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THE IMPACT OF BEHAVIOUR CHANGE INTERVENTION [BCI] ON ADOLESCENT HIV RISK REDUCTION IN SELECTED SCHOOLS IN NORTHERN MALAWI

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Introduction: We conducted a study to explore the impact of adolescent exposure to HIV and AIDS behaviour change Interventions (BCI) on their HIV risk reduction and sexual behaviour change in some selected secondary schools in the district of Mzimba, district of Nkhata Bay and Mzuzu city in Northern Malawi.

Methods: We used mixed methods in a descriptive survey design triangulating both quantitative and qualitative approaches, with questionnaires and focus groups as instruments for data collection. Adolescent boys and girls [n = 552], were randomly sampled to participate in the quantitative component. For qualitative focus groups we sampled participants purposively. We analyzed quantitative data through multiple regression analysis. On the other hand qualitative data was analyzed through thematic content analysis.

Results: Multiple regression analysis indicated that exposure to BCI did not impact risk reduction [Beta = -.082, p= .053, p > .05]. Qualitative focus group findings showed that proximate correlates such as: early sexual debut, lack of condom use, drug related sex, multiple and concurrent partnerships drive infection. Distal structural factors in socio-cultural, gender disparities and poverty were also noted drivers of sexual risk taking in the study area.

Conclusion: Studies aimed to inform HIV prevention through top-down design of models involving primary beneficiaries are vital for the registering of positive outcomes in HIV programming for young people. Apart from identifying factors driving high HIV incidence in the study area, the study informed an intervention to test the efficacy of a risk reduction behavioural model [RRBM] developed and designed with input from adolescent participants.

KEY WORDS: ADOLESCENT, HIV AND AIDS, BEHAVIOUR CHANGE, RISK REDUCTION, MALAWI

Introduction

Malawi, with an estimated HIV prevalence of 8.8% of adults aged 15-49 years, is among the ten countries with the highest HIV prevalence in the world (Malawi Demographic and Health Survey [DHS], 2017). Young people are considered one of the at risk groups mainly due to socio-economic correlates such as poverty and gender disparities (Mwale

& Muula, 2017; Watkins, 2004; UNGASS, 2010; Underwood et al., 2011; Baxter & Abdool Karim, 2016). The rate of new HIV infections in the country is high in the 15-24 years age category constituting over half of all new HIV infections, with female adolescents being disproportionately affected. Translated to prevalence it is estimated that 60% of those infected with HIV and AIDS are young women who are also at high risk of early and unwanted pregnancy (NAC, 2012). According to the DHS (2010) about 106,000 adolescent girls get pregnant every year.

The most recent DHS (2017) indicates that the percentage of young women and men aged 15-24 years who are HIV infected has risen from 3.6% in 2010 to 5.9% by 2015 and this is among the highest prevalence in the southern African sub-region. Previous studies have reported that major drivers of infection among young people include: risk-taking being part of identity formation which is often combined with lack of youth friendly health services as well as stigma expressed by service providers (Baird et al., 2012; Santrock, 2001; Barden-O'Fallon et al., 2004; Carael, 2004; UNAIDS, 2015). The onset of sexual activity that is often associated with a lack of knowledge and skills with which to make health choices has also been cited as driving infection (Doyle et al., 2012; Mwale, 2008b; Dinkerton, 2001).

Other empirically referenced factors include: adolescence being characterized by patterns of thinking in which immediate gratification tends to take priority over long-term implications (Gregson et al., 2002; Helleringer & Kohler, 2007), exaggerated optimism and social comparison bias. This involves adolescents going beyond realistic appraisals and falling prey to positive illusions (Lam et al., 2013; Mwale, 2008a). Adolescents have also been demonstrated as employing denial as a coping mechanism relative to chances of contracting HIV (Mkandawire et al., 2013; Ngugi, 2000). There is also a pointer to the social comparison bias commonly known as peer pressure as being one major contributing factor (Mwale, 2012; Kenyon et al., 2016; Rashid & Mwale, 2016). Other findings have further attributed adolescent susceptibility and sexual risk-taking to poverty and widespread culturally based beliefs and behaviours linking male heterosexual intercourse to overall health with implications on multiple and/or concurrent sexual partnerships (Marklam et al., 2013; Orubuloye, 2002). Such culturally related beliefs include the cultural representation of men as naturally inclined towards multiple partnerships as reflected in polygamous tolerance, the gender stereotypes that women should always be submissive even in sexuality matters and diverse rituals, rites of passage and initiation ceremonies in which sexuality is pantomimed and reinforced (Stokl et al., 2013).

