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**ORIGINAL ARTICLE**

# The application of Intervention Mapping in developing and implementing school-based sexuality and HIV/AIDS education in a developing country context: The case of Tanzania

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**Abstract**

*Aims:* Effective sexuality and HIV/AIDS education programmes are needed to protect young people against HIV/AIDS and teenage pregnancy in Tanzania and other Sub-Saharan African countries. Using a theory- and evidence-based approach and adapting the programmes to local contexts, increases the effectiveness of these programmes. This paper describes and discusses the challenges and opportunities concerning the application of Intervention Mapping (IM) in the development and implementation of a sexuality and HIV/AIDS education programme targeting young people aged 12–14 in Tanzania. *Methods:* The sexuality and HIV/AIDS programme was designed in a participatory manner, involving researchers, curriculum developers and teachers' and students' panels. The programme comprised five lessons, organized around 23 sessions with the aim of delaying the onset of sexual intercourse and increase correct and consistent condom use among young people. The programme was delivered by trained teachers as an extracurricular lesson. ***Conclusions:*** **The IM protocol facilitated the development of a comprehensive sexuality and HIV/AIDS education programme relevant and appropriate to the social cultural context and the needs of learners in Tanzania. The paper has demonstrated that, although the IM was developed in the Western context, it can be used in a flexible manner to adapt to local contexts such as those in Sub-Saharan Africa**.

**Key Words:** *School-based sexuality and HIV/AIDS education, Intervention Mapping, risky sexual behaviours, delaying sexual intercourse and condom use*

## Introduction

There is a large body of evidence that has demonstrated that well-designed sexuality and HIV/AIDS education programmes have positive effects on reducing risky sexual behaviours among young people, including delaying the onset of sexual intercourse, reducing the frequency of sex, reducing the number of partners and increasing contraception and condom use [1–3].

Kirby, Laris and Rolleri [3] have identified several factors that characterize effective sexuality and HIV/AIDS education programmes; four of these are particularly relevant to using theory and evidence-based approaches to programme development. First, the process of developing the programme should use a theoretical approach to guide the development of a programme that specifies the health goals, the behaviours affecting those goals, the risk and protective factors affecting those behaviours and activities addressing those risks and protective factors. Secondly, the process should assess the relevant needs and assets of the target group. Thirdly, programme developers should design activities consistent with community values and available resources. Lastly, the programme should focus on

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clear health goals, in this case, the prevention of HIV and other sexually transmitted infections (STIs) as well as teenage pregnancy.

Although the characteristics of an effective programme as propounded by Kirby et al. [3] are necessary and should be taken into account in programme development, they are just characteristics that reflect teaching and learning aspects; they do not provide clear guidelines for planning, developing and evaluating effective programmes so as to meet these characteristics [4]. Alongside these characteristics, there is need for theory- and evidence-based systematic guidelines right from the development level through implementation to the evaluation stage. The Intervention Mapping (IM) model provides a framework to do this [5].

IM is a six step systematic approach for designing, implementing and evaluating health promotion programmes employing existing theories and evidence of behaviour and social change [5]. IM provides guidelines and tools for the specification of programme objectives, the selection of theoretical methods and practical strategies and for the translation of these into programme materials and activities [6].

IM has been applied in designing health promotion programmes in developed countries. These include for example, school-based AIDS prevention [7] and AIDS risk reduction targeting drug users [8] in The Netherlands, and HIV, STIs and pregnancy prevention among high-risk minority youth [4] in the United States.

## Aim

This paper describes the six IM steps as applied in planning and developing a sexuality and HIV/AIDS education programme in Dar es Salaam, Tanzania. The steps are: (1) needs assessment/situation analysis; (2) programme objectives; (3) intervention design; (4) methods and strategies; (5) adoption and implementation; and (6) evaluation. The sexuality and HIV/AIDS education programme described in this paper was part of a tri-centre project, with sites in South Africa and Tanzania (SATZ) [9], with the aim of delaying the onset of sexual intercourse and increase correct and consistent condom use among school students.

## IM step 1: Needs assessment

The first step in IM is the assessment of the needs of the target population – in the SATZ project this is the adolescents. IM has included the PRECEDE model [10] to identify the needs on four levels, namely: quality of life, health, behaviour and environment and determinants.

In the SATZ project, the health problems were identified as HIV/STI transmission and unplanned teenage pregnancy. Risky sexual behaviour was identified as the most important mode of HIV infection as well as teenage pregnancy; as such this was the major topic to address in the Tanzania programme.

