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CONTENTS

Editorial

Same sex relationships and HIV/AIDS in Africa: Need for Research and programmatic focus
Friday Okonofua

9-12

Review Articles

Management of Infertility in HIV infected couples: A Review
Chris O. Agboghoroma and Osato. F. Giwa-Osagie

13-20

Original Research Articles

Prevalence of internalized homophobia and HIV associated risks among men who have sex with men in Nigeria
Sylvia B Adebajo, George I. Eluwa, Dan Allman, Ted Myers and Babatunde A. Ahonsi

21-28

Short preceding birth intervals and child mortality in Mozambique
Sandra D. Gonçalves and Tom A. Moultrie

29-42

Contribution of Transvaginal Ultrasound to Hysterosalpingography in the Etiological Research on Female Infertility in Abidjan
N’goran Kouamé, Anne-Marie N’goan-Domoua, Nicaise Konan, Alighonou Sétchéou, Olivier Tra-Bi, Roger-Daniel N’gbesso and Abdul-Kader Kéïta

43-49

Determinants of fertility in Namibia
Nelago Indongo and Lillian Pazvakawambwa

50-57

Age differences and protected first heterosexual intercourse in Ghana
Joshua Amo-Adjei

58-67

Increased Use of Injectable Contraception in Sub-Saharan Africa
John A. Ross and Alfred T. Agwanda

68-80

Age of Sexual Debut and Patterns of Sexual Behaviour in Two Local Government Areas in Southern Nigeria
Uche C. Isiugo-Abanihe, Olayiwola Erinosho, Boniface Ushie, Adeyinka Aderinto, Gbenga Sunmola and Richard Joseph

81-94
<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival Analysis of Timing of First Marriage among Women of Reproductive age in Nigeria: Regional Differences</td>
<td>95-107</td>
</tr>
<tr>
<td>Stephen A Adebowale, Francis A Fagbamigbe, Titus O Okareh and Ganiyu O Lawal</td>
<td></td>
</tr>
<tr>
<td>Prevalence and Factors Associated with Perpetration of Non-Consensual Sex among Students of a Tertiary Institution in Ibadan, Nigeria</td>
<td>108-118</td>
</tr>
<tr>
<td>Oladipupo S. Olaleye and Ademola J. Ajuwon</td>
<td></td>
</tr>
<tr>
<td>Female Genital Mutilation in Sierra Leone: who are the decision makers?</td>
<td>119-131</td>
</tr>
<tr>
<td>Owolabi Bjälkande, Bailah Leigh, Grace Harman, Staffan Bergström and Lars Almroth</td>
<td></td>
</tr>
<tr>
<td>Perception and Practice of Female Genital Cutting in a Rural Community in Southern Nigeria</td>
<td>132-139</td>
</tr>
<tr>
<td>Ofonime E. Johnson and Rose D. Okon</td>
<td></td>
</tr>
<tr>
<td>Deodatus C. Kakoko, Evert Ketting, Swithert R. Kamazima and Ruerd Ruben</td>
<td></td>
</tr>
<tr>
<td>Awareness, Use and Main Source of Information on Preventive Health Examinations: a Survey of Childbearing Women in Uyo, Nigeria</td>
<td>149-161</td>
</tr>
<tr>
<td>Emilia A. Udofia, Christie D. Akwaowo and Uwemedimbuk S. Ekanem</td>
<td></td>
</tr>
<tr>
<td>Trends and Differentials of Adolescent Motherhood in Ethiopia: Evidences from 2005 Demographic and Health Survey</td>
<td>162-174</td>
</tr>
<tr>
<td>Eshetu Gurmu and Tariku Dejene</td>
<td></td>
</tr>
<tr>
<td>Low Cost, Simple, Intrauterine Insemination Procedure with Unwashed Centrifuged Husband’s Sperm for Developing Countries</td>
<td>175-179</td>
</tr>
</tbody>
</table>

**CONFERENCE REPORT**

| Otibho Obianwu                                                                                                                          |       |

**BOOK REVIEW**

| Olayiwola Erinosho                                                                                                                      |       |
| Information for authors                                                                                                                  | 188-192|
| Subscription information & Advert rates                                                                                                 | 193    |
Revue Africaine de Santé de la Reproduction

Editor: Friday Okonofua

VOLUME 16 NUMÉRO 4 December 2012

SOMMAIRE

Editoriaux

Relations homosexuelles et le VIH / SIDA en Afrique: Nécessité de la recherche et de l’orientation programmatique
Friday Okonofua

9-12

Article de revue

Gestion de l’infertilité chez les couples infectés par le VIH: étude
Chris O. Agboghoroma and Osato. F. Giwa-Osagie

13-20

Articles de Recherche Originale

Prévalence de l’homophobie intériorisée et les risques liés au VIH chez les hommes qui ont des rapports sexuels avec les hommes au Nigéria
Sylvia B Adebajo, George I. Eluwa, Dan Allman, Ted Myers and Babatunde A. Ahonsi

21-28

Courts intervalles entre les naissances précédentes et la mortalité infantile au Mozambique
Sandra D. Gonçalves and Tom A. Moultrie

29-42

Apport de l’échographie transvaginale associée à l’hystérosalpingographie dans la recherche étiologique de l’infertilité féminine à Abidjan (Côte d’Ivoire)
N’goran Kouamé, Anne-Marie N’goan-Domoua, Nicaise Konan, Alihonou Sétchéou, Olivier Tra-Bi, Roger-Daniel N’gbeeso and Abdul-Kader Kéita

43-49

Déterminants de la fécondité en Namibie
Nelago Indongo and Lillian Pazvakawambwa

50-57

Age du premier rapport sexuel et les caractéristiques du comportement sexuel dans deux administrations locales
Joshua Amo-Adjei

58-67

La montée de la contraception injectable en Afrique subsaharienne
John A. Ross and Alfred T. Agwanda

68-80

Age du premier rapport sexuel et les caractéristiques du comportement sexuel dans deux administrations locales

81-94
Uche C. Isiugo-Abanihe, Olayiwola Erinosho, Boniface Ushie, Adeyinka Aderinto, Gbenga Sunmola and Richard Joseph

Analyse de la survie de la synchronisation du premier mariage chez les femmes en âge de reproduction au Nigeria : Différences régionales
Stephen A Adebowale, Francis A Fagbamigbe, Titus O Okareh and Ganiyu O Lawal

Prévalence et facteurs liés à la perpétration des rapports sexuels non consentuels chez les étudiants d’un établissement tertiaire à Ibadan, Nigéria
Oludipupo S. Olaleye and Ademola J. Ajuwon

Mutilations génitales féminines en Sierra Leone: qui sont les décideurs?
Owolabi Bjälkande, Bailah Leigh, Grace Harman, Staffan Bergström and Lars Almroth

Perception et pratique de la mutilation génitale féminine dans une communauté rurale dans le sud du Nigéria
Ofonime E. Johnson and Rose D. Okon

Prestations de services de planification familiale en Tanzanie: Une analyse comparative des établissements publics et privés
Deodatus C. Kakoko, Evert Ketting, Switbert R. Kamazima and Ruerd Ruben

Sensibilisation, utilisation et principale source d’information sur les examens médicaux préventifs: une enquête auprès des femmes en âge de procréer à Uyo, Nigéria
Emilia A. Udofia, Christie D. Akwaowo and Uwemedimbuk S. Ekanem

Tendances et différentiels de la maternité chez les adolescentes en Ethiopie: Evidences tirées à partir de l’Enquête Démographique et de Santé de 2005
Eshetu Gurmu and Tariku Dejene

Procédure d’insémination intra-utérine à bon marché et simple avec le sperme non-lavé et centrifugé tiré du mari au profit des pays en développement
Rose Nsa Ada Mve and Leonardo Formigli

RAPPORT DE LA CONFÉRENCE

Getting Real de services adaptés aux jeunes en Afrique: Rapport d'une session satellite à l'horizon 2012 International HIV / AIDS Conference
Otibho Obianwu

REVUE DE LIVRES

Olayiwola Erinosho

Information Pour Les Auteurs
APROPOS AJRH

La Revue Africaine de santé de la Reproduction (RASR) est publiée par le Women’s Health and Action Research Centre (WHARC). C’est une revue à la fois pluridisciplinaire et internationale qui publie des articles de recherche originaux, des articles de revue détaillés, de brefs rapports et des commentaires sur la santé de la reproduction en Afrique. La Revue s’efforce de fournir un forum aussi bien à des auteurs africains qu’a des professionnels qui travaillent en Afrique, afin qu’ils puissent partager leurs découvertes dans tous les aspects de la santé de reproduction et diffuser à travers le continent, des informations innovatrices, pertinentes et utiles dans ce domaine de santé de la reproduction.


