USE OF INDIGENOUS APPROACH AND A RANDOMISED CONTROL TRIAL TO EVALUATE THE UPTAKE OF SAFE MALE CIRCUMCISION AT SECONDARY SCHOOLS IN BOTSWANA

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Abstract
An evidence-based study makes it easier for the policymakers in the educational systems to choose among the many different interventions that are the most effective to institute, thus saving on time and cost. This study applied the theory of planned behavior (TPB) framework to inform an indigenous mixed approach, using a randomized control trial (RCT) design to test the efficacy of a school-based risk-reduction intervention for 14- to 19-year-old adolescent boys in Botswana. The intervention aimed at promoting the uptake of safe male circumcision (SMC) among the school-going adolescents in Botswana's senior secondary schools. The assessment results and testimonies recorded revealed that, compared with the control arm, the key intervention arm was significantly ($p < 0.05$) efficacious in increasing the uptake of SMC, at 3-months follow-up (3mfu).

Keywords: School-going adolescents, STI/HIV prevention, sequential explanatory mixed methods, theory of planned behavior, Randomized controlled trial, safe male circumcision.

1.0 Background of the study

Evaluation practices, unlike research, aim at the accountability and utilization of evaluation results (Chilisa et al., 2016). Thus, evaluation practice is useful when evaluating behavior change interventions to produce reliable, valid, and contextually relevant information that will prompt end users, like decision-makers or policymakers in the educational system, to use the intervention right away (Chilisa et al., 2017). For instance, the evaluation of safe male circumcision (SMC) in Botswana, particularly through randomized control trials (RCTs), has emerged as a critical component of public health strategies for generating information aimed at reducing HIV transmission. However, there is no evidence of evaluation that combines the use of RCT and indigenous approaches on SMC programmes among secondary school-going adolescents in Botswana. To make use of the proven benefits of SMC among adolescents in the Botswana context, there is a need to evaluate the initiative using the integration of RCT and indigenous approaches. To accomplish this, the researcher's and the studies' worldview should be taken into consideration during the intervention evaluation process (Chilisa, 2012). According to Chile et al., (2017), this will make it easier for the process to gain exposure to a variety of research paradigms, from the prevailing Euro-Western paradigms to the historically underrepresented indigenous paradigms.

In developing world settings, the historically marginalized indigenous research paradigms facilitate for identity of the narrative in rituals, proverbs, songs, revered traditions, myths, and folktales data (Chilisa et al., 2017) from the researched/participants' and their communities that is used or deconstructed and reconstructed to inform the process. This data which is largely unwritten text (Chilisa & Tsheko, 2014) is mainly qualitative in nature. On the other hand, the dominant Euro-Western paradigms facilitate for the generation of the interview and/or survey outcome data which is written texts and is either mainly qualitative or quantitative or both in nature. The combination of qualitative and quantitative approach, which is known as mixed methods approach, promotes a multidirectional lending and borrowing from knowledge systems between dominant and marginalized cultures (Chilisa & Tsheko, 2014; Onwuegbuzie & Hitchcock, 2017). This approach, which could be straightforward or complex in combining the use of qualitative and quantitative data, has become a common practice, in the recent past, in generating study information (Creswell & Plano Clark, 2007).

According to Hibbard and Onwuegbuzie (2012) the field of evaluation has the highest percentage of mixed methods research articles among the social, behavioral, and health science research. In the past, evaluation studies (Blake 1989; Rossman & Wilson 1991) were conducted in ways that took advantage of using multiple ways to address the study problem without necessarily indicating that the methodological approach is a mixed method design. The study designs were such that they used both the qualitative and quantitative approaches with the application of one of the approaches being dominant over the other. This was done to overcome the limitations of using a single design. Thus, the mixed method approach has been used in the past and is recently gaining popularity (Creswell & Plano Clark, 2007) as a viable alternative to the single design of pure qualitative or quantitative approach. According to Onwuegbuzie and Hitchcock (2017) mixed methods approaches continue to be used in several evaluation studies to address hard to conceptualize human challenges.