Vulnerability has in contemporary times also been ascribed to the fact that young people are growing up at a time when AIDS morbidity can be managed through antiretroviral therapy (ART). This has had an effect on the sense of urgency hitherto associated with HIV and AIDS issues which has become a situation of generalized public and political complacency (Foundation for AIDS Research, 2010). UNAIDS (2015) documents show that only about 42% of young people aged 15-24 years in Malawi have accurate knowledge of HIV and AIDS and in 2012 alone about 6,700 new infections occurred among adolescents ages 15-19 years which was translated to 18 infections on a daily basis. In 2013 there were 34,000 new HIV infections recorded in Malawi among young people,

7,400 of which occurring in children aged less than 14 years. Of the overall 36,000 cases of new HIV infections in 2016, over half were registered among young people in the 15-24 years category (DHS, 2017). The major gap arising from a majority of previous studies in Malawi in particular is that of the high incidence of HIV among young people (Gregson et al., 2002; Helleringer & Kohler, 2007; Lam et al., 2013; Mwale, 2008a; Marklam et al., 2013; Orubuloye, 2002; Mkandawire et al., 2013; Ngugi, 2000). BCI exposure is not significantly translating into expected HIV risk reduction behavioural outcomes.

In a meta-analysis, Medley et al (2009) show that although studies in general depict knowledge changes, many indicate lack of expected behaviour change outcomes. The question that arises is to what extent are intervention efforts being met? Is it a question of intervention relevance or a problem attributable to implementation bottlenecks? Can the challenge be ascribed to structural correlates such as poverty, culture and gender disparities, or to adolescents themselves with respect to how they socially construct HIV and AIDS as a medical challenge? Although several studies have endeavored to explore this exposure vis-à-vis outcome mis-match, there still remains a dearth of research with respect to considerations based on socio-culturally or ecologically based public health models in combination with cognitive behavioural approaches. Behaviour change interventions (BCI) have been proven to efficaciously reduce the incidence of HIV among young people in the US and elsewhere (Blankenship et al., 2006; Hankins & de Zalduondo, 2010; Baxter & Abdool Karim, 2016; Michielsen, 2012). Such interventions in HIV prevention among young people are often embedded within the comprehensive sexuality education framework or abstinence only/plus approaches and take the form of peer education programmes, life skills programmes, and other school based or community based interventions aimed at HIV risk avoidance or risk reduction. In this paper, we report a study that was conducted to appraise whether adolescent exposure to HIV and AIDS BCI has an effect on their HIV risk reduction in the Northern region of Malawi. We conducted the study as situation analysis to inform the design and modeling of a quasi-experiment rolled out in the same research site.

Methodology

We applied mixed methods in a descriptive survey design that combined quantitative and qualitative approaches using quantitative surveys and focus group discussions [FGDs] as data collection tools. Data were collected between January and April 2017 in Nkhata Bay and Mzimba districts and Mzuzu city within the Northern region of Malawi. The study sample included 552 adolescent respondents, both male and female selected from 12 schools. We used the formula developed by Cochran (2000) to calculate and determine our sample size, a method utilized for populations that are large and whose variability is not known as shown below:

$$n = \frac{z^2 \times p \times (1-p)}{E^2}$$

Where,
n = Sample size;
z = value corresponding to the confidence level (1.96 for a confidence level of 95%);
p = proportion of those that may have responded to BCI;
E = Bound on the standard error of estimation expressed as a decimal 0.05.
The value of was chosen to be 0.5 to make sure that the dominance of attributes of interest would not be biased.

In light of the formula we set p at p = 0.5 [maximum variability], desired 95% confidence level and ±5% precision or sampling error [0.05] and factored these into our formula:

$$n=\frac{(1.96)^2(.5)\,(.5)}{(.05)^2} = 385 \text{ adolescents}$$

We therefore set the sample size of 385 at 420 to factor in non-responsiveness and attrition. This was further adjusted to 555 for contingency coverage of participants and to facilitate concise randomization per sampling unit.
Sampling of students for potential participation was based on school lists from the 12 schools. In line with ethical principles and statutes guiding research with human participants such as that by the Helsinki Declaration and Charter of Fundamental Rights of the European Union, informed consent to participate was sought from participants. Participants were briefed and the assenting furnished with individual consent forms to sign. Parental consent forms to be signed by their parents or wards were also pre-offered considering that most were below the age of 18 years and hence minors in ethical terms. Those who had parental assent and also signed individual consent forms were selected to participate. The participants were assured of the confidentiality of their input and that the information provided would only be used for research purposes. Anonymity was guaranteed through use of only codes on questionnaires such that the information would not be personally identifiable with any respondent.
A questionnaire (additional file 1) in both English language and Chewa the standard vernacular language for the study area was self-administered to the 552 consented respondents. Prior to questionnaire administration, sampled respondents would be summoned to the school Hall or a free classroom for those in community day schools without a school Hall. The participants would then be re-briefed on the objectives of the study and that they had been summoned to fill a 40-60 minute questionnaire on the study. They would be told to be free and open to ask questions where necessary to the primary investigator. They would also be told that the questionnaire was not an examination but a tool to be filled for research purposes. Then they would be furnished with the questionnaire to fill. The questionnaire response rate was 100%.
In all school settings during the process, a conducive environment was ensured for respondents to be open minded considering that sexuality issues are often considered taboo

in general and with secrecy more so among adolescents. In the questionnaire, in addition to standard questions about knowledge, attitudes, behaviour and practices [KABP], we also included self-efficacy measures; biomedical protocol adherence measures like HIV testing and counseling (HTC) uptake or willingness for medical male circumcision [MMC] as well as STI treatment seeking tendencies. Intention for HTC or MMC was factored into the data collection tool, in light of the theory of reasoned action [TRA] thesis that intentions are proximate predictors of behaviour. Reliability analysis was conducted with Cronbach alphas being determined for some of the questionnaire items targeting perceptions, attitudes and self-efficacy. Table 1 below shows cronbach alphas on some retained items after reliability analysis:

Participant attitudes, beliefs and self- efficacy [Likert scale items]	Cronbach alphas [composite]
Attitude items	
Having multiple partners is cool and a sign of fame	
My culture strongly encourages having multiple partners	
My peers would reject me if I refused to have sex	
I try not to think about the possibility of catching AIDS	
Cronbach alpha for participant attitudes	0.816
Self-efficacy items	
I can be faithful to one sexual partner	
I can be able to abstain	
I can be able to consistently use condoms	
Cronbach alpha for participant self-efficacy	0.803
Belief items	
I believe AIDS is not real	
It is possible for young people to use condoms	
Practicing abstinence is no longer fashionable	
Using condoms reduces sexual pleasure	
AIDS is a product of witchcraft	
Cronbach alpha for participant beliefs	0.801

Table 1: Participant Cronbach alphas on HIV and AIDS perceptions, attitudes and self-efficacy

The questionnaire was complemented by FGDs. We co-opted FGDs not only to complement the questionnaire but also on the grounds of their high face validity: that is the ability to measure what they are meant to measure, and the ability to foster a high degree of openness. Our rationale for the FGDs tool choice was also based on UN analysis that 'Prevention measures that are promoted globally are often at odds with what [average]

populations perceive as acceptable strategies to protect themselves within their own social environments' (UN, 2015). Moreover, lay perceptions present a more complete picture of the factors that potentiate risk reduction or health promotive tendencies: '[Ordinary people's] basic conceptualization of risk is much richer than that of the experts and reflects legitimate concerns that are typically omitted from expert risk assessment' (UN, 2002; Slovic, 1987). We randomly sampled 3 schools per cluster from the total of 12 schools involved in the study to be involved in FGDs. From each of the selected schools per cluster, we then purposively selected a sub-sample of between 6 to 8 participants to be involved in 30-40 minutes FGDs. Guiding questions for FGDs (additional file 2) presented in both English language and vernacular were isolated from main questionnaire items albeit all guided by study objectives. A conducive environment was then identified for each session of FGDs. Research assistants helped facilitate the FGDs process in all sites with guidance from the principal investigator. The FGDs were best suited to complement the questionnaire rather than structured interviews because they may better afford group probing and fostering of more elaborate insights compared to the interview. We piloted the data collection instruments, both questionnaires and FGDs guiding questions, at a school not involved at any phase of the study for purposes of validity assessment to ensure that the tools measure what they were purported to measure. The main predictor variable was exposure to BCI. The main outcome variable was HIV risk reduction and sexual behaviour change.

Analysis

We used SPSS version 20 software to analyse quantitative data. Data analysis involved first descriptive univariate analysis that included: determining means, standard deviations, medians and inter-quantile range as well as confidence intervals for the means on continuous data for the main explanatory variables. Frequency distributions as well as cross-tabulations on main explanatory variables were also computed. Univariate analysis targeted main predictor variables and the primary outcome variable including: exposure to BCI, risk reduction, sexual experience, age at debut, number of sexual partners, condom use at debut, level of knowledge, self-efficacy, HTC and MMC uptake. We summarized the data in terms of frequency distributions and percentages on categorical variables as well as means and standard deviations on continuous variables. For the main predictor and outcome variables – exposure to BCI (dichotomous) and risk reduction (continuous), we determined normality of distribution for purposes of identifying the type of regression model to apply in hypothesis testing. Cross-tabulations between some predictor and outcome variables, mainly secondary outcomes, were also conducted to determine preliminary associations through the chi-square statistic. Associations were determined for example between age at sexual debut and STI odds, knowledge and perceived risk of HIV, self-efficacy on abstinence and odds of abortion for girls. Bivariate analysis through linear regression followed as part of preliminary isolation and identification of variables to be included into our multiple regression model as part of model building. In the linear regression computations, categorical variables considered to possibly predict or even confound the dependent variable relationship with the explanatory