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Le WHARC est une organization non gouvernementale à but non-lucratif s’engage dans la promotion de santé de la reproduction chez la femme en Afrique sub-saharienne. Foncé en 1995, le Centre a pour objectif principal de mener des recherches pluridisciplinaires et en collaboration, de promouvoir et de former des cadres en matières relatives à la santé de la reproduction chez la femme. Le Centre travaille surtout à travers des groupes multidisciplinaires de chercheurs aussi bien nationaux qu’internationaux en sciences médicales et en sciences économiques dans le domaine de santé de la reproduction.

Le WHARC reçoit une aide financière principale de la Fondation Ford et bénéficie de la coopération technique de l’International Perspectives on Sexual and Reproductive Health et de Studies in Family Planning. Le financement principal pour la revue vient de la part du Consortium on Unsafe Abortion in Africa. L’objectif du Centre est d’améliorer la connaissance en matière de santé de la reproduction chez la femme au Nigeria et dans d’autres régions d’Afrique à travers la recherche en collaboration, le paydoyer, des ateliers et des séminaires à travers des séries de publication - La Revue africaine de santé de la reproduction, Le Women’s Health Forum et des rapports des recherches de circonstance.
EDITORIAL

Same sex relationships and HIV/AIDS in Africa: Need for Research and programmatic focus

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Several reports indicate that sub-Saharan Africa has continued to maintain a high prevalence rate and remains the epi-centre of the current HIV/AIDS pandemic. To date, Africa accounts for up to 68% of the total number of people living with HIV/AIDS, for 90% of orphans and for a large percentage of the total number of morbidity and deaths from the disease in the world. It is now increasingly recognized that for significant progress to be made, efforts to curtail the virus in the continent must be prioritized for at-risk and highly vulnerable populations.

At the onset, reports suggested that heterosexual intercourse was the principal mode of transmission of the virus in Africa. This was a marked difference from the pattern in high income countries where homo-sexual (same-sex) relationships, especially men having sex with men (MSM) was a dominant mode of transmission. However, in recent times increasing reports of high prevalence rates of same sex relationships accounting for HIV/AIDS in Africa have been documented in the literature. Current estimates from parts of Africa suggest that MSM account for between 10-15% of new cases of sexual transmission of HIV/AIDS in Africa. Increasingly, consensual same sex relationships are being reported in various parts of Africa including same sex marriages, lesbianism, bisexuality, gay and trans-gender (LGBT) relationships.

Despite this increasing rate of same sex relationships in Africa, there has been little research and documentation of the pattern and trends in the related practices, which would permit an empirical elucidation of how HIV prevention and care can be specifically targeted at this high risk population. This lacuna is largely due to a prevailing culture of denial, stigmatization and even criminalization associated with same sex relationships in many parts of the continent. Reports suggest that same-sex relationship is currently shrouded in secrecy in many African countries, and in communities where some openness has started to emerge, it has been followed by outright condemnation, vitriolic attacks and even criminalization. Surely, this has done little to address the problem, while it has further driven the practice underground and reduced the ability of countries to target appropriate policies and interventions.

It is within this context that the editorial board of the African Journal of Reproductive Health accepted to publish its first research paper on same sex relationships in Africa in this edition of the journal. The paper by Adebajo and her colleagues from the office of the Population Council in Nigeria, describes an innovative approach for identifying men who have sex with men, and reports the results of interviews with this category of men to determine their experiences and perceptions of internalized homophobia.

This report is groundbreaking in several respects. First, this is one of a few documented studies on LGBT in Nigeria and serves to address the current lack of empirical research on the subject in the country. In recent times, Nigeria has joined other African countries in mounting a debate on same sex marriage and related practices. Unfortunately, the discourse has swayed from the sublime to the ridiculous, with the highest legislative body of the country passing a judgment of illegality on same sex marriage. Therefore, the publication of this paper indicates that all hope is not lost and that it is still possible to open up debate and conduct empirical research in less...
receptive communities. Indeed, we believe that it is only through research and communication of research findings that traditional beliefs and inappropriate laws and legislations on LGBT can be prevented and modulated.

Secondly, the results of the study which indicate a high prevalence of internalized homophobia among men who have sex with men, have implications for the design of interventions to address the problem. Perhaps, this can result in the development of appropriate behavioral change messages that can lead to safer sex practices and the adoption of more effective methods for the prevention and treatment of HIV/AIDS among men who have sex with men. Thirdly, the research findings would be useful in interrogating with policymakers who often see same sex relationships as biological anomalies rather than a normal pattern within a continuum of sexual behavior. Studies such as this can enable a more informed debate and a better understanding of the nature of the problem, leading to a systematic improved policy environment for addressing the social and development needs of men who have sex with men.

The current lack of information relating to the practice of same sex relationships in the African region is an important unfulfilled research gap in the region. Research is needed to document the prevalence and epidemiology of same sex relationships in various countries in Africa. Given the secrecy that surrounds the problem, innovative research approaches and methods that meet the highest degree of scientific validity and rigor are needed. Additionally, social and anthropological research is needed to identify the main risk factors and determinants of same sex relationships, their life course experiences, their sexual risk taking behavior and how LGBTs access services for the prevention of HIV/AIDS and other reproductive health problems. Indeed, same sex relationship is one issue that would always benefit from baseline research and assessments before interventions are undertaken. In turn, interventions must be purposefully designed with specific and concrete end-points in mind, in order to provide lessons for scaling up and sustaining such interventions.

In conclusion, the criminalization and stigmatization of same sex relationships in many parts of Africa is one of the most challenging social justice and human rights issues relating to sexual and reproductive health in Africa. Researchers, advocates and programmers have a responsibility to draw attention to the problem, and to use evidence-based information to build a systematic understanding and consensus on ways to address the problem.

References

EDITORIAL

Relations homosexuelles et le VIH / SIDA en Afrique: Nécessité de la recherche et de l'orientation programmatique

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Plusieurs rapports indiquent que l'Afrique subsaharienne a continué à maintenir un taux de prévalence élevé et demeure l'épicentre de la pandémie actuelle du VIH / SIDA. À ce jour, l'Afrique produit jusqu'à 68% du nombre total de personnes séropositives, 90% des orphelins et un grand pourcentage du nombre total de morbidité et de décès dus à la maladie dans le monde. Il est désormais de plus en plus reconnu qu'afin que des progrès importants soient accomplis, les efforts pour freiner le virus devraient être accordés une priorité à l'égard des populations à risque et très vulnérables.