There are several types of mixed method designs, which include sequential, explanatory, sequential exploratory, sequential transformative, concurrent triangulation, concurrent nested and concurrent transformative (Creswell & Plano Clark, 2007; Hibbard & Onwuegbuzie, 2012). These designs enable one to triangulate, complement, develop, initiate, or expand on the findings. The timing of when to use the qualitative and/or quantitative design components as well as the study's limitations will determine which design is employed. The organic nature of human needs which is intertwined in qualitative and quantitative elements call for evaluation processes to innovatively make use of the mixed methods approaches to better address them.

Chilisa and Tsheko (2014) describe how the mixed method approach was used in the evaluation of the efficacy of a multiphase study on an indigenous culturally relevant and age-appropriate adolescent risk-reduction intervention to prevent the spread of HIV/AIDS and sexually transmitted diseases among adolescents in Botswana. The study was informed by the

qualitative and quantitative data from both the dominant and marginalized cultures in the design and evaluation of the intervention. The first phase of the study combined the indigenous qualitative methods with other qualitative methods to enable the community and the adolescents to elicit cultural knowledge on adolescent sexuality and HIV/AIDS. The study went further to blend this cultural knowledge with the global knowledge within the theory of planned behavior (TPB) framework to inform the design of the intervention and the evaluation instruments that are culturally relevant for Batswana adolescents aged 9 to 20 years old. The resultant intervention, known as "Own the Future", and the evaluation methods which resonated with Batswana culture were confirmed for their reliability and acceptability for use in the Botswana secondary schools. These intervention and evaluation instruments were adopted for the intervention described in this article that aims to promote the uptake of safe male circumcision (SMC). The SMC uptake study applied the sequential mixed method design in the first and second phases and used the concurrent triangulation in the third phase as depicted in figure 1.

2.0 Phase I: Baseline Assessment Survey

Having identified and adopted a culturally relevant and age-appropriate adolescent risk-reduction intervention for the study, the evaluation process started off by getting all the necessary ethical permissions. This was the first phase of the study whereby 234 Form 4 students, aged 14 to 19 years old, whose parents/guardians consented and were eligible to be in the study were enrolled. These students were from 5 public Senior Secondary Schools (SSS) in the Ministry of Education and Skills Development (MoESD) South Central Inspectorate Region in Botswana. The public SSS Form 4 boys' population was targeted because it was a homogenous schooling population in terms of; age range, class level, curricular delivered, language of instruction (English) and to a larger extent social cultural experiences. The participants' circumcision status (circumcised or not circumcised) was not applied as an exclusion criterion because the You Are Also Able (YAAA) intervention was designed to be used in a setting whereby both circumcised and uncircumcised adolescent boys operate in. The circumcision status of participants was also considered to be a sensitive criterion as issues on SMC are not commonly discussed topics among young adolescents (Jayeoba et al., 2012; Sabone et al., 2013).

The SMC status was left out as an exclusion criterion because of the Batswana indigenous wisdom that discussions about sexuality, especially SMC among adolescents, make people uncomfortable in public settings. Therefore, given the study's duration, eliminating participants based on their circumcision status would have created a difficult-to-reach group of adolescents who were not circumcised. The eligible students who were both circumcised and uncircumcised were gathered at each school on different days in a specified location that had a flat spacious sitting arrangement. This setting provided for spacing out the students' sitting positions to avoid them collaborating or copying the responses from each other. Sloping, or close

or crowded sitting arrangements would have provided for students to be tempted to discuss or copy their responses even if they would have been encouraged to give individual responses.

In this first phase, which was a highly quantitative approach, the data collection manual was used to administer the baseline questionnaire. The use of the manual ensured that the data collection procedures at baseline were standardized across the five study sites (schools). This also provided ease of monitoring the implementation and repeating, in different settings, the procedure. The appropriately seated participants were read to, as a group, the assent form and requested to seek clarification about their participation in the study. The group assenting was to speed up the procedure as the result of many participants who had to assent in the limited time available. The participants were then requested to sign two personal assent forms to be part of the study. According to the laws of Botswana, the participants who were under the age of 21 were required to have their parents' consent and their individual assent to participate in the study.