variable were analyzed in their recoded binary formats. Such variables included: sexual experience, HIV knowledge, unprotected sex at debut, multiple and concurrent partnerships, transactional sex, sex under alcohol and drug influence, cultural traditional sex and STI exposure. Variables that significantly correlated with the dependent variable, both continuous and categorical in one on one linear regression computations were therefore considered for inclusion in multiple regression analysis through the stepwise criterion. Through inclusion and exclusion, the stepwise criterion helped us build our multiple regression model or regression equation. As part of hypothesis testing the model also helped us determine whether our main predictor variable, exposure to BCI would accurately predict risk reduction hence establishing a relationship or whether other variables were best predictors. Goodness of fit was determined through the coefficient of determination – R^2. We also as part of behaviour change model building went further to consider participants' BCI involvement and exposure as well as type of BCI they would prefer. With the condition for multiple regression being that the dependent variable be numerical or quantitative; risk reduction was computed in continuum from 0 to 100 with different percentiles such as 0-29, 30-49, 50-69, 60-79 and 80-89 and 90-100 albeit not ranks but numeric percentiles. Our model to inform analysis, the Risk-reduction Behavioural model [RRBM] was based on the generic gold standard for BCI - the ABC model in which A defines the Abstinence function; B the being faithful to one partner function and C the condom use function. In this model, the risk reduction percentile continuum; 90-100 represented the A function - those who have abstained but also strongly adhere to other risk reduction protocols like HTC reflecting an extremely high risk reduction percentile [coded 1]. The 80-89 percentile represented A & B functions – those who had abstained but were faithful to one partner and also adhered to other risk reduction protocols reflecting high risk reduction percentile [coded 2]. The 60-79 percentile represented B & C functions – those who could not abstain, are sexually active but were being faithful to one partner and consistently condomizing reflecting a moderately high risk reduction percentile [coded 3]. The 50-69 percentile represented the moderate C function - those who were using condoms with a regular partner but rather entertained other risks such as non-regular partners reflecting a moderate risk reduction percentile [code 4]. The 30-49 percentile represented the low C function – those who use condoms, might not have a regular partner but also entertained other extreme risk behaviours such as multiple and concurrent partnerships reflecting a low risk reduction or high risk taking percentile [coded 5]. The 0-30 percentile represented the risk taking [RT] function – those who engage in risk taking behaviours like unprotected sex, multiple and concurrent partnerships, and transactional sexual intercourse with little or no condom use reflecting an extremely high risk taking percentile [coded 6].

Consistent with our conceptual framework; codes 1 and 2 reflected adaptive behavioural responses; codes 3 and 4 moderate risk reduction behavioural responses and codes 5 and 6 maladaptive behavioural responses. These reflected subsequent codes in analysis – 1, 2 and 3 respectively [1 - adaptive, 2 moderate, 3 maladaptive- risk reduction]. Adaptive and moderate continuums were further classified as composite Adaptive [code 1] and the maladaptive continuum as composite maladaptive [code 2] – risk reduction versus

risk taking respectively. In hypothesis testing therefore, exposure to BCI [Yes or No] was tested for possible significance on risk reduction [with the aforementioned measures of A - abstinence, B - faithfulness to one partner and C - condom use and other variates like adherence to protocols - HTC, seeking treatment for STIs and male circumcision]. A Matrix for scoring risk reduction (additional file 3) was employed to calibrate respondents' categorization into risk reduction percentile levels from 0-100. Table 2 below displays participant risk reduction codes, associated behavioural traits, percentiles and coefficients:

Risk- reduction Codes	Behavioural traits	Percentiles & Coefficients
Code 1	[A – function– risk avoidance] Practicing abstinence and adherence to all other risk avoidance protocols	90 – 100 (0.90 – 1.0)
Code 2	[A + B – functions – risk reduction] – Practicing abstinence, being faithful to partner and adherence to risk reduction protocols	80 -89 (0.80– 0.89)
Code 3	[B + C –functions – risk reduction] -Sexually active, faithful to one partner, consistently using condoms and adherence to risk reduction protocols	60 -79 (0.60 -0.79)
Code 4	[C – function] – Condom use with regular partner	50 – 69 (0.50 – 0.69)
Code 5	[Low C – function – risk taking] Condom use with regular and casual partners	30- 49 (0.30 -0.49)
Code 6	[High –risk taking] – Risky sexual behaviours, unprotected sex, multiple partners , other risks	0 - 29 (0.0 – 0.29)

*Codes [1 & 2] – reflect adaptive behaviour and *Codes [5 & 6] – reflect maladaptive behaviour

Table 2: Participant risk reduction codes, behavioural traits, percentiles and coefficients

Scores were determined on questionnaire responses such as: sexual experience, ABC self-efficacy, risk perception, risk behaviours likely to drive infection [unprotected sex, transactional sex, multiple and concurrent partnerships, sex under drug and alcohol influence and sex motivated by cultural practices], adherence to biomedical prevention protocols [knowledge, behaviour and behavioural intention on HTC and MMC]. Participant responses and associated scores in addendum led to percentile assignments.

Qualitative data analysis was conducted using thematic content analysis within the modified Nvivo software domain. We conducted the analysis procedures in liaison with research assistants conversant with Chewa vernacular language. Specifically, recorded focus group discussions were transcribed, translated, text bracketed, gleaned, winnowed,

categorized using constant comparative procedure, thematized and finally theorized as required in the guidelines for qualitative data analysis by Merriam (1998) and Seidman (1998). Main themes in line with objectives included: sexual behaviour and knowledge, participant self-efficacy on A, B + C, participant characteristics likely to drive infection, participant adherence to biomedical HIV prevention protocols and participant BCI exposure as well as involvement in BCI programme design.

Results

The final sample consisted of 552 adolescent participants aged 11 -19 years. Of these 324 were female constituting 58.7% and 228 were male constituting 41.3%. In the early adolescent age category there were 223 [40.4%] participants and in the late adolescent category there were 329 [59.6%] participants. The mean and standard deviation for age were, ($\bar{x}$ = 15.11, s = 1.775). All the socio-demographic characteristics are displayed in Table 3 below.

