

## ORIGINAL RESEARCH ARTICLE

# Estimating the Number of Male Sex Workers with the Capture-Re-capture Technique in Nigeria

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## Abstract

Estimating the size of populations most affected by HIV such as men who have sex with men (MSM) though crucial for structuring responses to the epidemic presents significant challenges, especially in a developing society. Using capture-recapture methodology, the size of MSM-SW in Nigeria was estimated in three major cities (Lagos, Kano and Port Harcourt) between July and December 2009. Following interviews with key informants, locations and times when MSM-SW were available to male clients were mapped and designated as "hotspots". Counts were conducted on two consecutive weekends. Population estimates were computed using a standardized Lincoln formula. Fifty-six hotspots were identified in Kano, 38 in Lagos and 42 in Port Harcourt. On a given weekend night, Port Harcourt had the largest estimated population of MSM sex workers, 723 (95% CI: 594-892) followed by Lagos state with 620 (95% CI: 517-724) and Kano state with 353 (95% CI: 332-373). This study documents a large population of MSM-SW in 3 Nigerian cities where higher HIV prevalence among MSM compared to the general population has been documented. Research and programming are needed to better understand and address the health vulnerabilities that MSM-SW and their clients face. *Afr J Reprod Health 2013 (Special Edition); 17[4]: 83-89*.

**Keywords:** Male sex worker, Capture-recapture, size estimation, population estimates, Men who have sex with men, Nigeria, Lagos, Kano, Port Harcourt.

## Résumé

Estimer la taille des populations les plus touchées par le VIH, comme les hommes ayant des rapports sexuels avec des hommes (HSH) bien que crucial pour la structuration des réponses à l'épidémie, présente des défis importants, surtout dans une société en développement. En utilisant la méthode de capture-recapture, le nombre des prostitués hommes-HSH au Nigeria a été estimé dans trois grandes villes (Lagos, Kano et Port Harcourt) entre juillet et décembre 2009. Grâce à des entretiens avec des informateurs clés, les emplacements et les heures où les hommes prostitués-HSH étaient à la disposition des clients masculins ont été élaborés et désignés comme « points chauds ». Des comptages ont été effectués pendant deux week-ends consécutifs. Les estimations de population ont été calculées en utilisant une formule de Lincoln standardisée. Cinquante-six points névralgiques ont été identifiés à Kano, 38 à Lagos et 42 à Port Harcourt. Une nuit d'un week-end donné, Port Harcourt avait la plus grande population estimée des hommes prostitués-HSH, 723 (CI : 594 -892 95 %), suivi de l'Etat de Lagos avec 620 (CI : 517 -724 95%) et l'Etat de Kano avec 353 (95 % CI : 332 -373). Cette étude documente une grande population des hommes prostitués-HSH dans 3 villes nigérianes où la prévalence élevée du VIH parmi les HSH par rapport à la population générale a été documentée. La recherche et la programmation sont nécessaires pour mieux comprendre et aborder les vulnérabilités de la santé auxquelles font face les prostitués-HSH et leurs clients. *Afr J Reprod Health 2013 (Edition Spéciale); 17[4]: 83-89*.

**Mots-clés:** hommes prostitués, capturer-recapturer, estimation de l'ampleur, estimations de la population, les hommes qui ont des rapports sexuels avec des hommes, Nigeria, Lagos, Kano, Port Harcourt.

## Introduction

Recent studies in Nigeria have documented HIV prevalence between 1.3 and 17% and increased HIV risk behaviors among men who have sex with

men (MSM)<sup>1-3</sup>. Few programs or interventions however, are focused on this group and Nigeria's national strategic plan for HIV prevention has no program specific to the needs of MSM. Furthermore, due to stigma and discrimination,

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most MSM do not identify as gay or homosexual making them even harder to reach with appropriate prevention interventions.