Au début, des rapports ont suggéré que les rapports hétérosexuels constituaient le principal mode de transmission du virus en Afrique. Il s'agit d'une différence remarquable par rapport à la tendance dans les pays à revenu élevé où les relations homosexuelles (du même sexe), surtout où les hommes ont des rapports sexuels avec des hommes (HSH), constituent un mode de transmission dominant. Cependant, ces derniers temps, encore des rapports sur des taux de prévalence élevés de relations homosexuelles qui sont responsables du VIH / SIDA en Afrique ont été documentés dans la littérature. Les estimations actuelles venant de certaines régions d'Afrique donnent à penser que les HSH représentent entre 10-15% de mode de transmission sexuelle du VIH / SIDA en Afrique. De plus en plus, les relations homosexuelles consensuelles sont signalées dans diverses régions d'Afrique, y compris les mariages homosexuels, le lesbianisme, la bisexualité, des relations transsexuelles (LBHT).

En dépit de cette augmentation du taux de relations homosexuelles en Afrique, il y a eu peu de recherche et de documentation sur les caractéristiques et les tendances dans les pratiques connexes, ce qui permettrait d'élucider de façon empirique comment la prévention du VIH et les soins peuvent viser spécifiquement cette population à haut risque. Cette lacune est due en grande partie à une culture dominante de dénégation, de stigmatisation et même de criminalisation associée aux relations homosexuelles dans de nombreuses régions du continent. Des rapports suggèrent que les relations homosexuelles sont actuellement enveloppées d'une atmosphère de secret dans de nombreux pays africains, et dans les communautés où une certaine ouverture a commencé à émerger, il a été suivi de la condamnation pure et simple, des attaques au vitriol et même de la criminalisation. Certes, cela n'a pas fait grand chose pour résoudre le problème, alors qu'il a rendu la pratique encore clandestine et réduit la capacité des pays à cibler les politiques et les interventions bien informées.

C'est dans ce contexte que le comité de rédaction de la Revue africaine de santé de la reproduction a accepté de publier son premier document de recherche sur les relations homosexuelles en Afrique dans ce numéro de la revue. L'article d'Adebajo et ses collègues à la Population Council au Nigeria, décrit une méthode novatrice pour identifier les hommes qui ont des rapports sexuels avec d'autres hommes, et présente les résultats d'entretiens avec cette catégorie d'hommes afin de déterminer leurs expériences et perceptions de l'homophobie intériorisée.

Ce rapport est révolutionnaire à bien des égards. Tout d’abord, c'est l'une des quelques études documentées sur les LBHT au Nigéria et sert à combler le manque actuel des recherches.
empiriques sur le sujet dans le pays. Ces derniers temps, le Nigéria a rejoint d'autres pays africains pour organiser un débat sur le mariage de même sexe et les pratiques connexes. Malheureusement, le discours a balancé du sublime au ridicule, ce qui a amené le plus haut corps législatif du pays, à se prononcer sur l’illégalité du mariage homosexuel. Par conséquent, la publication de ce document indique que tout espoir n'est pas perdu et qu'il est toujours possible d'ouvrir le débat et de mener des recherches empiriques dans les communautés moins réceptives. En effet, nous pensons que ce n'est que grâce à la recherche et à la communication des résultats de recherche que les croyances traditionnelles et les lois inadéquates et les législations sur les LBHT peuvent être évitées et modulées.

Deuxièmement, les résultats de l'étude qui indiquent une prévalence élevée de l'homophobie intériorisée chez les hommes qui ont des rapports sexuels avec d'autres hommes, ont des implications pour la conception des interventions pour résoudre le problème. Peut-être, ceci peut aboutir à l’élaboration des messages de modification de comportement appropriés qui peuvent conduire à des pratiques sexuelles moins dangereuses et à l'adoption de méthodes plus efficaces pour la prévention et le traitement du VIH / SIDA chez les hommes qui ont des rapports sexuels avec d'autres hommes. Troisièmement, les résultats de la recherche seront utiles pour interroger des décideurs qui voient souvent les relations homosexuelles comme des anomalies biologiques plutôt que d'une tendance normale dans un continuum de comportements sexuels. De telles études peuvent permettre un débat plus éclairé et une meilleure compréhension de la nature du problème, conduisant à une amélioration de l'environnement politique systématique pour répondre aux besoins sociaux et développementaux des hommes qui ont des rapports sexuels avec d'autres hommes.

Le manque actuel d'informations relatives à la pratique des relations homosexuelles dans la région africaine est une lacune importante non satisfaite dans le domaine de recherche dans la région. Il faut des recherches pour documenter la prévalence et l'épidémiologie des relations homosexuelles dans divers pays d'Afrique. Compte tenu du secret qui entoure le problème, il faut des approches de recherche novatrices et des méthodes qui accomplissent le plus haut degré de validité et de rigueur scientifiques. En outre, il faut la recherche sociale et anthropologique pour identifier les principaux facteurs de risque et les déterminants de relations homosexuelles, leurs expériences, leur parcours de vie, les comportements sexuels à risque et comment les services d'accès du LBHT pour la prévention du VIH / SIDA et d'autres problèmes de santé de la reproduction. En effet, les relations homosexuelles constituent une question qui devrait toujours bénéficier de la recherche de base et des évaluations avant d’entreprendre les interventions. A leur tour, les interventions doivent être résolument conçues avec les objectifs spécifiques et concrets à l'esprit, afin de tirer des leçons pour l'intensification et le maintien de ces interventions.

En conclusion, la criminalisation et la stigmatisation des relations homosexuelles dans plusieurs régions d’Afrique sont parmi les problèmes les plus difficiles de la justice sociale et des droits de l’homme qui sont liés à la santé sexuelle et de reproduction en Afrique. Les chercheurs, les défenseurs et les programmeurs ont la responsabilité d'attirer l'attention sur le problème, et d'utiliser des informations fondées sur les expériences pour établir une compréhension systématique et un consensus concernant les moyens de résoudre le problème.

**Références**

Management of Infertility in HIV infected couples: A Review

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Abstract

The HIV epidemic has continued to grow and remains a major challenge to mankind. In the past, ethical considerations about the resulting child and risks of sexual, vertical and nosocomial transmission of HIV prevented practitioners from offering fertility services to people living with HIV. In recent times however, the use of highly active antiretroviral therapy (HAART), has not only improved the life expectancy and quality of life of those infected but also reduced the risk of HIV transmission. The need for fertility services in the HIV-positive population has thus increased and may be employed for management of infertility and protection from transmission or acquisition of HIV infection. As such, preconception counseling, sexual health and fertility screening have become routine in the management of HIV-positive couples. The option of care include adoption, self insemination with husband sperm, embryo donation from couples who have been verified to be HIV negative, insemination with donor sperm, timed unprotected intercourse (TUI) and sperm washing combined with intrauterine insemination (IUI) and assisted reproductive technology (ART) including in-vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI). Access to these fertility services by HIV-positive clients should be facilitated as part of efforts to promote their reproductive health and rights. (Afr J Reprod Health 2012; 16[4]: 13-20).

Résumé

L'épidémie du VIH a continué de croître et reste un défi majeur pour l'humanité. Dans le passé, les considérations éthiques concernant le bien-être de l'enfant et le risque de la transmission sexuelle, verticale et nosocomiale du VIH ont limité la dispensation des services de fertilité pour les personnes vivant avec le VIH. Ces derniers temps, cependant, l'utilisation de la thérapie antirétrovirale hautement active (TARHA), a non seulement amélioré l'espérance de vie et la qualité de vie des personnes atteintes, mais aussi de réduire le risque de la transmission du VIH. La nécessité de services de fertilité dans la population séropositive a donc augmenté et peut être utilisées pour le traitement des facteurs d'infertilité et de la protection de la transmission ou l'acquisition de l'infection du VIH. En tant que tel, le Counselling avant la reproduction, le dépistage de santé sexuelle et de fertilité sont nécessaires pour le traitement des couples séropositifs. L'option des soins comprendrait l'adoption, l'auto-insémination avec le sperme du mari, le don d'embryons de la part des couples qui ont été authentifiés comme étant séronégatifs, l'insémination avec le sperme du donneur, les rapports sexuels chronométrés non protégés et le lavage du sperme combiné avec l'insémination intra-utérine (IUI) et les techniques de reproduction assistée (TRA), y compris la fécondation in vitro (FIV) ou l’injection intra-cytoplasmique de spermatozoïdes (ICS). L'accès à ces services de fertilité par les clients séropositifs devrait être facilité comme faisant partie de la santé de reproduction et des droits (Afr J Reprod Health 2012; 16[4]: 13-20).