N=522		
Category	Frequency	Percent (%)
Age		
10-14	223	40.4
15-19	329	59.6
Gender		
Male	228	41.3
Female	324	58.7
Religion		
Christian	548	99.3
Muslim	4	0.7
School location		
Rural	377	68.3
Urban	175	31.7
School type		
Secondary	264	47.8
CDSS (Community)	288	52.2

Table 3: Participant socio-demographic characteristics

Sexual behaviour and knowledge

Sexual behaviour operationally defined as – penetrative heterosexual intercourse measures included: sexual experience, age at debut and condom use at debut. With regards to sexual experience 262 participants constituting 47.5%, (CI, 43% ≤ π ≥ 49%) were sexually active and 290 participants constituting 52.5%, (CI, 49% ≤ π ≥ 57%) were sexually inexperienced. Of the adolescent respondents who were sexually active, 189 [34.2%] compared to 73 [13.2%] acknowledged using condoms at sexual debut. The mean score and standard deviation for knowledge on HIV and AIDS dynamics were, ($\bar{x}$ = 75.27, s = 16.921). Regarding age at debut, 121 [46%, (CI, 41% ≤ π ≥ 51%)] of the sexually active

adolescents had early adolescent sexual debut [10-14 years or less] and 141 [54%, (CI, 48% ≤ π ≥ 59%)] had their debut in late adolescence [15-19 years]. We also considered sexual experience and age at debut in relation to location of participants, whether rural or urban. Of the early debutants 100 [82.6%, (CI, 76%≤ π ≥89%)] were from rural settings contrary to 21 [17.3%, (CI, 10%≤ π ≥24%)] who were from urban settings.

Participant self-efficacy on the A, B, +C of HIV prevention

We further considered participant self-efficacy as it relates to HIV risk reduction and sexual behaviour change within the background of association between belief and action. Participant self-efficacy on abstinence, partner faithfulness and condom use were considered.

Abstinence efficacy

Asked whether they were able to abstain, 290 [57%] of female participants compared to 216 [43%] of their male counterparts acknowledged that they could abstain. Only 7 male participants and 20 female participants, altogether 27 [5%] could not acknowledge abstaining.

Partner efficacy

One major driver of HIV infection among young people is adeptness to indulge in multiple and concurrent partnerships (Doyle et al., 2012; Baird et al., 2012; Kadzamira et al., 2001; Gregson et al., 2002; Mwale & Muula, 2017). Asked whether they are able to maintain one partner 170 [56%] of participants compared to 132 [44%] acknowledged that they could maintain one sexual partner.

Condom efficacy

Condoms have been proven to significantly reduce chances of HIV infection if correctly and consistently used (Lam et al., 2013; Helleringer & Kohler, 2007). Of all the participants, 184 could not support condom use with 121 [66%] being female and 63 [44%] male.

Participant characteristics likely to drive HIV infection

Participant characteristics likely to drive HIV infection as delineated from participants included: early sexual debut, unprotected sex, transactional sex, multiple and concurrent sexual partnerships, sex under substance or alcohol influence and cultural traditionally driven sex. Findings on these correlates are displayed in Table 4 below.

Indulgence in or not [HIV driver action]	YES	%	NO	%	TOTAL	p -value / α - .05
Sexual experience						
Male	142	54	86	30	228	.001
Female	120	46	204	70	324	.001
Total	262		290		552	
Unprotected sex at debut						
Male	44	60	98	52	142	.0001
Female	29	40	91	48	120	.001
Total	73		189		262	
Multiple and concurrent partnership						
Male	74	52	154	41	228	.001
Female	68	48	256	59	324	.001
Total	142		410		552	
Transactional sex						
Male	18	52	210	41	324	.001
Female	16	48	308	59	228	.001
Total	34		518		552	
Sex under alcohol and drugs						
Male	35	59	193	39	228	.001
Female	24	41	300	61	324	.001
Total	59		493		552	
Culturally traditional sex						
Male	27	52	201	40	228	.001
Female	24	47	300	60	324	.001
Total	51		501		552	
STI exposure						
Male	37	49	191	40	228	.0001
Female	39	51	285	60	324	.001
Total	76		476		552	

Table 4: Participant characteristics likely to drive infection

Early sexual debut

In the current study, 121 [46% (CI, 41%≤ π ≥51%)] participants reported having had their sexual debut early [10-14 years or less] and of these, 65 [54%] were male and 56 [46%] were female.

Unprotected sex

In the current study 262 participants constituting 47.5%, [CI, 43% ≤ π ≥49%)] in all acknowledged that they were sexually experienced. Of these sexually active adolescents,

189 [72%, (CI, 66% ≤ π ≥78%)] conceded to protected sex at sexual debut with 98 [51.9%] being male and 91 [48.1%] being female, while 73 [28%, (CI, 22% ≤ π ≥34%)] acknowledged unprotected sex at debut. In focus groups most adolescents alluded to myths and misconceptions being rife about condoms and lack of service provider trust with SRH service providers being mostly judgmental when adolescents wanted to access condoms. Some were of the sentiments that:

> *"Condoms are overrated as protective by interventions in their jingles, the media etcetera but we hear that they sometimes have pores and are filled with viral and bacterial ointment so we are afraid to use them and resort to unprotected sex."* [Adolescent FGD in urban school]

Multiple and concurrent partnerships.