In addition to the high prevalence of HIV among the general MSM population in sub-Saharan Africa, sub-populations of MSM, such as MSM sex workers (MSM-SW) have particularly high HIV risk behaviors, including limited knowledge of HIV transmission and prevention methods<sup>4,5</sup>. In coastal Kenya, MSM sex workers had high rates of unprotected anal intercourse coupled with low levels of basic HIV knowledge: 35% of respondents were unaware of HIV transmission via anal sex, which was perceived to be a dry environment through which the HIV virus cannot move. MSM sex workers also reported that unprotected anal sex was never mentioned in Kenyan HIV media campaigns or by health educators, and thus they did not perceive it as a risk factor for HIV transmission. In addition, condom use among MSM and MSM sex workers is low as some believe HIV is a “woman’s problem” and they are not at risk for HIV infection. Finally, many of these men have concurrent sexual relationships with women, are married with families, and do not consider themselves “gay”. Despite this, there are still relatively few resources directed to MSM in Africa, and virtually none allocated to MSM sex workers, despite growing evidence that these groups are disproportionately affected by HIV. Although enumeration of hidden high risk groups presents significant challenges because members of these high risk populations are often socially hidden and hard to reach<sup>6-8</sup> proving the existence of such populations is the first step to structuring the response to the epidemic and creating appropriate prevention interventions<sup>9</sup>. Capture-recapture is a statistical method for estimating the number of individuals from groups that are hidden or hard to reach<sup>10</sup> using a probabilistic calculation. The concept is based on the fact that individuals are more likely to be sampled multiple times within relatively small populations than within larger populations<sup>11</sup>. This method has been utilized for other hard to reach, hidden populations including female sex workers (FSW)<sup>12</sup>, and injecting drug users (IDU)<sup>13</sup>.

Male sex work in Nigeria has been addressed in qualitative social science studies<sup>14-17</sup>, although it has not been the main focus of any study. While recent research has estimated populations of MSM-SW in other African cities<sup>4-5</sup>, the current study is the first to estimate the number of men selling sex to other men in Nigeria, Africa's most populous nation with an estimated 2.6 million persons infected. This study was undertaken to estimate the magnitude of a heretofore little explored social phenomena in a country where stigma and criminalization of same-sex sexual behaviors has limited HIV programming and other health initiatives. Activities occurred in Kano, located in the Muslim North of the country, in Lagos, the commercial hub and in Port Harcourt, an oil rich state in the South-South of the country. Quantifying the populations of MSM sex workers will provide justification for increased HIV prevention programming for sub-groups of MSM and hopefully create opportunities for HIV prevention that do not currently exist.

## Methods

### Study Sites

We estimated the number of MSM-SW between July and December 2009 in Lagos from the southwest, Kano from north central and Port Harcourt from the south of Nigeria. These states were purposively selected because of anecdotal evidence of male sex workers and their characterization as cosmopolitan and commercial nerve centres pulling together people from the three major ethnic groups in Nigeria - Yoruba, Hausa and Igbo. Informal interviews with key informants knowledgeable about male sex work were conducted in each city by study staff. Locations where men meet other men to arrange transactional sex were mapped and designated as “hotspots” and included bars, clubs, shopping areas, cinemas, beaches and private residences. Times when these hotspots were most active and other pertinent information were also recorded. Advocacy visits were made to relevant “gatekeepers” (i.e., venue owners and other key informants) to inform them about the study and

engage participation and to explore the social organization of male transactional sex in each of the study cities, including how verbal, body language and other social cues were used to indicate intent to engage in transactional sex.

### ***Study population and design***

For the purpose of this study, a MSM-SW was defined as any man 18 years and older, who engaged in sexual acts with another man in exchange for money or gifts (transactional sex). In each city, the enumeration involved two counts. A team of local enumerators were divided into teams and assigned to the locations identified during the formative research and mapping on a weekend night which were identified as the most active nights. In each hotspot, the enumerators performed a capture, counting men who engaged in transactional sex who were then "tagged". A tag was defined in this case as a unique keychain that a recipient could easily recall having received. The second count ("the recapture"), conducted a week later, counted men who were tagged the previous week, as well as tagging newly encountered men.

