

Sustenance of HIV/STI Protective Behaviours by Slum-dwelling Adolescent Girls and Young Women is associated with their Income Status

Mr. Julius N. Nguku^{1,3}, Dr. Elizabeth W. Mwaniki¹ Ms. Tabitha Muia³,
Prof. Fiona N. Mbai².

^{1,3}B.Sc., MPH., Ph.D. in Public Health (Ongoing);

¹B.A. Educ., MPH, Ph.D. (Public Health)

³B.A.(Economics), MBA (Marketing)

²B.Sc., M.Sc. (Endocrinology), Ph.D. (Biological Sciences).

¹Department of Community and Public Health, School of Health Sciences and Technology, The Technical University of Kenya, P.O.Box 52428-00200, Nairobi, Kenya.

²Department of Biomedical Sciences and Technology, The Technical University of Kenya, P. O. Box 52428-00200, Nairobi, Kenya.

³HOPE worldwide Kenya, Bold Idea for Girls Project, P.O.BOX 117755-00100, Nairobi, Kenya.

Corresponding Author: Mr. Julius N. Nguku

SUMMARY (200 words): The burden of HIV and AIDS in Sub-saharan Africa continues to be the highest among all the regions in the world constituting about 70% of the 6,000 new infections that occur globally daily. In Kenya, while there has been an overall decrease in new HIV infections from 2013 to 2015, infections among the young people have been increasing, and there is a disproportionate vulnerability of Adolescent Girls and Young Women (AGYW) to this infection. In this retrospective cohort study, we sought to establish whether the income status of slum-dwelling AGYW who had previously benefited from BCC HIV/STI prevention programmes is associated with sustenance of HIV protective behaviours.

Quantitative data was collected through a standard Knowledge, Attitude, Perceptions and Behaviour (KAPB) survey tool with 207 respondents and analysed using a logistic regression model. Qualitative data included key informant interviews of four program managers and focus group discussions with 33 community leaders. The qualitative data was analysed through grounded theory technique.

The results showed associations between earning more than KES 1,000 with sustenance of condom use, negotiating power in heterosexual relationships and voluntary testing for HIV. The findings provide a strong argument for including economic empowerment aspects into programmes targeting this sub-population.

Date of Submission: 17-11-2018

Date of acceptance: 02-12-2018

I. Introduction

The burden of HIV and AIDS in Sub-saharan Africa continues to be the highest among all the regions in the world. Out of the estimated 6,000 new infections that occur globally each day, two out of three are in this region [1]. According to the Global AIDS Update Report of 2016, out of the total 2.1 million new global infections in 2015, 960,000 (45.7%) were in Sub-Saharan Africa [2]. Acquisition and transmission of HIV is attributable to a range of behavioral, biological, demographic and socio-economic factors [3,4]. The behavioral factors include the number of HIV-infected sexual partners that one has and consistent and correct use of condoms [5].

As observed by Higgins *et. al.* [6] inequalities between men and women reinforced by gender roles typically leave women especially vulnerable to HIV infection and its impacts. The situation is exacerbated by the anatomical predisposition in females whereby, before puberty, the exocervix of young females is lined with only a single layer of columnar epithelial cells which pre-disposes them to HIV and other STI infections [7]. Further, the mucosal properties of the female genital tract facilitate more efficient transmission of HIV and other STIS [8].

In Kenya, Adolescents and Young People (AYP) have not realized the expected benefits commensurate with the significant investments made in the provision of HIV services, including prevention care and treatment, despite many programmatic and political commitments [9]. According to the Kenya Fast-Track Plan to end HIV and AIDS Among Adolescents and Young People Report of 2015, adolescents and young people especially the young women, still bear the brunt of the HIV epidemic due to limited access to information, services, stigma

and discrimination [9]. The problem is compounded for slum-dwelling young people living with HIV and AIDS who face a myriad of challenges including: inadequate health care, weak support systems and perceived hopelessness about their future prospects [10]. AIDS-related ailments are the leading cause of morbidity and mortality among adolescents and young people in Kenya as 9,720 adolescents and young people died out of AIDS-related causes in 2014 [11].

According to the Kenya AIDS Response Progress Report of 2016, there was a reduction of new HIV infections in adults by 19% from 88,622 infections in 2013 to 71,034 infections in 2015. However, the new HIV infections increased by 17% for the young people aged 15 to 24 years: from 29,352 infections in 2013 to 35,776 new infections in 2015 [11].