It was further explained to participants on how to complete the baseline questionnaire as per the data collection procedure. They were assured that the completion of the baseline questionnaire was not in any way an examination or a test and that there were no correct or wrong answers. It was important to assure the participants of a respecting and dignifying set-up as it promoted the participants' understanding the reasons behind their completing the baseline survey. This resulted in the participants completing the survey without attempting to collaborate or copy the responses among themselves. Prior to completing the baseline questionnaire, the participants signed an agreement pledge to ensure that they provided correct and more valid self-reports on responses about the study outcomes. The pledge form, called "*the survey agreement form*" stated: "*I understand that it is important for me to do the best I can to answer the questionnaire carefully and honestly. I also understand that my answers will be completely confidential and that no one will ever see my name and answers to this questionnaire*". This pledge was expected to make the participants to answer the questionnaires honestly (Jemmott et al., 2010). Therefore, the adolescent boys' intention to practice safer sex by taking up SMC and other HIV preventative behaviours were attributed to the measurements reported by the survey instruments.

The baseline questionnaire which was guided by the theory of planned behavior (TPB) had predominantly closed-ended items with multiple choice responses. This quantitative approach was meant to generate numeric data on the participants' moderating variables like who they stayed with, their age, their faith, and their SMC uptake status. See table 1 below. This is because these characteristics were thought to have the potential to either strengthen or diminish the relationship between the participants' adoption of SMC and the intervention and its tactics, if they were shown to be significant.