In the current study 142 participants, constituting 25%, (CI, 21% ≤ π ≥29%) acknowledged indulging in multiple and concurrent partnerships. Of these 52% were male and 48% female. We went further to investigate how many sexual partners some of these adolescents had [coded: 2, 3 or more than 3]. Of the entire 142 who engaged in multiple and concurrent partnerships; 93 [65.5%] conceded to having 2 partners, 11 [7.7%] to having 3 partners and 38 [28.8%] to having more than 3 partners. On the same item, asked whether some of their friends were indulging in multiple and concurrent partnerships, 291 [54.0%] were of the acknowledged involvement against 254 [46.0%] who disputed.

Transactional sex

Transactional sex is operationally defined as the act of receiving money or gifts in exchange for sex. In the current study 34 participants constituting 6% (CI, 4% ≤ π ≥8%) of the overall acknowledged indulgence in transactional sex and of these 18 were male while 16 were female. On the same item, asked whether their friends were indulging in transactional sex, 243 [44.0%] conceded and 309 [56.0%] refuted.

Sex under alcohol and substance influence

In view of the fact that drug and alcohol abuse is highly correlated with diverse psychosocial challenges among adolescents, in the current study 53 participants in total constituting 11%, (CI, 9%≤ π ≥13%) of the overall acknowledged indulgence in sex under alcohol or drug influence.

Cultural traditional sex

In the current study, 51 participants constituting 9%, (CI, 7% ≤ π ≥ 11%) of the overall conceded indulgence in cultural traditionally related sexual behaviours. Qualitative focus group probing resulted in participants acknowledging that indeed some cultural practices in the research site were impacting negatively on their HIV risk reduction or avoidance. Some cultural practices mentioned especially in the rural sites included: *kuhara* [widow inheritance rituals] and *chilimika* [a cultural festive dance among the Tonga adolescents of Nkhatabay associated with sexual pantomime and scripting].

Participant BCI exposure and involvement in BCI programme design

Exposure to BCI

Considering that exposure to BCI is the first line step toward risk reduction and subsequent behaviour change; of the current study participants 428, representing 77.5%, (CI, 74% ≤ π ≥82%) acknowledged exposure to BCI compared to 124, [22.4%, (CI, 18% ≤ π ≥ 26%)] who reported that they had not been exposed to any form of BCI before.

BCI type preferred

Given BCI options namely: Peer education in adolescent clubs, Life skills facilitated by teachers, and Community youth programmes involving parents and guardians; 269 [48.7%] of the participants preferred Peer education, 170 [30.8%] Life skills, and 113 [20.5%] preferred Community programmes. Those adolescent participants who preferred peer education pointed to the freedom of self-expression, self-disclosure, and social comparison proffered by peer interaction or group dynamics that is often limited under parental or teacher guidance with the sentiments:

> *"In peer education you may be free to each other and can disclose freely while with parents or teachers some young people may be ashamed or shy."* [Adolescent FGD in rural school]

Of the adolescents who opted for Community programmes under parental guidance, most pointed to the life experiences and wisdom proffered through parental mentorship as the main justification for their option:

> *"It is because parents and guardians choose the best for you and they also know what is best for your life."* [Adolescent FGD in rural school]

Involvement in BCI programme or model design

We went further to find out from participants whether they had been previously involved in BCI programme design or model formulation through stakeholders like non-governmental organizations [NGOs] or any other stakeholders. Many participants had not been involved before and were skeptical about or not even aware that young people could be involved in designing interventions or even consulted. Focus group sentiments included that:

Multiple regression analysis

Our multiple regression procedure included preliminary linear regression on pairs of independent variables. The regression pairing also factored in the dependent variable [risk reduction] and the main predictor independent variable [exposure to BCI]. We then isolated those variables that correlated significantly with the dependent variable which was a step towards model building as displayed in Table 5 below.

Independent variable	Dependent variable	Correlation [R]	p-value at/ α - .05
Sexual experience vs	Risk reduction	.727	.0001
Number of sexual partners vs	Risk reduction	.643	.0001
Culturally related sex vs	Risk reduction	.366	.0001
Knowledge on dynamics vs	Risk reduction	.357	.0001
Transactional sex vs School location vs	Risk reduction Risk reduction	.327 .312	.0001 .0001
Age at debut vs	Risk reduction	.195	.001
Involvement in BCI design vs	Risk reduction	-.123	.004
Abstinence knowledge vs Gender vs	Risk reduction Risk reduction	-.190 -.146	.0001 .001
**Exposure to BCI vs	Risk reduction	-.082	.053

Note:

** Null hypothesis : There is no relationship between adolescent exposure to BCI and HIV risk reduction

**Linear regression analysis was utilized to identify covariates to fit into the multiple regression model together with BCI exposure as part of predictor determination.