Vulnerability of Adolescent Girls and Young Women

In Sub-Saharan Africa, 12 to 13 women are infected by HIV for every ten men, and the average rate of infection for teenage girls in some countries is five times higher than that for teenage boys [12]. Despite the recent progress in the overall global HIV/AIDS response, AIDS is still the leading cause of mortality among AGYW aged 15-24 in Eastern and Southern Africa with as many as 7,000 new infections a week, 468 of them being in Kenya [12]. In Kenya, compared to males of the same age-group, females aged 15-19 years are also less likely to access services offered by health programs and have less knowledge about HIV and AIDS [13].

Out of the 71,034 new HIV infections among people aged above 15 years in 2015, 51% (35,776 infections) were in young people aged 15-24 years; 23,312 infections (65.3%) being among the AGYW and the rest 12,404 (34.7%) being among adolescent boys and young men [11]. This shows there is greater susceptibility of AGYW to HIV infection compared to males of similar age. This disproportionate vulnerability of women to HIV infection has also been documented in other studies and reports [11-14]. There is also a dramatic difference in HIV prevalence between 15-19-year-old females (1.1%) and 20-24-year-old females (4.6%), suggesting the need for emphasis on HIV prevention for adolescent girls [11]. Age-sex disparity in HIV acquisition has been attributed to societal norms that promote unequal gender roles and responsibilities [15]. Reducing the vulnerability of AGYW to HIV will be key to stemming the spread of the HIV epidemic which is mostly spread through unprotected heterosexual activities [1,9,11,14]. The importance of behavior change in eliciting HIV protective behaviours has been underscored in several studies [16-18].

This study sought to establish whether the income status of AGYW who had previously benefited from three of HOPE worldwide Kenya's (HWWK) HIV/STI BCC programmes is associated with sustenance of HIV protective behaviours. The three programmes were implemented between October 2012 and September 2015 in Mukuru Slums, Nairobi. These programmes included: the "Global Fund Round 7" Program that reached 93 AGYW in Mukuru using a peer-education only approach; the 'Nuru' program that reached 201 AGYW using combination of peer education and an evidence-based behavioural intervention (EBI) termed 'Shuga'—a video show with a facilitators' guide that contains messages which advocate for responsible sexual behaviour; and the "Bold Idea for Girls" (BIG) program that reached 175 AGYW which integrated the peer-led approach, the EBI "Shuga", a gender program targeting women, economic empowerment through vocational and entrepreneurial skills training.

II. Materials And Methods

Enrolment

To determine the sample size of participants required for the study, the formula below was used.

$$n = \frac{Z^2 p q}{e^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.07)^2} = 196 \text{ girls}$$

Source: [19]

To the calculated sample size of 196 girls, an extra 10 (5%) were added to allow for stratification, missing or incomplete questionnaires. The final sample size was 206.

The sampling frame were lists of AGYW who had previously benefited from any of the three programs at least one year before the study. The lists were obtained from HWWK program data records. The inclusion criteria were: a female aged 15-24 years old who has given informed consent to participate in the study, residing in one of the three villages in the Mukuru Slums for the last 6 months, out-of-school and formerly benefited from one of the three HWWK HIV/STI BCC programs at least one year before the study. The exclusion criteria were that any other person would be excluded.

The participants who had previously benefited from the three HWWK HIV/STI BCC programmes in Mukuru Slums were identified through probability proportionate to size and simple random sampling method from the three programs to ensure that every eligible AGYW had an equal and known chance of being enrolled.

Study Design

The study design was retrospective cohort in which the researcher assessed HIV/STI protective behaviours sustained by AGYW at least one year after the closure of the BCC programmes to which they had previously been exposed. In the absence of any published study which informs the duration required for behaviour to be considered sustained after a HIV/STI BCC program, the duration selected in this study was based on evidence in the smoking cessation study published by Baldwin and *et. al.* [20] which showed twelve months as the optimal period considered for smoking cessation to be determined as sustained.

Study Area

The study was conducted in Mukuru Slums in Nairobi's Eastlands area which includes 3 identifiable clusters of villages and communities. The villages in the Mukuru Slums include: Mukuru kwa Reuben, Mukuru kwa Njenga and Lunga-lunga. Mapping conducted in Mukuru by the Partnership for an HIV-Free Generation (HFG) in 2008 revealed that Mukuru Slums have an estimated population of 504,000 persons. Thirty four percent of the population falls within the 15-24 years' age bracket [21].

Data Collection

A standard Knowledge, Attitude, Perceptions and Behaviour questionnaire was designed and applied to all the participants. Pretesting of the research questionnaire had been carried out in a slum setting similar to Mukuru known as Korogocho with 103 AGYW. Changes deemed necessary were made to the questionnaire before being applied to the study population.