The decision to focus the programme on the primary school student population was informed by several factors that have been given in favour of school-based sexuality education programmes. First, school-based programmes are, in principle, relatively easy to organize [11]. Furthermore, primary schools in Tanzania have a greater potential than secondary schools to reach a majority of young people, because more than 80% of children get access to primary school, while less than 15% of these proceed with secondary education [12,13]. Thirdly, the school setting is particularly relevant for providing sexuality and HIV/AIDS education for Africa where parent-initiated sex education is virtually lacking due to pervasive taboos around discussing sex [14]. Fourthly, studies have shown that sexuality education works effectively if it is provided even before young people mature physically, emotionally and intellectually [15–17].

### *Risky sexual behaviours among young people in Tanzania*

The fourth category in the needs assessment involves an analysis of determinants of risky sexual behaviours among young people in Tanzania, derived from literature review and primary data collection. The literature reviewed included published work and reports on the area of adolescent sexuality in general and determinants of sexual behaviour in particular. Because only a few HIV intervention programmes had been evaluated in Tanzania [17], it was necessary to undertake primary data collection to gather information for areas that could not be collected from the literature. Primary data collection techniques involved interviews with parents and teachers and focus group discussions with primary school students in Dar es Salaam. The analysis focused on sexual behaviours rather than other modes of HIV transmission such as using drugs by injection, because more than 80% of HIV transmission in Tanzania is through heterosexual unprotected sexual intercourse [18].

Both the literature review and the primary data collection results revealed that young people's sexual activity in Tanzania is characterized by three main

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risky sexual behaviours; namely, early sexual debut, multiple partnerships and lack of condom use [19,20]. A cross-sectional survey of peri-urban primary and secondary school pupils in North-West Tanzania, for example, revealed that 80% of primary school boys and 60% of girls aged 12–20 were sexually experienced; furthermore, the median age at first sexual intercourse was estimated at 15 years for boys and 16 years for girls [19]. A cross-sectional survey conducted by Todd et al. involving primary school pupils in rural Tanzania revealed that 50% of the boys and 20% of the girls aged 14–17 were already sexually experienced [20]. Todd et al.'s study also revealed that sexually active and experienced primary school students in Tanzania rarely and infrequently used condoms.

Multiple sexual partnership tendencies are not unusual among young people in Tanzania. A study by Lugoe, Klepp and Skuttle (1996) that investigated the predictors of condom use among secondary school students in the northern part of Tanzania revealed that between 10% and 20% of males and between 7% and 35% of females aged 13–21 reported having had more than two sexual partners within a period of two to four weeks [21].

*Determinants of risky sexual behaviours among young people in Tanzania*

Several factors contribute to risky sexual behaviours among young people. Early sexual debut, for instance, has been attributed to adolescents' curiosity and experimentation with behaviour [22]. Forced sex is another commonly cited factor for adolescents' early sexual debut. In an in-depth interview study exploring young people's experiences with infidelity in Dar es Salaam, Tanzania, young women reported that they were forced to have sex by relatively older men than themselves [23]. Focus group discussions with primary school students in Dar es Salaam regarding early sexual debut showed that alcohol use and gifts and favours were other factors that contributed to young girls' early initiation of sexual intercourse [24]. Gifts and favours that were frequently mentioned in the group discussions included food (chicken and chips) and lifts to and from school offered by the conductors of public transport buses (commonly referred to as *daladala*).

Few studies exist on the correlates of condom use among young people in Tanzania. As such, the programme development team relied on the international literature and primary data collection to gather information on the correlates of condom use. Literature review showed that intentions to use condoms are primarily determined by attitudes, perceived partner approval, pregnancy motivation and self-efficacy [25]. Primary data collection in Dar es Salaam using focus group discussions among young people revealed, for example, that lack of knowledge and skills about condom use was a critical barrier to accessing condoms among a primary school student population in Dar es Salaam.

## IM step 2: Objectives

The second step of IM encourages programme developers to identify evidence-based objectives for the intervention, based on the previous step, the needs assessment. On the basis of the needs assessment results, it was clear that a health promotion programme should focus on delaying the onset of sexual activity for students who were not yet sexually active, and increasing the use of safer sex practices for students who were already sexually active. Furthermore, on the basis of the results of the literature review and needs assessment, the SATZ project group decided to include two additional health promoting behaviours, namely "avoid taking gifts from strangers" and "avoid using alcohol" [25].