Figure 1: The study process

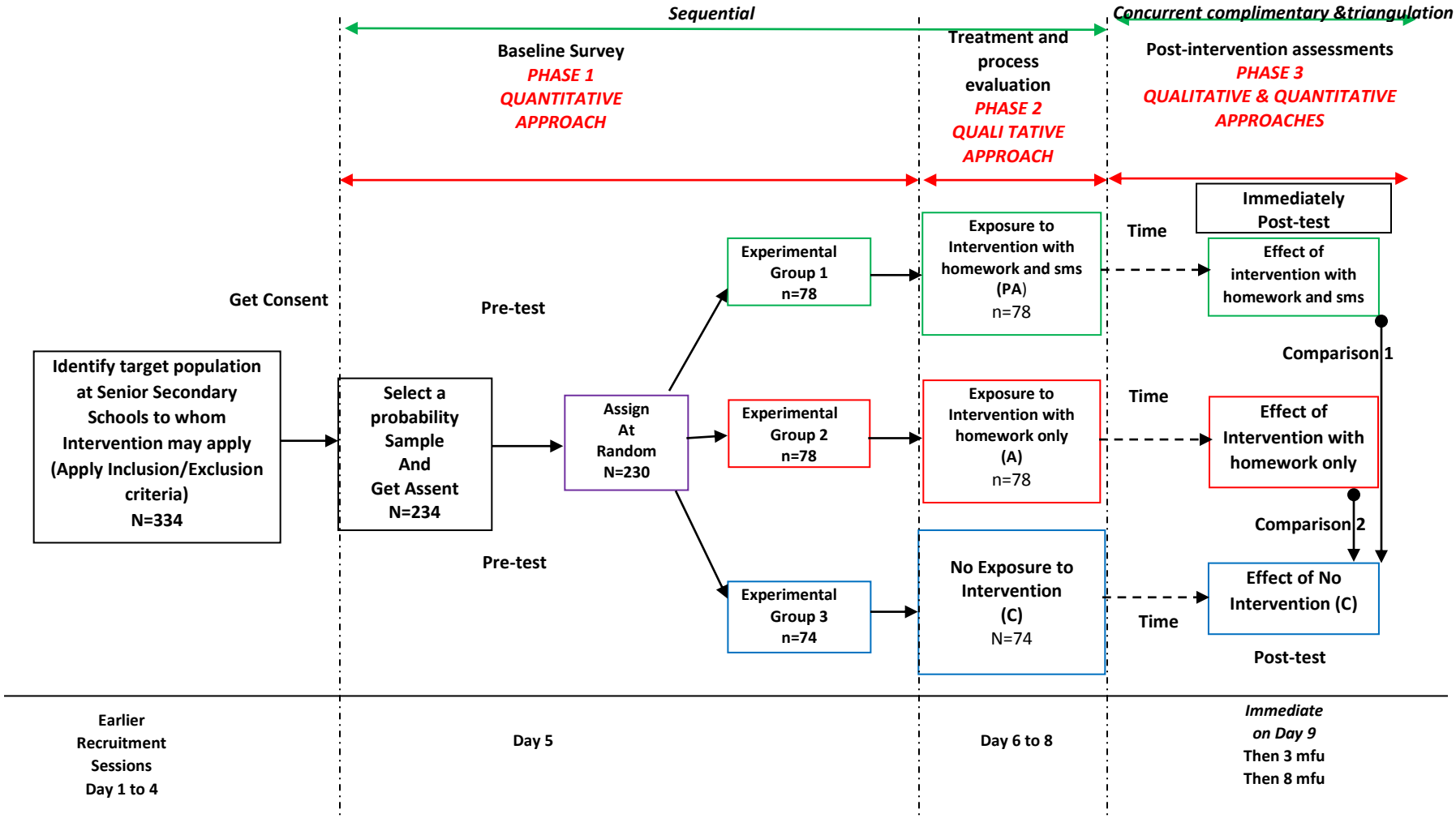

Table 1:
Socio-demographic Characteristics of Participants by Intervention Condition at Baseline and descriptive Statistics by Circumcision and HIV Testing at Baseline

	Participants that responded yes. No/Total (%)				
Characteristics at Baseline	**PA arm (n=78)**	**A arm (n=78)**	**Control C arm (n=74)**	**χ^2 ($p<.05$)**	**Total No/Total (%) (n=230)**
Live with Mom	47/78(60.3)	48/78(61.5)	39/74(52.7)	1.267(.531)	134/230 (58.3)
Live with Dad	18/78(23.1)	16/78(20.5)	13/74(17.6)	0.274(0.872)	47/230 (20.4)
Live with Mum & Dad	19/78(24.4)	15/78(19.2)	13/74(17.6)	0.585(0.746)	47/230 (20.4)
Member of Church	49/78(62.8)	50/78(64.1)	38/74(51.4)	2.167(0.338)	137/230 (59.6)
Are you Circumcised	32/78(41.0)	30/78(38.5)	32/74(43.2)	0.182(0.913)	94/230 (40.9)
Are you Not Circumcised	42/78(53.8)	41/78(52.6)	38/74(51.4)	0.182(0.913)	121/230(52.6)
Mean (SE) Age (Yrs.)	16.7(.098)	16.9(.096)	16.9(.102)	0.816*(.486)*	16.8(.057)

Note: SE is the Standard Error for the mean, Yrs. is years and * is the ANOVA computation F(p)

The participants' responses to the baseline (pre-test) instrument were captured through the pen and paper interview (PAPI) method. The use of the PAPI survey was the most economically appropriate and reliable method of collecting the baseline information on the uptake of SMC among the large number of participants in the short time span available. Other alternative method would have been an interview, open-ended questionnaires, focus-groups, visual items including records and biological markers to mention a few. This baseline information provided the basis of determining the degree of SMC uptake to be attributed to the intervention among the participants. Thus, the highly structured pre-test instrument made it possible to apply the quantitative approach in establishing the participants' distribution and uncovered the patterns in the uptake of SMC across the arms before the administration of the intervention. On completion of the instrument, the participants were thereafter assigned a study identification number and then randomly assigned to one of the 3 study arms.