Key Informant Interviews (KII) were conducted using a Key Informant guide with four (4) program managers purposively selected from HOPE *worldwide* Kenya programs previously implemented in Mukuru Slums. Two Focus Group Discussions (FGD) were held: one with 12 peer leaders who had been part the beneficiaries of the three programs; and the other with 11 community leaders drawn from the three Mukuru villages and included village elders, Community Health Volunteers, Faith-based organizations leaders; and heads of schools.

Analysis of Data

Quantitative data was recorded in an excel software platform and exported to analytic SPSS version 16 software [22]. The results were presented as proportions and odds ratios with 95% Confidence Intervals (CI) calculated to determine the differences, if any, in sustenance of HIV/STI protective behaviours (consistent condom use, one sexual partner, negotiating power with sexual partners in condom-use; and testing for HIV in the last 6 months) with income status of the participants. Pearson's correlation coefficients were calculated to determine associations between income status of the participants with the behavioral outcomes. One-way ANOVA test was done to establish the differences in the impact of income status on the outcomes. Statistical significance was set at $p < .05$.

Qualitative data were transcribed, coded and analyzed through grounded theory technique using QDA Miner Lite software. The analyses showed the perceptions of the program managers, community leaders and the female youth leaders about sustainability of HIV/STI protective behaviours by young women.

Ethical Approval

Ethical approval was obtained from the Great Lakes University of Kisumu Ethical Research Committee (GREC): Certificate of Approval of Research Protocol -GREC/222/32/2015.

Ethical Considerations

All the young women participating in the study were recruited into the program if they fulfilled the inclusion criteria and assented to the written informed consent. Girls aged below 18 years provided assent and their parents' or guardians' consent was obtained before inclusion in the study. All data collected, including password-secured soft copy data were kept confidential. Personal identifiers were removed from the analytic database.

III. Results

Demographic Characteristics of the Participants

Out of the total 237 young women who met the inclusion criteria and were contacted, 218 participants were enrolled, a response rate of 91.9%. The 218 participants responded to the questionnaire administered. 11 questionnaires were incomplete or had errors and were therefore excluded from the analysis. Hence, this study consisted of 207 complete questionnaires for analyses. The Cronbach's alpha coefficient for the 23 items in the questionnaire is .70, suggesting that the items in the questionnaire have good internal consistency.

Out of the 207 participants, 128 (61.8%) earned more than KES 1000 per month while the rest earned less. About half (51%) were aged 15-19 years while the rest were older, 67% were single while 70% had a minimum of secondary level of education. Most (32%) of them lived with their husbands or were cohabiting with a man. See Table 1 for the demographic characteristics of participants.

Out of the 207 participants, 140 (67.6%) were sexually active, 98 (70%) of whom earned more than KES 1,000 per month.

Income Status and Consistent Condom Use of the Participants

The proportion of sexually active participants who reported consistently using condoms during sex relative to income status was 90.1% for those who earned more than KES 1,000 per month compared to 71.4% of those who earned less. The difference was statistically significant (O.R 3.956; 95% C.I. 1.515-10.312; $p=0.004$), as shown in Table 2.

Statistically significant differences in condom use were observed between those who earned more than KES 1,000 and those who earned less for the sexually active adolescent girls aged 15-19 years ($p=0.013$); and young women aged 20-24 years ($p=0.002$), as shown in Figure 1.

Table 1. Income Status and Demographic Characteristics of Study Participants

	Income status	Income minimum of 1,000 KES (n, %) 128 (61.8%)	Income of less than 1,000 KES (n, %) 79 (38.2%)	Total (n, %) 207(100%)
Age	15-19 years	62(59%)	43(41%)	105(51%)
	20-24 years	66(65%)	36(35%)	102(49%)
Marital Status	Single	100(72%)	39(28%)	139(67%)
	Married	28(41%)	40(59%)	68(33%)
Who the participant lived with	Alone	39(76%)	10(24%)	49(24%)
	Parent/Guardian	32(55%)	26(45%)	58(28%)
	Husband/Cohabiting	27(40%)	40(60%)	67(32%)
	Friend/sibling/relative	30(91%)	3(9%)	33(16%)
Level of Education	No formal/ Primary	43(68%)	20(32%)	63(30%)
	Secondary/Tertiary	85(59%)	59(41%)	144(70%)

Among the 95 sexually active single participants, statistically significant differences in condom use were observed between those who earned more than KES 1,000 and those who earned less (AOR 4.51; 95% CI 1.39-14.61; $p=0.012$). However, the difference between the two income levels among the married participants was not statistically significant ($p=0.121$).