### ***Data collection and analysis***

Due to the sensitivities surrounding MSM and sex work in Africa and the belief that members of a community are uniquely suited to interact with that community, we chose enumerators from within the populations of interest whenever possible. Thus, the majority of enumerators were MSM, MSM sex workers, or at a minimum, familiar with these populations in their respective cities. Enumerators were recruited through referrals from local organizations and colleagues. Criteria for inclusion included a willingness and availability to participate over the time frame of the project, interest in the project and familiarity with the target population and areas where MSM sex workers might congregate. Enumerators were compensated for the time spent training and performing the exercise, but were not incentivized per MSM sex worker identified.

On average, 30 enumerators participated in each of these activities in each city (Kano 31; Lagos 29; Port Harcourt 30). Training consisted of

4 days of interactive didactic and participatory work in which information was elicited about MSM and MSM sex workers populations within each locale; information on the concepts of mapping and capture/recapture research methodology, ethical issues, confidentiality, security, data collection, and recording of information. This was interspersed with dynamic role playing to allow comfort with identifying, approaching and interacting with MSM sex workers in the field, including how to recognize and approach MSM selling sex to determine their eligibility for the study, and discretion when "capturing and recapturing" so as not to alert bystanders. Each team was assigned to pre-identified hotspots at specified times in different locations within the city. Given the sensitive and potentially dangerous nature of the research, non-identified security personnel and drivers were hired in each city to respond quickly to any problematic situations.

No personally identifiable data was collected from any study participant. Access to enumeration worksheets completed by enumerators was limited to study investigators. Because male-male sexual activity and sex work is illegal in Nigeria, we were concerned about inadvertently alerting the authorities simply by our presence. To minimize this possibility (which did not occur), we trained enumerators in principles of confidentiality and ethical handling of personal information and collected no personal identifying information. All enumerators were grouped so that 2 or more enumerators were present in the same geographic locale during both the Capture and the Recapture phase. Ethical approval was obtained from Population Council IRB and the Nigerian Institute for Medical Research. Data files were password protected and data entry and analysis was limited to the project lead.

### ***Capture/Recapture methodology***

**Capture Phase:** In each city, the capture phase commenced on the first Friday or Saturday evening following training. Enumerators were assigned venues and locations identified during formative research and mapping where they employed a three-step approach to identify MSM

sex workers: 1) identification of MSM sex workers through body language and other techniques identified during formative research and participatory research planning; 2) approaching and interacting with a suspected “contact” until they self-identified as MSM; and 3) confirmation, in a socially appropriate context, that the man is attempting to sell sex; 4) if the above conditions were met, a “tag” (in our study, a keychain with a small compartment where two condoms were inserted) was given to the informant.

In offering the “tag”, the enumerator confirmed that the contact was an MSM sex worker. The informant was free to either accept or refuse the “tag”, but in either circumstance, the enumerator recorded the event, cataloguing the time, date, and location of each identified contact. No personally identifying information was collected from contacts, but HIV prevention information, literature and/or a referral list of HIV providers were offered to every contact. If the identified MSM sex worker accepted the “tag” (e.g., keychain), he was considered a capture. If another enumerator approached the informant at another time or place on the same night, he would first ask if the informant had received the tag from anyone else that night. If they had, the contact ended there. The enumerator then went to the next potential MSM sex worker and repeated the process. This continued until: 1) the venue closed; 2) a predetermined time in the field was met; 3)

there was a threat to the physical safety of the enumerators. Because the analysis of capture-recapture methodology is dependent on the assumption that the measured population is a closed system, the recapture activities occurred within the following one to two weeks after the initial capture activities take place, to minimize any population drifts.

**Recapture Phase:** On the same day of the week in the same venues, 1-2 weeks following the capture, we repeated the exercise. Enumerators approached men in the same way described previously and queried them on the following: 1) did the informant receive a keychain (tag) the week before and from whom? 2) did the informant accept the tag in the previous week?; 3) was the informant approached and offered a tag this week and if yes by whom?; 4) did the informant accept a tag during the recapture phase?

Lincoln Peterson’s formula was used to calculate the estimated population size<sup>18,19</sup>.