Keywords: HIV, AIDS, Infertility, highly active antiretroviral therapy (HAART), sperm washing, assisted reproductive technology

Introduction

The human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) epidemic has continued to grow and remains a major challenge to mankind. According to Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO); as at December 2009, about 33.2 million people were living with HIV majority (68%) of which are in sub-Saharan Africa. The prevalence of HIV in most African countries has remained high. The 2010 HIV national sentinel survey in Nigeria reported a prevalence of 4.1%. The mode of transmission of HIV in Africa is predominantly heterosexual, the infection rate being more
amongst persons within the reproductive age (15 - 45 years). Until recent times the reproductive health and especially fertility needs of HIV positive clients were largely ignored. This was adduced mainly to ethical considerations of welfare of the child including the risk of transmitting the infection to the child\(^4\), reduced life span of the infected parent(s) and the issue of orphans. There were further concern about risk of transmitting infection to the partner, hospital workers and other clients. However, with the advent and increasing access to highly active antiretroviral therapy (HAART) and advancement in scientific/safe practices these concerns have been largely addressed. The use of antiretroviral drugs has thus led to significant improvement in life expectancy and quality of life in HIV infected persons\(^5\). Similarly antiretroviral drugs used during antenatal, intrapartum and neonatal periods; caesarean section and avoidance of breastfeeding has led to a drop in vertical transmission risk from over 30% to less than 2%\(^5,6\). Scientific innovations have also ensured safe procreation for uninfected partners, protection of hospital workers and other uninfected clients. Ethical reasons for restriction of fertility care for HIV positive clients are therefore no longer justifiable\(^7\) - \(^9\).

The strong desires for procreation and child bearing among HIV-infected persons have been documented\(^10\) - \(^11\). This has led to attempts at natural conception which exposes the partner of HIV positive person to risk of infection or re-infection/super-infection\(^12\), \(^13\). The risk of an infected male passing on HIV infection to an uninfected female partner is quoted as 0.1 - 0.3% per act of intercourse and that of infected female to uninfected male partner is 0.03 and 0.09% per act of intercourse, provided the couples are in monogamous relationship; not engaged in any other risky activities, and with absence of genital injury/infections\(^14\). Saracco et al\(^15\) reported an annual HIV transmission rate up to 7.2% in couples engaging in unprotected intercourse in HIV sero-discordant relationship.

Many HIV positive clients may seek fertility services to maximize reproductive potential and/or minimize the transmission risk to their partners and children. Professionals are expected to provide appropriate fertility services and not discriminate against HIV positive clients\(^10\) - \(^19\). This article reviews the critical issues in reproduction in the context of HIV infection. The available options of safe procreation and management of infertility in the HIV-positive population is discussed.

**Infertility in the General Population**

It is estimated that 8-12 percent of couples suffer from infertility\(^20\). In the African society where high premium is placed on child bearing, infertile couples are socially ostracized. They face much psychological upheaval and are usually desperate for solution. Infertility may be due to factors in one or both partners. Problems in the male may be quantitative or qualitative abnormalities in the semen. Scientific innovations have also ensured safe procreation for uninfected partners, protection of hospital workers and other uninfected clients. Ethical reasons for restriction of fertility care for HIV positive clients are therefore no longer justifiable\(^7\) - \(^9\).

The strong desires for procreation and child bearing among HIV-infected persons have been documented\(^10\), \(^11\). This has led to attempts at natural conception which exposes the partner of HIV positive person to risk of infection or re-infection/super-infection\(^12\), \(^13\). The risk of an infected male passing on HIV infection to an uninfected female partner is quoted as 0.1 - 0.3% per act of intercourse and that of infected female to uninfected male partner is 0.03 and 0.09% per act of intercourse, provided the couples are in monogamous relationship; not engaged in any other risky activities, and with absence of genital injury/infections\(^14\). Saracco et al\(^15\) reported an annual HIV transmission rate up to 7.2% in couples engaging in unprotected intercourse in HIV sero-discordant relationship.

Many HIV positive clients may seek fertility services to maximize reproductive potential and/or minimize the transmission risk to their partners and children. Professionals are expected to provide appropriate fertility services and not discriminate against HIV positive clients\(^16\) - \(^19\). This article reviews the critical issues in reproduction in the context of HIV infection. The available options of safe procreation and management of infertility in the HIV-positive population is discussed.

**Infertility Management in HIV-Positive Clients**

It is estimated that 8-12 percent of couples suffer from infertility\(^20\). In the African society where high premium is placed on child bearing, infertile couples are socially ostracized. They face much psychological upheaval and are usually desperate for solution. Infertility may be due to factors in one or both partners. Problems in the male may be quantitative or qualitative abnormalities in the semen. The female causes of infertility may be functional or occlusive tubal/peritoneal factors and endocrine/ovulatory dysfunction. The tubal/peritoneal problems are mainly due to sexually transmitted infections (STIs) / pelvic inflammatory diseases (PID), post partum/post abortal infections, adhesions from previous surgeries and endometriosis. Endocrine/ovulatory dysfunction may be in form of polycystic ovary syndrome (PCOS), hypothalamic dysfunctions and premature ovarian failure. Other contributory factors to infertility include erectile dysfunction, Asherman’s syndrome and uterine fibroids\(^21\).

The management of infertility includes investigations to determine the associated factors and application of appropriate treatment. The standard investigations include seminal fluid analysis in the male. In the female, the tubal/peritoneal factor is assessed using hysterosalpingogram (HSG), or hysterosalpingo contrast sonography (HyCoSy) and/or laparoscopy and dye test. The endocrine / ovulatory status may be assessed by early follicular phase hormone profile (i.e. day 2-5 luteinizing hormone (LH), Follicle stimulating, hormone (FSH), estrogen (E2) prolactin and testosterone) and mid-luteal phase progesterone. Pelvic ultra-sound scan is also necessary to exclude uterine and ovarian pathology. Hysteroscopy may also be performed to evaluate the uterine cavity. The treatment depends on identified problem which may be standard ovulation induction, tubal surgery and partner/donor insemination. The more advanced methods of infertility treatment - assisted
reproductive technology (ART) including in-vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) may occasionally become indicated.

**Effect of HIV on Fertility**

Higher rates of infertility have been reported among the HIV-positive group compared to the general population. This has been attributed to many factors. Infertility in the HIV-positive couple may be voluntary as they might be using condom regularly during sexual intercourse. This is particularly relevant in the context of sero-discordant couple, in order to avoid transmitting the infection to the HIV-negative partner. The use of condom has remained the most effective means of preventing transmission of HIV in sexually active persons. Reduction in the frequency of sexual activity as a result of chronic ill health and for psychological reasons may also be contributory. HIV-positive females are more prone to tubal/peritoneal factors from increased susceptibility to infections and PID. Adverse effects on the hypothalamo-pituitary ovarian axis and reduced ovarian reserve have also been suggested. HIV-positive men tend to have reduced seminal parameters (including count, motility and morphology). A recent report also suggested that the success rates in IVF/ICSI may be reduced in the HIV-positive clients due primarily to poor ovarian response. Early recourse to fertility screening and treatment is therefore necessary to optimize chances of success.