Income Status and Number of Sexual Partners of the Participants

Among the 98 sexually active participants who earned more than KES 1,000, 64 (65.3%) had one sexual partner, compared to 27(64.3%) out of the 42 who earned a maximum of KES 1,000. The difference in the prevalence of one sexual partner between the two income levels was not statistically significant ($p=0.903$) (see Table 2). There were also no statistically significant differences in prevalence of one sexual partner between those who earned more than KES 1,000 and those who earned less in both the adolescent girls ($p=0.368$); and young women ($p=0.536$).

Table 2. Income Status and HIV Protective Behaviours of Study Participants

	Having minimum income of KES 1,000 per month (N=98)			Having income of less than KES 1,000 per month (N=42)		Unadjusted OR (95% C.I.)	p-value
	n	n/N	%	n	n/N %		
Consistently using condoms during sex	89	89/98	90.1	30	30/42 71.4	3.956 (1.517-10.312)	p=0.004*
Having one sexual partner	64	64/98	65.3	27	27/42 64.3	1.046 (0.491-2.227)	p=0.908
Negotiating power in sexual relationships	76	76/98	77.0	21	21/42 50.0	3.455 (1.601-7.452)	p=0.002*
Tested in the last 6 months	84	84/98	85.7	28	28/42 66.7	3.000 (1.245-7.231)	p=0.014*

Difference showing statistical significance at $p < 0.05$

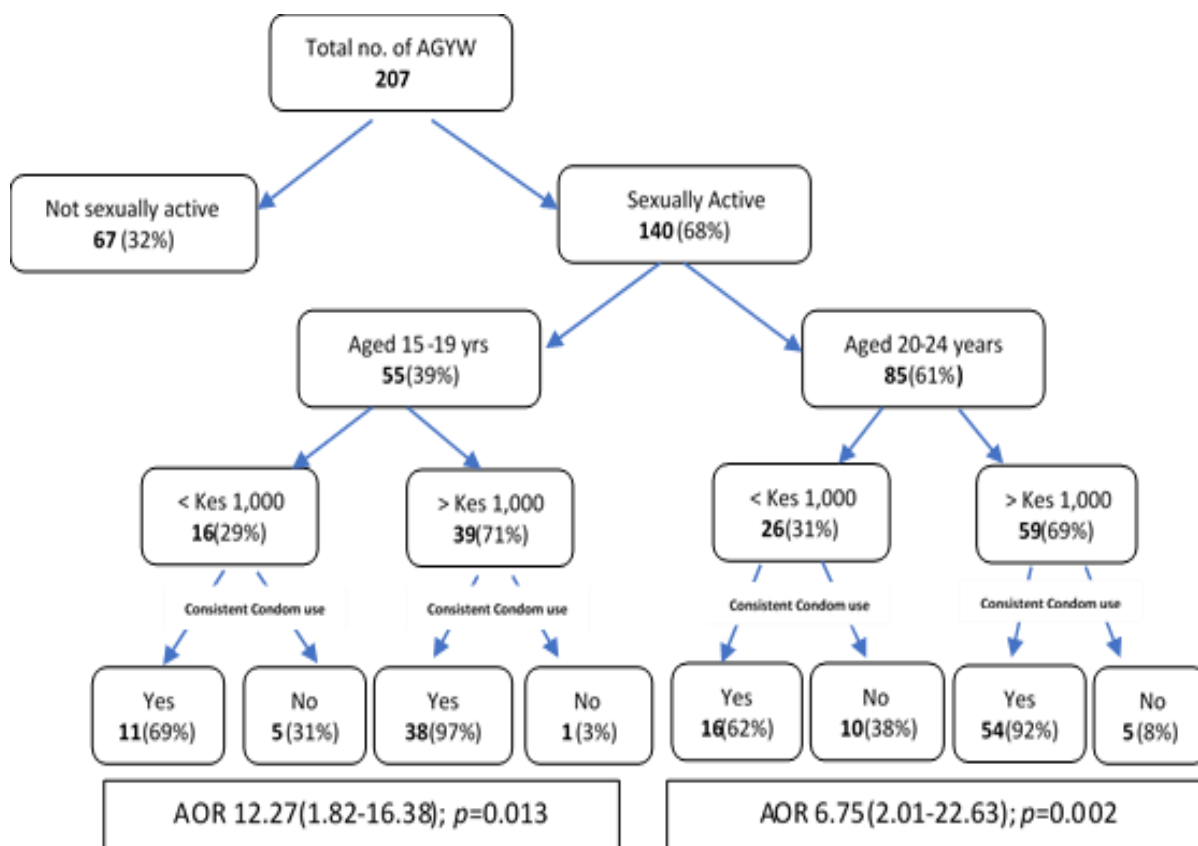


Figure 1: Income Status and HIV Protective Behaviours with Age

Figure 1 shows that those who earned more than KES 1,000 per month were significantly ($p < 0.05$) more likely to sustain consistent condom use during sex than those who earned less; for both age ranges 15-19 years and 20-24 years.