- $c_1$  = MSW captured in first count
- $c_2$  = MSW captured in second count
- $m$  = Matches (MSW captured in both counts)
- $n$  = Estimated population size

Where:

$$n = \frac{c_1 * c_2}{m}$$

$$Var(n) = \frac{c_1 * c_2 * (c_1 - m) * (c_2 - m)}{m^3}$$

$$95\% CI = n \pm 1.96 * \sqrt{Var(n)}$$

**Table 1:** Distribution of male sex workers at hotspots and estimated population size

	Capture (1st count)		Recapture (2nd count)				Estimated population (C1 * C2)/m
	Accepted tag C <sup>1</sup>	Refused tag	Already counted	Accepted tag C <sup>2</sup>	Recaptured (m)	Refused tag	
<b>Kano</b>							
Private homes	22	3	-	9	26	2	-
Cinemas	38	5	-	15	3	1	1
Streets/public area	163	17	5	98	66	20	10
Shopping area	18	-	-	9	3	-	2
Café/bar/restaurant	15	5	6	12	10	1	6
Hotels	33	3	-	6	14	1	-
<b>Total</b>	<b>289</b>	<b>33</b>	<b>11</b>	<b>149</b>	<b>122</b>	<b>25</b>	<b>19</b>
<b>Lagos</b>							
Private homes	34	-	-	10	8	1	-
Hotels	36	3	-	19	19	-	-
Clubs	43	3	1	15	3	-	-
Bars	10	-	-	30	14	1	2

Streets/public area	40	6	-	31	8	1	1	
Shopping malls	82	8	3	52	10	10	2	
<b>Total</b>	<b>245</b>	<b>20</b>	<b>4</b>	<b>157</b>	<b>62</b>	<b>13</b>	<b>5</b>	<b>620</b>
<b>Port Harcourt</b>								
Hotels	22	3	2	31	4	3	-	
Clubs	121	54	1	88	34	21	9	
Eateries	15	4	-	20	2	3	4	
Private homes	13	2	-	48	7	6	2	
Streets/public area	40	-	-	22	14	-	-	
<b>TOTAL</b>	<b>211</b>	<b>63</b>	<b>3</b>	<b>209</b>	<b>61</b>	<b>33</b>	<b>15</b>	<b>723</b>

## Results

A total of 56 hotspots were identified in Kano, 38 in Lagos and 42 in Port Harcourt, where MSM sex workers were known to frequent. In Kano, streets and public areas were the most popular meeting places; in Lagos, shopping malls had the largest concentration of MSM sex workers and in Port Harcourt, clubs were the most popular hotspots. Overall, on any given Friday or Saturday night, Port Harcourt had the largest estimated population of MSM sex workers, 723 (95% CI: 594-892) followed by Lagos state with 620 (95% CI: 517-724) and Kano state with 353 (95% CI: 332-373). Although no behavioral data was collected, anecdotal reports from enumerators reported MSM sex-worker clients are non-gay identified men who want “no strings attached anonymous sexual encounters with other men”.

## Discussion

This study successfully estimated a small but significant number of MSM sex workers working in Lagos, Kano, and Port Harcourt, Nigeria. While we were not able to obtain behavioral information or information about sexual risk behaviors for HIV from these men, previous research suggests that HIV prevention interventions for these men are largely absent<sup>3</sup>. This study documents the existence of an important HIV risk group in the country with the second largest population of HIV-infected persons in sub-Saharan Africa that is not adequately targeted by existing HIV prevention programs<sup>20,21</sup>.

While population estimates and HIV prevalence of brothel and non-brothel based female sex workers Nigeria has been extensively studied in national surveys, including the Federal Government's Integrated Biological and

Behavioural Surveillance Survey (IBBSS), information about MSM sex workers does not exist. Due to the stigmatization and criminalization of both homosexuality and prostitution in Nigeria, men engaged in transactional sex with other men likely try to keep these behaviors hidden<sup>3,22-23</sup>. Engaging such men in research activities and outreach initiatives remains a major challenge. Social desirability bias (the tendency of respondents to answer questions in a manner that will be viewed favorably by others, and which often involves de-emphasizing or denying socially unacceptable behaviors and identities) almost certainly leads to the underreporting of participation in both homosexual behavior and transactional sex.