**Management of Infertility in HIV-Positive Patients**

While it is generally recommended that HIV-positive clients should be allowed access to fertility services, there is yet no generally accepted protocol for their management. However, interest in the subject is developing rapidly. When indicated, standard investigations, medical / surgical treatment modalities and assisted reproductive technology used in the management of infertility in the general population applies. The main principles in the management include reduction of the level of infectiousness in infected partner(s) and reduction of exposure and susceptibility especially in uninfected partner. Pre-conception reproductive counseling, sexual health and fertility screening are recommended in the determination of the preparedness and type of fertility services needed. It is essential that the HIV-positive couples who contemplate pregnancy should be on an appropriate antiretroviral therapy to suppress viral load whilst maintaining a satisfactory health state and thus reduce the risk of transmission to the partner and/or baby. Hence the need to commence antiretroviral treatment and/or ensure adherence should be emphasized. Counseling and education on safe sex practices should be provided and condom should be used throughout the period of fertility treatment, pregnancy and the postpartum. The care of the HIV positive persons contemplating pregnancy should be multidisciplinary, comprising of HIV physician, fertility specialist and obstetrician with a special interest in HIV.

**Pre-conception Reproductive Counseling**

Preconception reproductive counseling should be provided to the partners individually and together before commencement of fertility treatment. It entails provision of information on available reproductive options, the inherent risks, costs, likely chance of success and failure of each option. Counseling message should be able to differentiate between risk free and risk reduction methods of fertility management. It should address issues of welfare of the child when one or both partners are sick and or die and the potential social and psychological impact of parental HIV status on the offspring. The counseling should explore the risk of sexual and vertical transmission of HIV. The chance of mother - to - child transmission of HIV (MTCT) if the female is infected and the available strategies of prevention should be discussed. This would enable clients to make informed choice and give consent for treatment.

**Sexual Health Screen**

The presence of Chlamydia, gonorrhea, syphilis, herpes genitalis, trichomonas vaginalis, bacteria vaginosis, Hepatitis B virus, Hepatitis C virus and
other sexually transmitted infections increases the risk of acquisition or transmission of HIV virus. Screening and treatment of these conditions is a necessary step prior to infertility management.

**Fertility Screen**

The aim of the fertility screen is to identify any potential fertility factor which may delay conception and hence increase exposure period. It will also assist in defining the optimum mode of treatment. Seminal fluid analysis is undertaken in the male. In the female, tests include early follicular phase (day 2 - 5) endocrine profile - follicle stimulating hormone, luteinizing hormone, oestrogen, and prolactin; mid-luteal serum progesterone for detection of ovulation; pelvic ultrasound scan for uterine and ovarian factors; hysterosalpingogram (HSG), or hysterosalpingo contrast sonography (HyCoSy) and/or laparoscopy and dye test for tubal patency test. Diagnostic hysteroscopy may also be undertaken to evaluate the uterine cavity.

**Option for Conception in the Context of HIV Infection**

The available options for achieving pregnancy depends on if the couples are HIV sero-discordant or sero-concordant for HIV. The various options are shown in Table 1. These include- adoption, self insemination of husband sperm, insemination with donor sperm, timed unprotected intercourse (TUI) and sperm washing combined with IUI, IVF or ICSI.

**Adoption**

In a well adjusted relationship, adoption can serve as means of fulfilling the desire for a child in the family. It is a risk free measure and may be useful in the context when one or both partners are HIV infected. The child is however, not a biological product of either partner. The health situation of the couple(s) could be an obstacle in the adoption process. Adoption is yet to be popularly accepted in the African society. The potential social and psychological impact of parental HIV status on the adopted child should also be considered.

**Self Insemination with Partner’s Semen**

Timed self insemination of partner’s semen by an infected woman at the time of her ovulation has been used as a risk free means of achieving pregnancy when the male partner is uninfected.

**Insemination with Donor Sperm**

This involves the use of sperm from an HIV-negative donor for artificial insemination. This practice effectively removes the risk of HIV seroconversion in the uninfected female partner as the donor will have been confirmed to be HIV negative before the sperm is used. This option of fertility treatment is applicable when the male partner is HIV-positive but the female partner is HIV-negative. It however, removes the chance of genetic parenting in the male.

**Timed Unprotected Intercourse (TUI) - Natural Conception**

This involves the practice of engaging in unprotected sexual intercourse during the fertile period of the woman’s menstrual cycle. There is likelihood that overtime the uninfected partner may acquire the infection. It is also possible for infected partner to acquire another variant or drug resistant virus. Its use prior to the period of HAART was associated with high risk of transmission. The use of HAART is effective in reducing plasma levels of HIV RNA and expectedly results in reduction in risk of HIV sexual transmission. Although the risk of HIV transmission through unprotected intercourse when the patient is on HAART is not yet fully quantified recent reports indicate that transmission risks is significantly reduced if the viral load is undetectable. Recently some authors advocated the use of unprotected intercourse limited to the fertile window period in the woman’s cycle when the infected partner is on HAART and viral load is undetectable or less than 1000 copies/ml as an option for couples with no access to other safer methods of achieving pregnancy. A prospective cohort study of 453 HIV sero-discordant couples reported a dose effect for infected patients with no transmission in cases where the infected partner had plasma viral loads of less than 1000 copies/ml.
Table 1: Management Options in HIV-Positive Couples

<table>
<thead>
<tr>
<th>HIV Status</th>
<th>Management Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Sero-discordant Couple</td>
<td>Timed unprotected intercourse (infected partner should be on antiretroviral treatment)</td>
</tr>
<tr>
<td>(Male +ve, Female –ve)</td>
<td>Insemination with donor sperm</td>
</tr>
<tr>
<td></td>
<td>Sperm wash + intrauterine insemination</td>
</tr>
<tr>
<td></td>
<td>Sperm wash + In-vitro fertilization</td>
</tr>
<tr>
<td></td>
<td>Sperm wash + Intracytoplasmic sperm injection</td>
</tr>
<tr>
<td></td>
<td>Adoption</td>
</tr>
<tr>
<td>Male Sero-discordant Couple</td>
<td>Timed unprotected intercourse (infected partner should be on antiretroviral treatment)</td>
</tr>
<tr>
<td>(Male –ve, female +ve)</td>
<td>Self-insemination of partners semen</td>
</tr>
<tr>
<td></td>
<td>Adoption</td>
</tr>
<tr>
<td>Sero-concordant Couple</td>
<td>Any of the above</td>
</tr>
<tr>
<td>(Male +ve, Female +ve)</td>
<td></td>
</tr>
</tbody>
</table>

Barreiro et al. in their study found no seroconversion in 62 discordant couples who became pregnant when the viral load was undetectable in the infected partner. However, under certain conditions viral shedding in semen persists even in men with fully suppressed plasma viral load because of different compartmentalization of HIV in plasma and semen. Unprotected intercourse in the setting where one or both partners are HIV-infected is potentially unsafe.

**Sperm Wash**

Sperm wash is an established, safe and effective risk-reduction method of obtaining HIV free spermatozoa (free of seminal plasma and semen cells such as leucocytes) for intrauterine insemination (IUI) and other methods of assisted reproductive technology. The method of sperm washing was pioneered by Semprini et al. The technique is based on the observation that HIV is present free in seminal fluid and as cell-associated virus in leucocytes and non-spermatozoa cells (NSC) but is not capable of attaching to, or infecting spermatozoa. Sperm wash involves the process of sperm migration on density gradient centrifugation, repeated washing of the migrated pellet followed by spermatozoa swim up procedure. In practice sperm obtained after 3-7 days of abstinence is centrifuged in a 40-80% colloidal, silica density gradient to separate progressively motile HIV-free sperm from NSC/leucocytes and seminal plasma, which remain in the supernatant. The sperm pellet at the bottom is resuspended in fresh medium and centrifuged twice before final swim up. Polymerase chain reaction (PCR) test for HIV RNA or DNA is performed on aliquot of the final sample. This is recommended as part of quality control to confirm that the final product is free of HIV particles. While this method is effective in separating spermatozoa from the free virus and other components of seminal fluid which could harbor the virus, detectable viral load have been reported in up to 8% of samples tested after sperm wash procedure. The washed sperm can be used for IUI, IVF and ICSI. A multicentre study from the Centre for Reproductive Assistance Techniques for HIV in Europe (CREAthe) showed that sperm wash procedures is safe and effective in preventing sexual transmission of HIV to uninfected partners. In this report, there were no seroconversion in the partners who had 2840 IUI, 107 IVF, 397 ICSI and 49 frozen embryo transfers cycles, followed up for over 6 months after assisted reproduction attempt. The safety of washed sperm has also been attested to by other workers.