Income Status and Negotiating Power in Sexual Relationships of the Participants

The proportion of sexually active participants who showed negotiating power in hetero-sexual relationships relative to income status was 77% for those who earned more than KES 1,000 per month compared to 50.0% of those who earned less. The difference was statistically significant ($p = 0.002$) (Table 2). Controlling for age gave similar results with statistically significant differences being observed in power in sexual relationships between those who earned more than KES 1,000 and those who earned less for adolescent girls (AOR 5.50; 95% C.I 1.48-12.39; $p = 0.012$); and young women (AOR 2.68; 95% C.I 1.03-7.01; $p = 0.043$).

Income Status and Testing for HIV by the Participants

Out of the 98 AGYW who earned more than KES 1,000, 84(85.7%) had tested for HIV in the last 6 months compared to 66.7% of those who earned less. The difference was statistically significant ($p=0.014$) (Table 2). Statistically significant difference in testing in the last 6 months was observed between those who earned more than KES 1,000 and those who earned less among the young women aged 20-24 years (AOR 4.762, 95% CI 1.669-13.580, $p=0.003$). However, the difference between the two earning levels in testing for HIV was not statistically different for the adolescent girls aged 15-24 years ($p=0.687$).

Associations between income status and HIV/STI protective behaviours

Positive and statistically significant (at $p<0.05$) Pearson’s correlation coefficients were observed between income status and consistent condom use ($r=0.34$; $p<0.0001$); power in sexual relationships ($r=0.20$, $p=0.04$) and testing for HIV in the last 6 months ($r=0.21$, $p<0.0001$). However, the Pearson’s correlation coefficient between income status and number of sexual partners was not statistically significant ($r=0.034$, $p=0.489$).

One-way ANOVA tests were done for consistent condom use, one sexual partner, testing for HIV in the last 6 months and power in heterosexual relationships with income status. Significant (at $p<0.05$) differences were observed in the behavioural outcomes with the income status of the participants. The F-values for always using condoms during sex, one sexual partner, power in sexual relationships and testing for HIV in the last 6 months were, 3.291, 3.285, 2.381 and 3.351, respectively as shown in the Table 3.

Table 3. Differences between behavioural outcomes with income status

Select outcome behaviour variables		F-values	Sig. (p-values)
Consistent condom use	Between Groups	3.291	.006
One sexual partner	Between Groups	3.285	.006
Power in Sexual Relationship	Between Groups	2.381	.038
Tested for HIV in the last 6 months	Between Groups	3.351	.006

Perceptions of Program Managers

Analysis of the Key Informant Interviews (K.I.I) given by the four program managers showed the perceptions of the informants regarding the most effective strategies to ensure sustainability of protective behaviours by slum-dwelling AGYW. The key informants mentioned: integrating sustainability aspects into the programs; incorporating economic empowerment for the beneficiaries, engaging the community from the onset, to “make the programs a part of the communities’ to do things”, as put by one of the key informants; male engagement and parent/guardian involvement—as they are important part of “support system” for the girls.

The more frequently mentioned opinions by the program managers as challenges to program sustainability included: high poverty levels among the beneficiaries, limited resources; restrictions by donors—where one of the informants decried donors disallowing costs to facilitate income-generating activities for the beneficiaries ,incompetent community members ,religious and traditional beliefs that discourage use of condoms, handout culture—where the beneficiaries “expect to be paid” to continue implementing/practising what they learnt ,and not keeping fidelity to the strict Evidence Based Intervention (EBI) guidelines by program staff during implementation.

Perceptions of Peer and Community leaders

Discussants among peer and community leaders had several opinions about how to ensure that AGYW sustain HIV/STI protective behaviours. These included: the community should be engaged in the program from the onset, economic empowerment should be part of the program; ; boys and men should also be involved in the programs; and peer leaders should be given opportunities to participate in program-related activities after the program closure.