3.0 Phase II: Intervention Implementation and Process Monitoring

Subsequent to the quantitative assessment the participants were randomly assigned to one of the 3 study arms. This second phase of the study was mainly a qualitative approach whereby the participants were exposed to either of the treatments or control. The randomization to treatment was conducted on the first intervention day. First, participants that were from the same household were identified. Such participants had to be in the same arm to avoid contamination of treatment. The PA arm was assigned number '1', A arm the number '2' and C arm the number '3'. These numbers were then randomized on the computer to give the order in which the arms

were assigned to the participant. Basing on the order in which the arms were randomized to, from the first to the third, the sampled names were assigned to the arms. That is, at every study site, the first name on the list was assigned to the first arm, the second name got the second arm, and the third name received the third arm. Thus, the fourth name got the first arm, while the fifth name got the second arm, and the sixth name got the third arm. This assigning pattern was repeated in the same order until the last name on the list was assigned at the study site. The randomization of the study sample of 234 was as indicated in Table 2. Four participants assigned to the control arm (C arm) at the school site 5 withdrew from the study just before the first intervention session. This withdrawal dropped the sample size to 230 participants.

In this phase two of the study the You Are Also Able (YAAA) curriculum, adapted from the University of Botswana, Own The Future; Pulling Together We Will curriculum (PTWW) (Chilisa et al, 2012), was administered as the intervention in the experimental arms. All the experimental arms applied the conservational indigenous methods of naming, talking circle, storytelling and yarning (Chilisa & Tsheko, 2014) to get or give feedback, build relationships and connectedness among the participants and their parents. These highly qualitative methods also built relationships and connectedness between the facilitators and the participants. The experimental arms also used the conventional methods of writing pledges notes or letters to ensure the sustainability of the participants' and their parents' commitments to the lessons learnt from the intervention.

The experimental group one (PA arm) received the YAAA intervention where the adolescents' parents were involved in the intervention using homework and cellphone text message (SMS). This arm which had 78 participants used the strategy of reaching the parents through homework and cellphone text message. The experimental group two (A arm) received the YAAA intervention where the adolescents' parents were involved in the intervention using homework only. This arm which also had 78 participants used the strategy of reaching the parents through homework only. The control group (C arm) did not receive any intervention but was necessary to attribute the study's results to differences between the interventions and control conditions. This arm had 74 participants which was a drop of 4 participants from the initial 78 before the interventions were administered.

Most of the activities in the YAAA modules were adapted to fit the psychomotor and cognitive level of a 14- to 19-year-old adolescent boy. The Own the Future; PTWW modules were adopted to focus on mainly SMC among adolescent boys. Using the indigenous method of naming intervention, like Chilisa and Tsheko (2014), study facilitators drew the attention of the adolescents to the intervention name, YAAA. This naming was aimed at building confidence in the participants for taking up SMC and having responsible sexual behavior. To ensure relevance and maintain connectedness to the lessons learnt at individual level, the intervention modules are also titled:

- Getting to know yourself.
- Prevention of HIV and STI and you.
- Safe male circumcision.
- Relationships and safe male circumcision.
- HIV/STI prevention and my responsibilities.
- Saying no to risky behavior effectively.
- Program review and closure.

These modules were covered in 3 school days. The YAAA intervention was administered in the afternoon during study lessons. The overall purpose of the YAAA intervention is to provide Batswana adolescent boys with the knowledge, motivation, and skills necessary to help them change their behaviour in ways that will reduce their risk for various diseases that impact the Botswana community, especially reducing the risk of HIV infection through taking up SMC. Thus, this curriculum aims to empower adolescent boys to take up SMC with the help of their parents or caregivers. The participants' parents were the biological or foster or stepfather and/or mother and so on, that were currently living with the participant. However, the participants' guardians were any other adult person that was currently living with and was the custodian of the participants. Therefore, the programme activities were delivered and directed to any of the boys' caregiver that would have consented on behalf of the participants and supplied their contacts.

The parents or caregivers for the adolescents in the PA arm were requested to sign a pledge note committing that they will help their adolescents at home. The parents' pledge was to enlist the parents'/guardians' help to empower their adolescents to take up SMC. By working close with their adolescents this also ensured that parents/guardians were aware of the nature of the treatment YAAA curriculum. The pledge read as follows: "*I understand that it is important for me to do the best I can to assist my son carefully and honestly in doing the study assignments and participate in the study*". This pledge was sent to the parents/guardians through their adolescents in the PA arm on the first session of intervention and collected during the next session. The involvements of the parents or caregivers' strategies in promoting the uptake of SMC were meant to encourage parent-child communication (DiClemente et al., 2008) in promoting the uptake of SMC among adolescent boys.