Table 5: Pairwise Linear regressed independent variables correlating significantly with the dependent variable

The main predictor variable, exposure to BCI was noted as not significantly correlating with the dependent variable - risk reduction [R = -.082, p = .053, p > .05]. The variables that significantly correlated with the dependent variable in pairwise linear regression were considered for inclusion in multiple regression model building. The rational was to determine whether they could in aggregate predict or explain risk reduction. Through the stepwise multiple selection and exclusion criteria we built our regression model or equation and the best fitting model isolated sexual experience as having the strongest predictive or explanatory power on risk reduction – the dependent variable, (X_1 [Beta = .727, p < .001]). The overall model explained 53% of the variance in risk reduction which was significant (F [1,529] = 617.138, p < .001]). Other variables that formed part of the stepwise inclusion and exclusion criteria included: not having multiple sexual partners [X2], non-involvement in sex under alcohol or drug influence [X3], knowledge on HIV and AIDS dynamics [X4], HTC uptake [X5], non-involvement in cultural traditional related sex [X6], involvement in BCI programming [X7] and knowledge on abstinence [X8], with the following variate: $y = b_o + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 ..... b_n x_n$

One on one correlation between respondents' knowledge of HIV dynamics and risk reduction indicated a weak positive correlation, [r = .357, p = .0001, p < .05]. Participant knowledge scores were significantly associated with risk reduction scores but the association was weak. This result points to a weak link between knowledge on HIV dynamics and subsequent HIV risk reduction outcomes. Exposure to BCI was stepwise excluded in our multiple regression analysis as not significantly predicting or explaining adolescent

HIV risk reduction. There was no evidence against the null hypothesis of no relationship between adolescent exposure to BCI and HIV risk reduction.

Discussion

The findings are discussed within the Socio-cultural Theory (Vygotsky, 1978) and Social Cognitive Theory (Bandura, 1977) underpinning sociological, ecological, environmental and structural determinants of adolescent sexual behaviour. The study indicates that adolescent exposure to HIV behaviour change interventions may have limited effect on their HIV risk reduction and sexual behaviour change. Risk reduction was adapted as our proximate measure of behaviour change. HIV risk reduction behaviours include: limiting the number of sexual partners, delaying sexual initiation, practicing abstinence and consistently using condoms (Hearst & Chen, 2004). The ultimate assessment of behavioural change in response to AIDS is change in HIV incidence (Smith & Watkins, 2005; Underwood, 2011). In light of the fact that there is a dearth of incidence data, our current study assessed HIV risk reduction indirectly by use of reported sexual behaviour and other measures.

Knowledge and risk reduction skills building have previously been linked to sexual behaviour change (Marklam et al., 2013; Mkandawire et al., 2013; Gregson, et al., 2002; Barden-O'Fallon et al., 2004; Carael, 2004; Mwale, 2008b). The desired effect of improving the level of knowledge about AIDS and its prevention according to much of this previous literature is that individuals will become motivated to alter the behaviours that put them at risk of contracting the HIV virus [8]. In light of that, our study also factored in frameworks such as the TRA and the HBM that implicitly use knowledge and risk reduction skills building as key components of the process leading to behaviour change (Baird et al., 2012; UNAIDS, 2013).

In the present study, we found that a majority of participants had relatively good knowledge of HIV dynamics [mode of transmission, prevention and care], good knowledge of abstinence and biomedical prevention protocol such as HTC. That knowledge however was for most adolescents and especially in rural settings not consistent with their expected risk reduction behavioural outcomes. On aggregate for instance, a relatively high proportion of participants were sexually active and had initiated sex at an early age. This trend was more pronounced in rural participants compared to their urban counterparts. Rural adolescents were also high on the index of those prone to unprotected sex at debut, early sexual debut and low risk perception. This result was striking as we also noted that rural adolescents are mostly neglected when it comes to extra-curricular BCI programmes promoted by private organisations such as UNICEF and UNFPA. Previous studies point to lower skills and efficacy development as well as poverty as being some of the structural correlates contributing to the HIV incidence gap in rural Malawi (Baird et al., 2012; Luiz, 2012; Dancy et al., 2014).

Structural interventions (Kenyon, 2016; Blankenship et al., 2006) that work to target the underlying distal root causes of risk taking sexual behaviours such as socio-economic disparities and gender disparities might mitigate sexual risk taking in rural communities. Such initiatives include the provision of scholarships and bursaries (Baird et al., 2012;

Cluver et al., 2013; Dancy et al., 2014) to encourage girls to stay in school with the hope that they delay sexual initiation and have access to the requisite information to do so. Examples of such initiatives in Malawi are the phased out GABLE programme that gave scholarships to underprivileged girls especially from rural settings to access secondary education. The other initiatives include the Campaign for Girl Education (CAMFED) programme, Girls Empowerment Network (GINET) programme all under UNICEF; and the Livingstonia Synod AIDS Programme (LISAP). These initiatives are currently supporting underprivileged girls with basic needs and provide bursaries for girls to remain in school as one way of empowering them and protecting them from contracting HIV.