IV. Discussion

According to Global AIDS Update, HIV epidemic is the biggest global public health challenge of the 21st century especially in Sub-saharan Africa, which accounts for more than 67% of the world’s HIV-infected people despite the region being home to only 12.5% of the world’s population. Globally, 15% of women living with HIV/AIDS are Adolescent Girls and Young Women (AGYW), with 80% of these women living in Sub-saharan Africa[2]. Slum-dwelling AGYW are at an even more heightened risk given the observation by Jones *et. al.* and Madise *et. al.* [10,23]that slum populations exhibit notable inequalities in health relative to non-slum urban residents and even rural populations.

In this study, we show statistically significant differences between AGYW who had previously benefited from HIV/STI BCC programs who had a monthly income of more than KES 1,000 with those who earned less with respect to reported consistent condom use, negotiating power in heterosexual relationships and

testing for HIV in the last six months. The results were the same even after controlling for age and marital status for condom use and negotiating power in sexual relationships. The evidence from the results support the inference that the behavioural outcomes were different among the AGYW with different income status. The results confirm the association between sustenance of protective behaviours with the income status of the AGYW who had previously been exposed to HIV/STI prevention programmes.

Further, the data shows that having an income was positively and significantly correlated with consistent condom use, negotiating power in sexual relationships and testing for HIV in the last six months. This is consistent with the findings of several previous studies [23-25] which have advocated for inclusion of economic empowerment in HIV/STI prevention programmes in order to produce substantial reductions in HIV transmission between individuals or in entire communities.

We did not find any association between prevalence of one sexual partner with income status of the participants. This implies that the number of sexual partners that slum-dwelling AGYW have is not associated with their income status.

Several authors have cited the lack of economic power to negotiate for safe sex as a major challenge for young women in resource-poor settings [26,27]. Madise *et al.* [23] posit that, in order to preserve the health of slum-dwelling young women and reduce their reliance on sex work and other risky behaviours, projects need to create livelihood opportunities for them.

In the KII with the program managers, and the FGDs with the peer and community leaders, poverty was identified as a major factor contributing to failure to sustain protective behaviours by the AGYW. The peer and community leaders attributed lack of economic power by the slum-dwelling AGYW to the inability to negotiate for safe sex with their male partners. The discussants suggested inclusion of economic empowerment aspects in HIV prevention programs for slum-dwelling girls which agrees with the recommendations made by Jewkes *et al.* [27]; Seelay *et al.* [28] and Schaefer *et al.* [29]. Creating livelihood opportunities for young women in urban slums would provide a strong motivation to preserve their health and reduce reliance on sex work thus reducing sexual risks. This is also supported by a statement by a peer leader from Kwa Njenga village who said that, "If a man offers KES 3,000 to a Mukuru girl and wanted to have sex without a condom, the girl would most likely agree as she needs the money". This poverty situation might also contribute to a situation cited by one of the peer leaders during the FGD, that some Mukuru mothers expose their daughters to sex work to augment household income.

The findings in this study are based on self-reported sexual behaviour which has been shown to be biased in some settings caused by under-reporting of risky sex by participants due to social desirability [30]. Brenner *et al.* [31] observed that nearly all studies on sexual risk behaviour have been based on self-reported data and suggest that, research involving self-reported information should be designed in such a way that threats to validity are reduced as much as possible. In this study, this limitation was mitigated by training the enumerators to reduce bias by using non-judgmental approaches.

V. Conclusion

We have found an association between earning more than KES 1,000 with sustenance of condom use, negotiating power in heterosexual relationships and testing for HIV in the last six months by slum-dwelling AGYW who had previously benefited from HIV/STI BCC programmes. The study findings provide a strong argument for including economic empowerment aspects into programmes targeting this sub-population. This is evidenced by the significant differences observed between those who earned more than KES 1,000 and those who earned less in the outcome measures.

Acknowledgements

The authors thank HOPE *worldwide* Kenya Bold Idea for Girls program staff for their dedicated effort; the Grand Challenges Canada for providing the funding for this research project (grant number S5-0422-01); and the participants for their time and effort.