In the PA arm the parent involvement tapped on the applications of cellular phones in interacting directly with the adolescent boys' parents as suggested by Abroms and Maibach (2008) and applied by Lester, et al. (2010) and Lin, et al. (2012). The cell phone text messages (SMS) were sent on the intervention days to the parents or guardians emphasizing on the importance of the adolescent boys being supported to practice SMC and safer sex. The text message read as follows; "*Hello parent/guardian. Thank you for permitting your son to take part in this project. Your son has been given knowledge and skills on safe male circumcision (SMC) as a practice of safer sex. Please discuss with him issues on SMC and encourage him to undergo*

SMC and practice safer sex". This message was sent immediately after the first intervention session.

The following message was sent on the subsequent intervention session read as follows; "*Hello parent/guardian. Thank you once again for permitting your son to take part in this project. This is to remind you that your son has been given knowledge and skills on safe male circumcision (SMC). Please continue discussing with him issues on SMC and encourage him to undergo SMC and practice safer sex*". By communicating to the parents through the SMS and the adolescent boys' homework, the PA adolescent boys' parents/guardians were directly involved in promoting the uptake of SMC among their adolescent boys.

The SMS text and homework activities are designed to increase the parent/guardian comfort in encouraging and helping their adolescent boys to understand faulty reasoning and decision-making about taking risky sexual behaviours at their current age. This strategy is meant to evoke feelings, thoughts, and stereotypes about the uptake of SMC together with the behavioural, normative and control beliefs about taking up SMC among the parents and their adolescent boys. Hence the YAAA intervention that involved parents (PA arm) through homework and SMS was expected to increase the uptake of SMC among the SSS adolescent boys. Thus, more adolescent boys in the PA arm were envisaged to take up SMC than the ones in the control condition (C arm).

The parents/guardians to the adolescent boys in the PA arm who were communicated to through SMS texts messages and homework assignments sent through the participating son/s were also provided with airtime units to SMS back to the evaluator. This was a qualitative phase that was used to monitor the level of the parents/guardians' commitment and involvement. Several parents responded through SMS to the first SMS message stating that; "*this is a good program will talk to my son about going for circumcision*". Some of the parents/guardians made a short call to express the willingness to encourage their sons to go for circumcision and practice safe sex. The use of the SMS confirmed that the parents received the study messages through their son/s. this was indicative that the parents lived by their pledge and were communicating with their son, hence promoting parent-child communication. This gave an insight of overcoming barriers to parent-child communication.

Similar to Chilisa and Tsheko (2014), the indigenous method of the talking circle facilitated for capturing the feedback from the participants on the beliefs and what made it easy or hard for them to take up SMC. The misconceptions and barriers identified were corrected and the positive feedback were reinforced. The talking circle also gave feedback about the adolescents' parents in participating in the intervention through assisting in the homework assignment. These qualitative data was used to inform the intervention on the emerging barriers to the parent-child communication. For instance, some participants in the PA arm shared that; "*it*

was easy for me to discuss with my parents because they received the message that I am supposed to discuss the SMC uptake with them". Other participants in the A arm shared that; "*my parent came home late and so she did not help me in the homework assignments.*"

Similar to the case of the participants, the adolescents' parents' misconceptions and barriers identified were corrected and the positive feedback was also reinforced. The intervention monitoring process using the talking circle provided for the researched (participants and their parents) voice to be heard (Chilisa et al, 2016) and focusing or re-focusing the implementation activities to avoid digression from attaining the desired behavior formation among the adolescents and their parents. The final module of the intervention involved participants writing a commitment letter. The conventional methods of writing letters to ensure the sustainability of the participants' commitments to the lessons learnt from the intervention. After the intervention was administered all the participants in the 3 study arms were separately assessed for the intervention effects and contamination.