Unprotected anal intercourse (UAI), a high risk sexual behaviour for HIV acquisition, carries a significantly higher risk of HIV transmission than vaginal intercourse. Studies have shown that the risk of transmission of HIV through UAI is approximately 19 times higher than during unprotected vaginal intercourse<sup>24</sup>. Unprotected anal sex with multiple sex partners, presumed common among male sex workers in Nigeria, constitutes an especially high risk of HIV transmission.

The capture-recapture method of estimating the size of a target group provides the opportunity to obtain national estimates and thus determine the contribution of MSM to the burden of HIV in Nigeria. The UNAIDS Modes of Transmission (MoT) study conducted in 2010 estimates that MSM contribute about one-tenth of new HIV infections in Nigeria<sup>20,21</sup>, though they collectively constitute only a small proportion of the general population. This calculation does not further differentiate MSM sex workers, who have a higher HIV risk profile compared to MSM who do not

engage in transactional sex. Hence, providing reliable population estimates allows the calculation of the appropriate statistical weights in national surveys and thus a more accurate estimation of behavioural and biological information among high risk groups.

Available data from the published literature in low and middle income countries reveal lifetime prevalence of men having sex with men of 3-20%<sup>24</sup>. Approximately 40-60% of these men engaged in high risk sex with other men. In Nigeria, approximately 33% - 50% of MSM have reported being paid for sex by other men<sup>1,25-26</sup>. A recent study in Nigeria showed that about 36% to 54% of MSM had sex with a female partner two months prior to the survey and of these over two-thirds had unprotected vaginal sex with their partners<sup>27</sup>. The study also reported higher HIV prevalence among MSWs in Abuja (47% vs. 38%) and Lagos (23% vs. 16%) while it was lower among MSWs in Ibadan (7% vs. 11%). Male sex workers may therefore constitute a group at high risk of HIV infection that contribute disproportionately to the general (predominantly heterosexual) epidemic in Nigeria. Having accurate information about MSM sex workers is important for planning of public health programmes that mitigate the impact of HIV among this group, and among their sex partners.

There are several limitations to the capture-recapture method. First, location-based solicitations comprise only a portion of male sex work activity. The use of mobile phones and internet to transact sex may eliminate the need to be physically present at identified hotspots. Such encounters would therefore be missed by the capture-recapture methodology. Moreover, internet-facilitated meetings on gay chat sites are increasingly common, especially in Lagos and Port Harcourt. Second, given that identification of informants was heavily dependent on enumerators, the estimated size of the population could well have been a function of the number of enumerators working. A third methodological limitation of the capture recapture is that since the counts were limited to only the weekends, potential informants who visited hotspots during the week would have been missed. These limitations, combined with refusal to be tagged, most likely resulted in an

underestimation of the size of MSM sex workers in these cities.

These results will serve to 1) document the existence of MSM sex workers in African countries with a high level of denial of MSM, 2) increase visibility amongst policy makers and funders of this group of men with significant vulnerabilities related to HIV and STI acquisition, and 3) provide a platform from which advocacy for this population's programming needs can begin or be strengthened. Moreover, policy implications of this study include the need for highly targeted HIV interventions to support the needs of MSM and MSM-SW. HIV prevention and treatment services directed at this vulnerable population must take into account the diversity of the population, the hidden nature of transactional sex, and the predominance of internet and mobile phones as the medium of social and sexual interactions within the MSM and MSM-SW communities. Policy implications of this study include formulation of appropriate policies to guide HIV prevention interventions that support the needs of MSM and MSM-SW.

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## Contributors

SK, AK and SB conceptualised the study design and protocol, managed the conduct of the study and conducted the analysis. JC coordinated the field implementation and conducted the trainings of the enumerators. DA, OA and LA were the programme officers assigned to each city to supervise, monitor and collate all results. EG wrote the introduction, results and discussion sections. AB provided writing and editorial input on all sections of the paper. SB made all decisions regarding the final content and submission of the manuscript and all authors approved the final manuscript. The authors declare that this work was conducted by the authors and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

**Competing interests**

None

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