Financial Support

Data for this manuscript was sourced from the Bold Idea for Girls (BIG) Project funded through the Stars in Global Health Program of the Grand Challenges Canada: Grant Number: S5-0422-01

References

- [1]. Kharsany AB, Karim QA. HIV infection and AIDS in Sub-Saharan Africa: Current status, challenges and opportunities. *The Open AIDS Journal*. 2016; **10**:34. (Available: DOI: [10.2174/1874613601610010034](https://doi.org/10.2174/1874613601610010034))
- [2]. Joint United Nations Programme on HIV/AIDS. Global report: UNAIDS report on the global AIDS epidemic 2016. *UNAIDS*; 2016. (Available:<http://www.unaids.org/en/resources/documents/2016/Global-AIDS-update-2016>)
- [3]. Davey DL, Wall KM, Kilembe W, Naw HK, Brill I, Vwalika B, Chomba E, Mulenga J, Tichacek A, Javanbakt M, Gorbach PM. HIV Incidence and Predictors of HIV Acquisition from an Outside Partner in Serodiscordant Couples in Lusaka, Zambia. *Journal of acquired immune deficiency syndromes*. 2017;**76**(2):123. (Available: doi: [10.1097/QAI.0000000000001494](https://doi.org/10.1097/QAI.0000000000001494))
- [4]. Camlin CS, Kwena ZA, Dworkin SL, Cohen CR, Bukusi EA. "She mixes her business": HIV transmission and acquisition risks among female migrants in western Kenya. *Soc Sci Med*. 2014;**102**:146-56. (Available: doi: [10.1016/j.socscimed.2013.11.004](https://doi.org/10.1016/j.socscimed.2013.11.004), Epub 2013 Nov 15)
- [5]. Rodger A, Bruun T, Cambiano V, Vernazza P, Strada V, vanLunzen. J, et al. HIV transmission risk through condomless sex if HIV+ partner on suppressive ART: PARTNER Study. *21st Conference on Retroviruses and Opportunistic Infections*. 2014; p. 3–6.
- [6]. Higgins JA, Hoffman S, Dworkin SL. Rethinking gender, heterosexual men, and women's vulnerability to HIV/AIDS. *American journal of public health*. 2010; **100**(3): 435-45. (Available: <https://doi.org/10.2105/AJPH.2009.159723>)
- [7]. Karim QA, Sibeko S, Baxter C. Preventing HIV infection in women: a global health imperative. *Clinical Infectious Diseases*.2010; **50**(Supplement 3): S122-9. (Available: <https://doi.org/10.1086/651483>)
- [8]. Vitali D, Wessels JM, Kaushic C. Role of sex hormones and the vaginal microbiome in susceptibility and mucosal immunity to HIV-1 in the female genital tract. *AIDS research and therapy*. 2017; **14**(1):39. (Available: <https://doi.org/10.1186/s12981-017-0169-4>)
- [9]. National AIDS Control Council (a). Kenya Fast-Track Plan to End HIV and AIDS among Adolescents and Young People. *NACC*. 2015 (Available: <http://nacc.or.ke/adolescent-fast-track-plan/>)
- [10]. Jones G. Young People: Vulnerability, Risk and HIV in the Urban Slum. In: HIV and Young People. SpringerBriefs in Public Health. *Springer, Cham*. 2016; 67-81 (Available: https://doi.org/10.1007/978-3-319-26814-9_4)
- [11]. National AIDS Control Council(b). Kenya AIDS Response Progress Report. *Kenya Government Press*. 2016;xiv. (Available:http://nacc.or.ke/wp-content/uploads/2016/11/Kenya-AIDS-Progress-Report_web.pdf)
- [12]. Nabukalu D, Klipstein-Grobusch K, Herbst K, Newell ML. Mortality in women of reproductive age in rural South Africa. *Global Health Action*. 2013; **6**:4-8. (Available:<http://dx.doi.org/10.3402/gha.v6i0.22834>)
- [13]. Kenya Demographic Health Survey Team. KDHS 2014. *Government Printer*. 2015;255. (Available: <https://dhsprogram.com/pubs/pdf/fr308/fr308.pdf>)
- [14]. Kenya AIDS Indicator Survey Team. National AIDS and STI Control Programme, *Ministry of Health, Kenya*. 2012;27-36. (Available:<https://www.msh.org/blog-tags/kenya-aids-indicator-survey>)
- [15]. Dellar RC, Dlamini S, Karim QA. Adolescent girls and young women: key populations for HIV epidemic control. *Journal of the International AIDS Society*. 2015; (**2Suppl 1**). (Available: <https://dx.doi.org/10.7448/IAS.18.2.19408>)
- [16]. Baxter C, Abdool Karim S. Combination HIV prevention options for young women in Africa. *African Journal of AIDS Research*. 2016 Jul **15**(2):109-21 (Available: doi: [10.2989/16085906.2016.1196224](https://doi.org/10.2989/16085906.2016.1196224))