*Delineation of performance objectives*

After identification of health promoting behaviours, IM asks programme developers to specify their general health promoting objectives, and to break down these objectives into so-called performance objectives (PO). Performance objectives describe what the learner is expected to do in order to perform the health promoting behaviour identified. There is substantive literature to guide the formulation of performance objectives on safer sex practices, particularly condom use [23,26]. Because of the paucity of studies on the determinants of abstinence and delayed sexual intercourse among young people in Tanzania, the formulation of performance objectives on delaying onset of sexual intercourse was mainly guided by findings from primary data collection.

Overall, there were five performance objectives on the first health promoting behaviour (HBP1) – delaying the onset of first sexual intercourse, and six on the second promoting behaviour (HPB 2) – correct and consistent condom use. These are summarized below:

Performance objectives for delaying onset of first sexual intercourse:

- PO 1: Plan/decide to delay sexual intercourse
- PO 2: Suggest alternative sexual activities
- PO 3: Avoid risky situations such as being alone with a boy/girl friend

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- PO 4: Avoid taking gifts from strangers
- PO 5: Avoid using alcohol and other drugs

Performance objectives for correct and consistent condom use:

- PO 1: Plan to use a condom
- PO 2: Obtain/buy condoms
- PO 3: Always carry condoms
- PO 4: Negotiate use of condoms with sex partners
- PO 5: Correctly use condoms
- PO 6: Maintain condom use at every sexual encounter

*Developing proximal programme objectives*

In the final task of identifying objectives, IM requires programme developers to answer the question "What do the target audience need to do/know/think (determinants) at the end of the programme?" For example, in performance objective 1 (plan/decide to delay sexual intercourse), what knowledge is required to enable learners to identify places where they can buy condoms and what skills do they need to correctly use a condom? Similarly, which skills should a student have to be able to assertively communicate her or his desire not to have sex? The result of this task was a matrix showing performance objectives in row headings and learning objectives in column headings for each behavioural determinant (see Table I).

## IM Step 3: Selection of theoretical methods and strategies

Having specified the proximal objectives of the programme, health promotion planners have to identify theory-based methods for changing the determinants of the performance objectives, and they have to translate these methods into practical educational strategies and materials that fit the implementation context.

The process of selecting methods and strategies started with the analysis of existing school-based HIV education programmes. These programmes were reviewed with regard to the degree to which (1) programme objectives were covered; (2) they included theory-based methods that were identified as potentially useful for sex education (e.g., active learning, modelling); (3) they met the criteria of effective sexuality education programmes (3); and (4) they were in harmony with the Tanzanian national educational objectives. Two major criteria were used to select the programmes for inclusion in the analysis framework. First, the extent to which the content of the programme focused on sexuality and reproductive health. Second, the extent to which the content of the programme explicitly embraced a comprehensive approach to sexuality and HIV/AIDS education by addressing both abstinence and contraception including condom use. In total, 10 programmes were selected. The programmes were selected from among those developed by both government institutions and non-governmental organizations.

It emerged from the analysis of existing programmes that they had a greater emphasis on HIV/AIDS education than other aspects of sexuality education. Previous programmes had tended to address HIV/AIDS in isolation from other sexuality issues. The central objective of most of the programmes analysed focused on knowledge for HIV transmission and prevention and not on the overall improvement of adolescents' sexual health. This is perhaps understandable given the criticality of the HIV/AIDS epidemic in Tanzania and other Sub-Saharan African countries.

It was clear therefore that the focus of the analysed existing programmes fell far short of both the key objectives of the Dar es Salaam SATZ project as well as the characteristics of effective sex education programmes. Therefore, none of the analysed programmes was eventually adapted in the final SATZ programme.

## IM Step 4: Intervention design

The programme development involved three groups of people including programme developers, trainers of teachers and programme coordinators. The programme developers were recruited from the University of Dar es Salaam and the Tanzania Institute of Education on the basis of their expertise in curriculum development and experience in developing sexuality related programmes. Trainers of teachers came from the Tanzania Institute of Education and a population and reproductive health organization (UMATI). These parties formed a programme development team that met on a regular basis to review progress on the programme development process until the programme was produced.

The programme comprised five lessons delivered in 23 sessions over 17.25 hours. The lessons were delivered in two modes. First, there were classroom sessions involving teacher presentations, group discussions, story telling and role-plays. Secondly, pupils were given homework book assignments to be accomplished at home with the help of parents. Parents were informed of the homework book assignments by letters that were sent through their children. The aim of homework book assignments was to foster

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Table I. Matrix for performance objectives and determinants for sexuality and HIV/AIDS education programme in Dar es Salaam.