4.0 Phase III: Measuring the Intervention Effects and Validation of the Outcomes

The third phase of the study was to determine the intervention effects from valid SMC uptake outcomes among the adolescent boys. The study used a pre-test post-test randomized control (PPRCT) group designed to evaluate the efficacy of the YAAA Intervention. This involved assessing the participants' uptake of SMC measured at pre-test (baseline assessment), posttest, at 3months and 8months follow ups. The post-test, 3 mfu and 8 mfu assessments were conducted to follow-up the participants' uptake of SMC to measure the YAAA Intervention effects in the PA and A arms. These assessments were conducted after the intervention delivery to PA and A arms. The assessment instruments for the post-test, 3 mfu and 8 mfu periods had predominantly closed-ended items, however there was a section with open-end items. This structure of the instruments provided for the qualitative and quantitative data to be generated in this third phase of the study.

The post-test assessment was conducted on the following available school day immediately after the last intervention session at each school site. The 3 mfu was conducted 3 months from the post-test assessment and 8 mfu was conducted 8 months after the 3 mfu assessment. Two weeks before the 3 mfu and 8 mfu assessments day the school administration and the participants were sent a reminder for the date of the assessment. Three separate rooms, one room for each arm (PA, A and C), were allocated by the school administration for the administration of the post-test, 3 mfu and 8 mfu survey. Thus, using the data collection manual, the participants gathered in three separate rooms according to their study arms. The allocation of the separate rooms for each arm ensured that the groups did not mix, hence avoiding contamination.

In this third phase a highly quantitative approach was used to generate assessment data on the uptake of SMC among the adolescent boys. This was done by using similar items to those in the pre-test instrument. The pre and post intervention quantitative data sets were compared to determine the intervention effect. A multiple regression analysis was run to determine the likelihood of the adolescent boys in the PA and A arms taking up SMC. The study was prone to contamination since the participants were randomly assigned to the study arms at individual level within the study site. The random assignment of participants to the arms at the same study site exposed the study to intervention contamination (Ybarra et al., 2013) which was a threat to internal validity. The threats due to contamination would also have compromised the data quality and validity. These threats were minimized by measures of, partial blinding the participants, isolating PA, A, and C arms adolescent boys as much as possible from meeting during the study sessions. The participants were kept separate during the interventions and follow-up session.

Each study arm was conducted in a separate room away from the other arms to avoid contamination. In the third phase it was also important to concurrently triangulate the data generation procedure with qualitative items to further validate the SMC uptake. This triangulation was meant to determine the contamination level and its effect on the intervention to clarify the validity of the outcome despite randomizing the sample to control for internal validity. The random sampling was administered to give equal chances to all the short-listed boys for being recruited, as representatives of their population, to participate in the study. This was conducted before the pre-test assessment. According to McMillan (2007), random assignment ensured that known and unknown adolescent boys' and environment characteristics that could affect the outcome of the study were evenly distributed across conditions. In addition, this random assignment equalized the influence of non-specific processes not integral to the SRRIs whose impact was being tested. Non-specific processes might have included effects of participating in a study, being assessed, receiving attention, self-monitoring, and positive expectations. Thus, the random assignment ensured that the experimental (PA or A) and control groups are truly comparable to each other; that is, the adolescent boys of the experimental and control groups were equivalent. This controlled for most threats to validity (Fisher & Foreit, 2002).

McMillan (2007) argues that an accurately conducted PPRCT design main trial should control for threats to validity. In this study, by combining the pre-test assessment and randomly assigning the participants to either of the treatments (independent variables – PA or A) and a control (that receives nothing) the study controlled for all sources of internal validity. According to Gay and Mills (2011), the random assignment controlled for regression and selection factors while the administration of the captivating YAAA intervention immediately after the pre-test controlled for mortality due to loss of interest in the study resulting in dropouts; the randomization and the control group controlled for maturation; and the control group controlled for history, testing and instrumentation. Thus, the random assignment and the use of the control

condition ensured that any extraneous variation not due to the intervention were either controlled experimentally or randomized. This allows the study's outcomes to be causally attributed to differences between the intervention and control conditions.