**Sperm Wash combined with Intrauterine Insemination (IUI), In-Vitro Fertilization (IVF) and Intracytoplasmic Sperm Injection (ICSI)**

Some authorities advocate that washed sperm be used primarily for IUI in a normal (unstimulated)
cycle at the time of ovulation. Sperm wash combined with IUI appears to be simple, easy and of low cost. Due to increased presence of infertility factors in HIV-positive clients, sperm washing may be combined with ovulation induction, IVF or ICSI. This is the recommended practice in many European countries and United Kingdom14,27,40.

Other experts prefer sperm washing combined primarily with ICSI as the treatment of choice even in the absence of any fertility factor 41,42. This is based on the premise that IUI requires the insemination of large numbers of sperm to be effective and typically multiple cycles of insemination to achieve a pregnancy. In ICSI only one sperm is used per oocyte thereby providing a theoretical advantage by minimizing oocyte contact with potentially contaminated seminal plasma and semen cells such as leucocytes. Because the semen analysis is often abnormal in HIV-positive men, the use of ICSI in infertility management become even more relevant in this group of clients. The theoretical risk of injecting spermatozoa contaminated with HIV viral particle is a limitation to this practice. ICSI is costly, more labor intensive, less accessible and may be associated with higher risk of obstetric complications than IUI. However, in a 10 year review of 420 consecutive cycles of sero-discordant couples where ICSI with washed sperm was the procedure, the authors recorded no case of maternal or perinatal HIV transmission 43.

Safety Issues in Infertility Management of HIV-Positive Clients

Handling and freezing gametes and embryos from patients who are HIV-positive carries risk of cross-contamination to samples from HIV-negative patients and health workers. Contamination with HIV, Hepatitis B and C has been documented in ART settings 44,45. This is one reason why some centres are reluctant in offering fertility treatment to HIV positive clients. Recently some guidelines and recommendations on laboratory and patient care have been put in place to minimize this risk 44,46,47. The key issues in the recommendation includes-

a) Screening of all clients undergoing ART for HIV and hepatitis B and C.

b) Handling of potentially infected samples in separate laboratory or laboratory area with dedicated equipment (eg. incubators, flow hoods), alternatively if space and cost are issues, to schedule HIV-positive cases to be last in work list or at a different time to HIV-negative ones.

c) Cryopreservation in separate cryostorage tanks for each infection and infection combination.

d) The use of “double bagging” or sealing techniques to prevent the direct contact of cryocontainers with liquid nitrogen.

e) The storage of samples in liquid nitrogen vapour instead of in liquid nitrogen itself

f) The use of sperm washing techniques to decrease the viral load before freezing semen samples

g) Strict observance of universal safety precautions including adequate decontamination process (1% hypochloride or other suitable chemicals) and single-use disposable materials.

h) Quality management systems with detailed and regular risk assessment/audit

Uncertain Issues in Infertility Management in HIV-Positive Couples

Although much can now be offered the HIV positive couples there are issues yet to be resolved. In the setting of an HIV-positive woman, the process of ART treatment involves many invasive procedures (including IUI, oocyte retrieval and embryo replacement) that can contaminate the gamete or embryo and may result in HIV transmission48. There is the need to monitor patients and babies conceived through these procedures.

Conclusion

Increasing demand for fertility services among HIV positive couples have been documented in many countries. The current trend is mainly attributable to the availability and use of HAART which has made HIV infections more of a chronic but controlled medical condition. Fertility care for the HIV positive is now regarded as a right that should not be denied. Cumulative data suggest that
sperm washing protocols is safe and effective in significantly reducing or eliminating HIV from semen sample. Washed semen can be safely used with IUI, IVF and ICSI. These procedures have potential to reduce sexual HIV transmission in our society with predominant heterosexual transmission. It is essential to make these services accessible to HIV positive clients.

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Prevalence of Internalized Homophobia and HIV Associated Risks among Men who have Sex with Men in Nigeria

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Abstract

This study assessed the level of internalized homophobia and associated factors among men who have sex with men (MSM) in Nigeria. Using respondent driven sampling, MSM were recruited in Lagos and Ibadan between July and September, 2006. Internalized homophobia was assessed as a negative composite score using an 11-item scale. A total of 1,125 MSM were interviewed. About 44.4% self-identified as homosexual or gay while 55% regarded themselves as bisexual. About a third of the respondents reported internalized homophobia. With homosexual/gay men as reference, respondents who self-identified as bisexual were two times more likely [AOR 2.1; 95 CI: 1.6 – 2.9, p<0.001] to report internalized homophobia. Those who were HIV positive were also twice as likely to report internalized homophobia compared to those who were HIV negative [AOR 1.8; 95% CI: 1.2 - 2.7, p=0.004]. As internalized homophobia impedes acceptance of HIV prevention programming, identifying MSM who experience internalized homophobia is integral to the success of HIV prevention programming in Nigeria (Afr J Reprod Health 2012; 16[4]: 21-28).

Résumé

Cette étude a évalué le niveau de l'homophobie intériorisée et les facteurs qui y sont liés chez les hommes qui ont des rapports sexuels avec des hommes (HSH) au Nigeria. À l'aide d'un échantillonnage basé sur les interviews, les HSH ont été recrutés à Lagos et à Ibadan entre les mois de juillet et septembre, 2006. L'homophobie intériorisée a été évaluée par un indice négatif composite en utilisant une échelle de 11 items. Au total, 1,125 HSH ont été interviewés. À peu près 44,4% se sont identifiés comme des homosexuels tandis que 55% se considéraient comme des bisexuels. Environ un tiers des interviewés ont signalé l'homophobie intériorisée. En se servant des hommes homosexuels comme référence, les interviewés qui se sont identifiés comme bisexuels avaient deux fois plus la possibilité [AOR 2.1; IC 95: 1.6 – 2.9, p<0.001] de signaler l'homophobie intériorisée. Ceux qui étaient séropositifs avaient également deux fois plus la possibilité de signaler l'homophobie intériorisée par rapport à ceux qui étaient séronégatifs [AOR: 1.8; IC à 95%: 1.2 - 2.7, p = 0.004]. En étant donné que l'homophobie intériorisée empêche l'acceptation de la prévention de la programmation du VIH, l'identification des HSH qui éprouvent l'homophobie intériorisée fait partie intégrante de la réussite de la prévention de la programmation du VIH au Nigéria (Afr J Reprod Health 2012; 16[4]: 21-28).

Keywords: Men who have sex with men, Internalized homophobia, Nigeria, Bisexuality, Gay

Introduction

Nigeria with an estimated population of over 167 million people in 2011 has the second highest burden of HIV and AIDS in sub-Saharan Africa. Current estimates suggest approximately 3 million Nigerians are living with HIV. The modes of HIV transmission study undertaken in Nigeria attributed 23% of new infections to three most-at-risk populations (comprising men who have sex with men (MSM), injecting drug users (IDUs) and female sex workers (FSWs), with MSM alone contributing about 10%.