Combination options denoted multi-component or multi-pronged approaches (Hankins & de Zalduondo, 2010; Baxter & Abdool Karim, 2016; Underwood et al., 2011) that are multi-level and integrate two or several intervention designs might work best to mitigate the challenges in rural communities. Such combination option intervention designs might include two or more of the generic interventions: a behavioural component, a biotechnology component, a biological component and structural component. An example of implementation of a combination option was the Bandiera et al. (2012) randomized controlled trial in Uganda whose main intervention combined an HIV risk reduction behavioural component with a structural vocational training and cash transfer component. Such combination options do not only furnish HIV risk reduction skills building but also mainly address the root causes of sexual risk taking in sub-Saharan African societies namely poverty and other economic and sociocultural correlates such as gender disparities.

There was a striking finding for early sexual debut. Early inception of sexual activity has in previous studies been associated with early exposure to HIV but also the Human Papilomma Virus (HPV) linked with cervical cancer later in life. There are also associations with early pregnancy and early marriages among rural Malawian girls and other girls in SSA (Doyle et al., 2012; Peltzer, 2010; Magnani, 2005; Swartz et al., 2012). We therefore recommend tailoring interventions in line with age categories of adolescents. Interventions targeting early adolescents and the very young could focus on abstinence and delayed debut. On the other hand with the observation that most adolescents in late adolescence are more likely to be sexually active, interventions targeting them may focus more on faithfulness and condom use.

There was a pointer to adolescent respondents being subjected to contradictory messages from diverse sources with distinct focal areas, a situation which ended up confusing the respective adolescent targeted audience. Some highlighted sources of contradictory messages in the study include: culture, religion, peers and conflicting interventions. Some cultural norms and values in the study area were noted to be contradicting generic interventions on late sexual initiation, abstinence, and perhaps condom use. Previous studies have referenced cultural traditions and norms in most sub-Saharan African communities that implicitly or explicitly foster behaviours such as early sexual initiation, early marriages, and multiple partnerships (Rashid & Mwale, 2016; Underwood et al., 2011; Dancy et al., 2014; Kenyon et al., 2016; Merson et al., 2008; Stokl et al., 2013; Peltzer, 2010).

Conflicting interventions were also cited as perpetrating contradictory messages. It was

highlighted that some programmes focused more on condom programming against others emphasizing abstinence. This dichotomy in messages was noted to breed confusion in young people. There is conjecture as to whether safe sex messages may be underemphasizing the fact that condoms only reduce, albeit never totally eliminate, the risk of infection. Programmes promoting condom marketing have been criticized for not being honest to the youth that abstinence and being faithful are the best ways for avoiding risk whereas condoms only reduce risk in individuals who choose not to avoid risks with 'A' nor 'B'. Further it is argued that condom promotion using the 'safe sex message' actually fosters a false sense of security in youth and leads paradoxically to increased risk taking behaviours and vulnerability such as beginning sex at earlier ages and having more sexual partners (De Sanjose et al., 2008). This false sense of security has been labeled 'risk compensation' by Dinkerton (2001). We recommend harmonization or coordination of programmes especially those within the extra-curricular domain to reduce contradictions and confusing the target audience. Interestingly an observation on contradiction emanates from government policy at the status quo with the realization that while the Ministry of Health (MoH) through its guidelines for Adolescent Sexual and Reproductive Health (ASRH) recommends the use of contraceptives, the Ministry of Education (MoE) bars the distribution and use of condoms in schools. Paradoxically, medical male circumcision (MMC) was linked with disdain and lack of willingness associated with religion and culture in the study area. This could posit a missed interventional opportunity considering the proven efficacy of MMC to reduce HIV contraction by 60%. It was previously estimated for instance when the MMC services were being rolled out in 2009 in sub-Saharan Africa that 70% coverage by male circumcision services could prevent another 700 000 cumulative infections by 2015 (Bollinger & Stover, 2007; UNAIDS, 2011). It therefore becomes imperative in the study area to delink and deconstruct MMC from culture or religion.

Our study had limitations given that our main source of sexual behaviour data were self-reports. Such self-reported data is subject to respondent bias. Also, we were researching sexual behaviour and with such behaviour being considered as sensitive and taboo in most Malawian societies our findings might have been subject to the social desirability bias. Respondents might also have been tempted to underreport or over-report their experiences for example male respondents exaggerating their number of sexual partners. To improve on external validity and generalisability, we controlled for the limitations through randomization in our sampling design. The framing of our questionnaire items and guiding questions for FGDs improving on reliability of the data collection tools also helped facilitate representativeness of findings.

Conclusion

Overall the study findings contribute to understanding adolescent dynamics relative to how they translate BCI knowledge, skills and messages into subsequent behavioural change. Such understanding may help inform evidence based programming and design of sustainable and effective prevention models. Structural interventions might be more effective but more so those that implement combination options with diverse compo-

nents integrated to target both proximate behavioural determinants as well as distal correlates that act as underlying or root causes of sexual risk taking such as poverty and gender disparities. For further research in Malawi and elsewhere, we recommend studies on such tailored structural interventions focusing on or involving primary adolescent beneficiaries. Such studies applying randomized controlled trial design may help substantiate the efficacy of interventions and inform or guide policy.

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