted Infections (STI) Pre-doctoral Training Grant (T32)
2014 Global Health Field Research Award – Iringa, Tanzania

2010 Distinguished Service Award, New York City Department of Health and Mental Hygiene
2007 University of California, San Diego Employee of the Year Nominee
2002 Robert L. Hampton Award for Outstanding Contributions to the College Community
2002 Connecticut College Senior Leadership Award
2002 Louise M. Dieckmann Prize for Piano, Connecticut College

Volunteer work and additional Experience:

Member, Johns Hopkins University Alumni, New York City Chapter
Advisory Board Member, Monroe College School of Allied Health Professions, Bronx, NY
Co-organizer, Bi-national HIV/STI Prevention Symposium, Tijuana, Mexico
Counselor, Orphanage Outreach, Monte Cristi, Dominican Republic
Tutor, CORP Alternative-to-Incarceration Program for Juvenile Law Offenders, New London, CT

International travel: Andorra, Belize, Canada, Colombia, Costa Rica, Cuba, China, Dominican Republic, England, France, Mexico, Greece, Guatemala, India, Italy, Indonesia, Japan, Kenya, Morocco, Peru, Portugal, Qatar, South Africa, Spain, Tanzania, Thailand, Tunisia, Turkey