HIV prevalence among MSM is the second highest in Nigeria after female sex workers, yet funding and policies for HIV prevention interventions, care and treatment are severely inadequate in quantity and quality. Without adequate and appropriate interventions, MSM will continue to be at risk for HIV transmission and infection. MSM in Nigeria continue to experience extremely high levels of stigma, discrimination and criminalization which result in them becoming
more hidden, using more discreet methods to meet and socialize with their peers and thereby becoming harder to reach with appropriate prevention interventions.

The literature indicates that MSM report the experience of varying degrees of internalized homophobia, defined here as self-hatred and shame resulting from negative stereotypes, beliefs and prejudice about homosexuality leading to devaluation and internal conflicts. Homophobia towards oneself is found to be inextricably linked with broader social attitudes and norms that stigmatize and discriminate against MSM and homosexuality. Although in western societies, negative stereotyping against men who have sex with men has reduced significantly, this does not hold true for all countries, which explains the variation of internalized homophobia across societies, cultures and contexts. Hooghe (2011), in his study, found widespread levels of homophobia among Belgian adolescents despite various legal reforms in the country against discrimination of gay women and men. Andersen and Fetner (2008) provided a macro view to tolerance and acceptance of MSM. They proposed that as national income inequality increases, tolerance to homosexuality declines. They also provided evidence to show that as economic development increases, tolerance increases. This may explain why the professional and managerial classes are generally more tolerant to homosexuals than the working class.

Internalized homophobia has been reported to be associated with relationship satisfaction, extent of attraction to men and women, membership and length of social time spent with gay groups, disclosure of HIV status and identity. This indicates the need to design programs that address the issue. In addition, the presence of internalized homophobia has been found to be negatively linked to level of awareness of available HIV prevention services in the community, a change in perceptions of condom use self-efficacy and the extent to which people feel similar to and relate with other members of their community.

Few studies in sub-Saharan African settings have carefully examined the issue of internalized homophobia in the context of HIV prevention and impact mitigation. The present study examines the correlates of internalized homophobia and the HIV-associated risks among MSM in Nigeria.

**Methods**

**Study site**

The study was conducted in Lagos and Ibadan, two bustling metropolitan and major commercial cities located in the south west of Nigeria, with population sizes of approximately 15 million and 2.5 million respectively.

**Study size and power calculations**

Given the lack of data of internalized homophobia among MSM in Nigeria, we used HIV prevalence to estimate the required sample size. HIV has been linked with internalized homophobia. We used an estimated HIV prevalence of 10-25% to calculate the minimum sample size required to estimate the prevalence of HIV with a desired precision of +/- 4%, non-response of 45% and design effect of 1.4. Adequate power to detect significant differences in effects was defined as 80% and above.

**Study population and sampling design**

MSM were defined as any man ≥ 16 years who had engaged in oral or anal sex with another man in the last 12 months. To increase the sample representativeness of the hidden population of MSM for which no sampling frame exists, a cross-sectional study involving respondent driven sampling was employed to recruit respondents into the study. Unlike convenience sampling techniques, the respondent driven mechanism has been widely reported to provide diverse samples of MSM and population based estimates of a specific trait that are asymptotically unbiased. It involves the use of peers and compensation for participating and recruiting peers. Efforts were made to diversify the seeds (initial recruits that started the referral system) in RDS. Thirty-eight seeds were selected. Each seed was given three uniquely coded referral coupons and $5-13 as compensation for travel, effort and time in participating and recruiting peers into the study. Each recruit was in turn given three coupons to...
refer three peers and this continued until the sample size was reached. Coupons were limited to three to prevent an over representation of particular traits in the sample, as recommended by Heckathorn, 1997. Due to the sensitivity of the study, special precautions were taken in conducting the study procedures to maximize the safety and confidentiality of participants. The study protocol was reviewed and approved by the University of Toronto Research Ethics Board (REB) and the Lagos University Teaching Hospital, Nigeria Ethics Review Board. Participation in the study was voluntary and did not in any way compromise participant’s access to services offered by service providers. Free condoms and lubricants were also provided to participants.

**Behavioural data, biological sample collection and analysis**

A structured questionnaire was used to collect information on socio-demographic characteristics, network size, sexual identity, sexual preferences and behaviours, partner characteristics and sexual mixing patterns. Internalized homophobia was measured using an eleven-item scale which included questions on homosexuality and its effect on level of comfort and how it affects relationship with friends and family members (the scale adequately captured internalized homophobia; Cronbach’s $\alpha = 0.79$). Items included “I am glad to be a man who has sex with men,” “I wish I were heterosexual” and “Life as a homosexual is not as rewarding as life as a heterosexual.” A three-point Likert scale was used to assess each item with answers varying from “strongly disagree, neutral and strongly agree” and having a score of -1 to 1 depending on the type of question. Questions supporting homosexuality e.g. “I am glad to be a man who has sex with men” which denoted a positive attitude to homosexual identity were assigned a score of -1, 0 or 1 for strongly disagree, neutral and agree respectively, whereas a question like “I wish I were heterosexual,” was assigned a score of 1, 0, and -1 for strongly disagree, neutral and agree respectively. This created a balance in the scoring system and credited negative scores for questions suggestive of internalized homophobia.

A composite index score was calculated with negative scores indicating the presence of internalized homophobia and the more negative the scores, the higher the levels of internalized homophobia. Subsequently, the scores were re-categorized into binary variable “0/1” with “0” representing all negative values and 1 representing all values $\geq 0$ and used as the dependent variable in the logistic regression. The scale was examined using principal component analysis and this showed that a scale with all eleven items was the best scale to adequately characterize internalized homophobia.

Following completion of the behavioural interview, HIV counseling and testing were offered to study participants who elected to be tested. HIV testing followed the WHO/UNAIDS HIV testing strategy III using two enzyme immune-absorbent assays (EIAs) - Genetic Systems LAV EIA – [GS] (Bio-Rad Laboratories Blood Virus Division Redmond, WA) and Vironostika HIV-1 Microelisa System [V] (Organon Teknika Corp. Durham, NC). Using the parallel algorithm, all the blood specimens were simultaneously tested with the two tests – GS and V. All samples were assayed at the Harvard/AIDS Prevention Initiative, Central Research Laboratory located within the Lagos University Teaching Hospital.

Results of HIV tests were given to respondents at the end of the study visit with post-test counseling. Respondents who tested positive were referred to government ART clinics for confirmatory test and further management.

Data were analyzed using RDSAT software version 5.6 for adjusted prevalence of internalized homophobia and STATA version 10.0 (Stata Corporation). We conducted descriptive analyses for demographic variables including age, marital status, employment and educational attainment using RDSAT software to adjust for recruitment patterns and the relative sizes of participants’ networks (www.respondentdrivensampling.org). RDS recruitment coupled with RDSAT data analysis produced population-based estimates. Individualized weights based on the outcome variable (internalized homophobia) were generated in RDSAT and exported to the STATA software for regression analyses (bivariate and multivariate
analysis). Selection of independent variables into the regression model was determined through literature and theoretical concepts. Selection of internalized homophobia risk factors into the model was determined if bivariate analysis was significant at p-values of less than 0.2. A p-value < 0.05 was considered to be significant for all tests conducted.