In this study the adolescent boys were thus also tracked and asked appropriate qualitative and quantitative questions at the follow up assessments to determine the possible influence due to contamination to the treatments and the control group (McMillan, 2007). This combination of qualitative and quantitative approach was to assess the "*why, how, what, where, when* or *who*", that would have contributed to the contamination. Thus, the post-test, 3-month follow-up (mfu) and 8 mfu study questionnaires had items in the last section Z that were aimed at assessing the possibilities of the participants discussing their interventions or control across the study arms. These items were steps to monitor the level of contamination.

The quantitative item was a closed-ended question that asked: "*Have you discussed this project with another adolescent who was in the project, but in a different group than you?*", with a dichotomized response of "*yes"* or "*no*". There were also qualitative open-ended items that asked: "*If you have discussed this project with an adolescent who was in a different group than you, what did you tell him you learnt?*" and "*If you have discussed this project with an adolescent who was in a different group than you, what information did you learn from him?"* The frequency of admission to discussing the programme in the interventions and control groups at post-intervention 3- and 8-month follow-ups was computed and compared between the study arms. The frequency was for the item asked, "Have you discussed this project with another adolescent who was in the project, but in a different group than you?"

Table 3: Indications of contamination: A comparison of proportions for admitting to discussing the programme in the interventions and control groups at post intervention, 3 -month follow-up and 8-month follow-up

	Participants that said Yes to Key contamination questions *(Have you discussed this project with another adolescent who was in the project, but in a different group than you?)*		
Assessment period	**PA arm %(n)**	**A arm %(n)**	**Control C arm %(n)**
Post intervention assessment	32.4% (22/68)	15.7%(11/70)	4.3%(3/70)
3 mfu assessment	25.0%(18/72)	25.0%(18/72)	24.3%(17/70)
8 mfu assessment	17.2% (10/58)	15.8% (9/57)	11.1%(6/54)

Note: The total group number n for the different assessment periods across the three arms kept changing due to participant attrition and therefore presented in brackets; PA arm is intervention group that involved parents through homework and SMS; A arm is intervention group that involved parents through homework only; C arm is the control condition; 3 -month follow-up is abbreviated as 3 mfu and 8-month follow-up is abbreviated as 8 mfu

Table 3 shows that less than 40% of the participants in each study arm PA (32.4%), A (25.0%), and C arms (24.3%) admitted having discussed the project when they were asked the same question. Therefore, more than 60% of the participants did not admit having discussed the project when they were asked the question. The table also shows that the highest proportion (count) of participants discussed the programme across groups at either post intervention or at 3 mfu. This was an indication of contamination, however, further content analysis was conducted to the response to a follow-up qualitative item to determine the details of discussion between the adolescent boys across the groups.

The qualitative item asked, "*If you have discussed this project with an adolescent who was in a different group than you, what did you tell him you learnt?*" Only 13/68 in PA arm and 5/72 in A arm of the adolescent boys responded to have talked of the benefit of SMC with 1 in PA arm and 2 A arm responding to have encouraged the friend to get SMC. None of the adolescent boys in the C arm, which was the study comparison arm, responded that they had talked about SMC. Therefore, the contamination was deemed not severe owing to the low proportions or counts of the adolescent boys admitting and responding to have discussed the intervention on SMC uptake. The intervention facilitation forms and participants' responses during the review of the previous sessions, which were also used to monitor any contamination occurrence, indicated no discussion between the adolescent boys' arms.

5.0 Conclusion

The study used the quantitative and qualitative approaches, which is a mixed method approach, to evaluate the effect of the intervention in promoting SMC among adolescent boys. The use of mixed method approach within scientifically accepted evaluation procedures enables one to thoroughly validate the study outcomes. The applications of the mixed methods facilitated for the study to establish and determine the required data as accurate as possible. The use of these approaches did not compromise the quality of the generated data. The approach improved the accuracy of the assessment ultimately validating the outcome. The use of mixed methods approaches better explained and validated the study outcomes. The uptake of SMC among adolescent boys which is human behavior change is better addressed by both qualitative and quantitative data. Thus, in innovatively using the mixed methods approaches more accurate and reliable outcomes can be generated and determined for human behavior needs.

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