- [17]. Biddle SJ, Braithwaite R, Pearson N. The effectiveness of interventions to increase physical activity among young girls: a meta-analysis. *Preventive Medicine*. 2014;**1**(62): 119- 31. (Available: doi: [10.1016/j.ypmed.2014.02.009](https://doi.org/10.1016/j.ypmed.2014.02.009))
- [18]. Briscoe C, Aboud F. Behaviour change communication targeting four health behaviour in developing countries: a review of change techniques. *Social science and medicine*. 2012; **75**(4):612-21. (Available: <https://doi.org/10.1016/j.socscimed.2012.03.016>)
- [19]. Kasiulevičius V, Šapoka V, Filipavičiūtė R. Sample size calculation in epidemiological studies. *Gerontologija*. 2006;**7**(4):225-31.
- [20]. Baldwin AS, Rothman AJ, Hertel AW, Linde JA, Jeffery RW, Finch EA, Lando HA. Specifying the determinants of the initiation and maintenance of behaviour change: an examination of self-efficacy, satisfaction, and smoking cessation. *Health Psychology*. 2006;**25**(5):626. (Available: DOI: [10.1037/0278-6133.25.5.626](https://doi.org/10.1037/0278-6133.25.5.626))
- [21]. Berkowitz R, April Y, Lucia KM, Penina MM, Vincent MM, Michael SM. Mukuru on the move. 2015.
- [22]. Norusis M. SPSS 16.0 statistical procedures companion. *Prentice Hall Press*; 2008.
- [23]. Madise NJ, Ziraba AK, Inungu J, Khamadi SA, Ezech A, Zulu EM, Kebaso J, Okoth V, Mwau M. Are slum dwellers at heightened risk of HIV infection than other urban residents? Evidence from population-based HIV prevalence surveys in Kenya. *Health & Place*. 2012;**18**(5):1144-52. (Available:<https://doi.org/10.1016/j.healthplace.2012.04.003>)
- [24]. Harris N, Sandor M. Defining sustainable practice in community-based health promotion: A Delphi study of practitioner perspectives. *Health Promotion Journal of Australia*. 2013; **1**:53-60.
- [25]. Hankins CA, de Zaluondo BO. Combination prevention: A deeper understanding of effective HIV prevention. *AIDS*. 2010;**24**(P):S70-S80.
- [26]. Pettifor A, Nguyen NL, Celum C, Cowan FM, Go V, Hightow-Weidman L. Tailored combination prevention packages and PrEP for young key populations. *Journal of the International AIDS Society*. 2015; 19434. (Available: doi: [10.7448/IAS.18.2.19434](https://doi.org/10.7448/IAS.18.2.19434), eCollection 2015)
- [27]. Jewkes R, Dunkle K, Nduna M, Shai NJ. Transactional sex and HIV incidence in a cohort of young women in the stepping stones trial. *Journal of AIDS and Clinical Research*. 2012;**3**(5).
- [28]. Seeley J, Watts CH, Kippax S, Russell S, Heise L, Whiteside A. Addressing the structural drivers of HIV: A luxury or necessity for programmes? *Journal of the International AIDS Society*. 2012;**15**(Suppl 1). (Available: DOI: [10.7448/IAS.15.3.17397](https://doi.org/10.7448/IAS.15.3.17397))
- [29]. Schaefer R, Gregson S, Eaton JW, Mugurungi O, Rhead R, Takaruzza A, Maswera R, Nyamukapa C. (2017). Age-disparate relationships and HIV incidence in adolescent girls and young women: evidence from Zimbabwe. *AIDS* (London, England). **31**(10): 1461. (Available: doi: [10.1097/QAD.0000000000001506](https://doi.org/10.1097/QAD.0000000000001506))
- [30]. Schroder KE, Carey MP, Vanable PA. Methodological challenges in research on sexual risk behavior: I. Item content, scaling, and data analytical options. *Annals of Behavioral Medicine*. 2003; **26**(2):76-103. (PMCID: PMC2452993; NIHMSID: NIHMS52211)
- [31]. Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *Journal of adolescent health*. 2003 Dec **1**; **33**(6):436-57. (Available: [https://doi.org/10.1016/S1054-139X\(03\)00052-1](https://doi.org/10.1016/S1054-139X(03)00052-1))

Mr. Julius N. Nguku. "Sustenance of HIV/STI Protective Behaviours by Slum-dwelling Adolescent Girls and Young Women is associated with their Income Status" *IOSR Journal of Nursing and Health Science (IOSR-JNHS)* , vol. 7, no.6 , 2018, pp. 32-39.