Results

Table 1 summarizes the characteristics of the study population. All 1125 study participants were recruited by peers through the respondent driven sampling method. Median age was 22 years (IQR 20 – 26 years) with the majority of the respondents (71%) being less than 25 years. Median age of sexual debut with a man was 18 years (IQR 15 – 20 years) and the median number of male sex partners was 3 (IQR 2 – 5 partners) with 76% of the respondents having two or more male sexual partners in the last 12 months prior to the study. HIV prevalence in the study population was 13.4%. Over 96% of respondents had completed at least secondary level education and 35% had completed tertiary level education. Only 43.3% of the respondents were employed and majority were single (97%). For sexual identity, 44.4% self-identified themselves as homosexual or gay and 55% as bisexual. Given that less than 1% of the respondents regarded themselves as heterosexual and transgender, they were categorized within the bisexual group for analysis. For sexual preference, 56% indicated they preferred to have sex with a man while 16% preferred sex with a woman. About a third had had sex with ≥ 2 female partners in the last 12 months preceding the study. Overall, 37% of the respondents had been forced to have sex in the 12 months preceding the study, 30% engaged in transactional sex (defined as buying or selling sex) and 10% of the respondents had bought sex while 27% had sold sex in the 12 months preceding the study.

Internalized homophobia as determined by a negative composite score on an eleven-item scale was experienced by about a third of the respondents. Table 2 summarizes responses to internalized homophobia scale items. The majority (78%) agreed they were glad to be MSM and 82% agreed their sexual orientation did not make them inferior. About a third wished they were heterosexual. Although 75% reported no regrets about their sexuality, 40% agreed they will accept the opportunity to be heterosexual.

For the logistic regression, variables that demonstrated significant associations with internalized homophobia in the bivariate analyses were modeled in a multivariate analysis to determine factors associated with internalized homophobia. Age, having more than two female partners in the past 12 months, HIV status, sexual identity and employment status showed significant associations with internalized homophobia at the bivariate level (p<0.05). Respondents who self-identified as bisexuals were two times more likely [AOR 2.1; 95 CI: 1.6 – 2.9, p<0.001] to report the presence of internalized homophobia compared to respondents who self-identified as homosexuals/gay. Those who were HIV positive were also twice as likely to report internalized homophobia compared to those who were negative [AOR 1.8; 95% CI: 1.2 – 2.7, p=0.004]. Age, having two or more female partners and employment status were not significantly associated with internalized homophobia.

Discussion

The concept of internalized homophobia is new in Nigeria. There is mounting evidence that MSM cut across all educational, marital and socio-economic strata in Nigeria. This is the first study in Nigeria to examine and report that about a third of MSM in Nigeria experience varying degrees of internalized homophobia. This is even more so among MSM who self-identify as bisexual and among those who are HIV positive. The high levels of internalized homophobia experienced by bisexual men may not be unconnected to internal conflicts resulting from the dual lives they lead because of the cultural norms attached to marriage from which they are not exempt. Additionally, the internal responses to high levels of stigma, discrimination and homophobia against MSM further reinforce internalized homophobia. This finding is congruent to a recent study of internalized homophobia in South Africa. Further research that examines depression in this group of
Table 1: Characteristics of study population (n=1125)

<table>
<thead>
<tr>
<th></th>
<th>Total % (n)</th>
<th>Presence of homophobia% (95% CI)</th>
<th>Absence of homophobia% (95% CI)</th>
<th>p-value‡</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25 years</td>
<td>71.2 (801)</td>
<td>30.3 (27.2 - 33.5)</td>
<td>67.7 (66.5 - 72.9)</td>
<td></td>
</tr>
<tr>
<td>&gt; 25 years</td>
<td>28.8 (324)</td>
<td>37.4 (32.1 - 42.6)</td>
<td>62.7 (57.3 - 67.9)</td>
<td>0.023</td>
</tr>
<tr>
<td>HIV prevalence</td>
<td>13.4 (145)</td>
<td>45.5 (37.3 – 53.7)</td>
<td>54.5 (46.3 – 62.6)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Median age=22 years (IQR 20 - 26yrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at sexual debut with a man=18yrs (IQR 15 - 20 yrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>2.7 (30)</td>
<td>36.7 (19.1 - 54.2)</td>
<td>63.3 (45.7 - 80.8)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>62.4 (700)</td>
<td>32.1 (28.7 - 35.6)</td>
<td>67.9 (64.4 - 71.3)</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>34.9 (392)</td>
<td>32.7 (28.0 - 37.3)</td>
<td>67.4 (62.7 - 72.0)</td>
<td>0.869</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>43.3 (487)</td>
<td>35.5 (31.3 - 39.8)</td>
<td>64.5 (60.2 - 68.7)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>56.7 (638)</td>
<td>29.9 (26.4 - 33.5)</td>
<td>70.1 (66.5 - 73.6)</td>
<td>0.047</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/co-habituating</td>
<td>2.9 (33)</td>
<td>42.2 (25.3 - 59.6)</td>
<td>57.6 (40.4 - 74.7)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>96.5 (1086)</td>
<td>32.2 (29.4 - 35.0)</td>
<td>67.8 (65.0 - 70.5)</td>
<td>0.218</td>
</tr>
<tr>
<td><strong>Sexual Identity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homosexual</td>
<td>21.6 (243)</td>
<td>24.7 (19.3 - 30.1)</td>
<td>75.3 (69.9 - 80.7)</td>
<td></td>
</tr>
<tr>
<td>Gay</td>
<td>22.8 (257)</td>
<td>19.8 (15.0 - 24.7)</td>
<td>80.2 (75.3 - 85.1)</td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>55.2 (621)</td>
<td>40.1 (36.2 - 44.0)</td>
<td>59.9 (56.4 - 63.8)</td>
<td></td>
</tr>
<tr>
<td>Heterosexual/transgender</td>
<td>0.4 (4)</td>
<td>*</td>
<td>*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≥ 2 Male partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>76.2 (857)</td>
<td>32.0 (28.8 - 35.1)</td>
<td>68.0 (64.9 - 71.2)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>23.8 (268)</td>
<td>33.6 (27.9 - 39.30)</td>
<td>66.4 (60.8 - 72.1)</td>
<td>0.623</td>
</tr>
<tr>
<td>≥ 2 female partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30.8 (347)</td>
<td>40.3 (35.2 - 45.5)</td>
<td>59.7 (54.5 - 64.8)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>69.2 (778)</td>
<td>28.8 (25.6 - 32.0)</td>
<td>71.2 (68.0 - 74.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Was forced to have sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37.2 (419)</td>
<td>35.3 (30.7 - 39.9)</td>
<td>64.7 (60.1 - 69.3)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>62.8 (706)</td>
<td>30.6 (27.2 - 34.0)</td>
<td>69.4 (66.0 - 72.8)</td>
<td>0.101</td>
</tr>
<tr>
<td>Sold sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27.1 (305)</td>
<td>35.1 (29.7 - 40.5)</td>
<td>64.9 (59.6 - 70.3)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>72.9 (820)</td>
<td>31.3 (28.2 - 34.5)</td>
<td>68.7 (65.5 - 71.8)</td>
<td>0.233</td>
</tr>
<tr>
<td>Bought sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9.6 (108)</td>
<td>36.1 (27.0 - 45.2)</td>
<td>63.9 (54.8 - 73.0)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>90.4 (1017)</td>
<td>32.0 (29.1 - 34.8)</td>
<td>68.0 (65.2 - 70.9)</td>
<td>0.38</td>
</tr>
</tbody>
</table>

*Sample size too small to compute CI; ‡Chi square

Individuals may shed more light on the association between bisexuality and internalized homophobia. Thus, for HIV prevention and education programs targeted at MSM to be effective, it is important for interventions to recognize that there are sub-sets of the MSM population and behaviour change messages may not meet the needs of all MSM because of the gulf in the content and quality of the messages between the providers and beneficiaries. It may also be the case that bisexual men being sexually active in both homosexual and heterosexual relationships are potential receivers and transmitters within both populations, putting themselves and others at increased risk of HIV and other sexually transmitted infections. Further studies to understand the diversity of sexuality and its experience among MSM in Nigeria are required to improve appropriate prevention interventions for this population.