| Performance Objective (PO) | Domains | | | |
|---|---|---|---|---|
| | Knowledge | Attitudes | Skills | Social support/ reinforcement |
| PO 1 Plan/decide to delay sexual intercourse | Learners mention ways of responding to requests about having sexual intercourse | Learners express the advantages of delaying the onset of sexual intercourse | Learners express ability and confidence to resist requests for unwanted sexual intercourse | Parents discuss sexuality and HIV/AIDS with their children at home |
| PO 2 Suggest alternative sexual acts | Learners mention at least three alternative ways of expressing sexual feelings other than sexual intercourse | Learners express positive feelings towards non-penetrative sexual practices including masturbation | Learners demonstrate confidence in convincing partners to use chosen non-penetrative sexual practice | Parents support their children in having positive friendship with other peers |
| PO 3 Avoid risky situations such as being alone with a boy friend | Learners describe the techniques for initiating, maintaining, and terminating a conversation | Learners express the importance of negotiating skills in winning partner support for non-penetrative sexual practices | Learners demonstrate negotiating skills. | Peers respect the decision of their partners about having non-penetrative sexual practice |
| PO 4 Avoid taking gifts from men | Learners list at least three situations that could lead into having unplanned sexual intercourse | Learners express the importance of understanding situations that are risky in relation to having unplanned sexual encounter | Learners demonstrate confidence in the ability to identify and avoid receiving gifts that are consequently associated with sexual intercourse | - |
| PO 5 Avoid using alcohol and other drugs | Learners mention the health and psychosocial effects of using alcohol and other drugs | - | Learners express confidence in the ability to avoid using alcohol and other drugs | There will be effective legislation that bars businesses from supplying alcohol and other drugs to young people aged below 18 |
| PO 6 Plan to use a condom | Learners explain the difficulty involved in using condoms if not planned | Learners express the importance of planning condom use | Learners express confidence in being able to plan ahead for using condoms | - |
| PO 7 Obtain/buy condoms | Learners identify places where condoms can be obtained/bought | Learners feel comfortable buying/obtaining condoms | Learners express confidence about buying/obtaining condoms | Suppliers of condoms will not stigmatize young people as they buy/ obtain condoms |
| PO 8 Always carry condoms | Learners list various safe ways of carrying condoms | Learners explain the importance of always carrying condoms | Learners feel confident about carrying condoms | Parents, teachers, and other significant others will support young people's decision to carry condoms |
| PO 9 Demonstrate correct use of condoms | Learners list the steps involved in correct use of condoms | Learners express favourable outcome of correct use of condoms | Learners feel confident in demonstrating correct condom use | - |
| PO 10 Negotiate condom use with partner | Learners list the basic negotiating steps involved in condom use | Learners view negotiating condom use as being responsible and respectful to the partner | Learners demonstrate skills and express confidence in negotiating condom use | Peers will be respectful of partners deciding to use condom during sexual intercourse |
| PO 11 Maintain condom use for every sexual encounter | - | Learners feel committed to using condom consistentlyStudents explain/ acknowledge the advantages of maintaining condom use | Learners feel confident in being able to use a condom with regular partner as well casual partners | - |

discussions about sexuality and HIV/AIDS between parents and their children. School-based sex education works more effectively if it is complemented with parent-child communication strategies [27].

### IM Step 5: Adoption and implementation

A plan for implementation and adoption was designed at the programme conception phase.

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The plan involved implementation objectives, methods and strategies. The planning team involved researchers, teachers, students, and government officials from health and education sectors. The planning team formed into a consultative forum called a linkage board. The linkage board, which met on a regular basis, had an advisory role regarding the timing of programme implementation, selection of suitable teaching and learning materials as well as teacher training opportunities.

Prior to programme implementation, teachers were trained on the content and facilitation skills. Training activities included administration of pre-test and post-test assignments. These were aimed at measuring teachers' knowledge about sexuality issues in general and their attitudes towards teaching sexuality and HIV/AIDS education in particular. The training programme was also used to pre-test the programme materials as well as teaching methods and strategies among teachers. Teachers were asked to comment on the attractiveness, completeness, suitability and relevance of the programme materials and methods to primary school pupils given their experience in teaching the intended audience. Teachers' comments were incorporated in the final version of the programme. A professional graphic designer was employed to draw illustrations to enhance the attractiveness and easy understanding of the programme document for young people.

The involvement of various stakeholders in the planning process improved the chances of successful programme implementation and adoption and enabled the programme designers to foresee barriers to implementation such as policy constraints. The students, for example, advised on the suitability of the learning materials, while teachers advised on the appropriate time and mode of programme implementation. The government officials played a key role in ensuring that the objectives, methods and strategies were in line with the Tanzania education policy and that they were relevant to social-cultural context of the implementation setting. The involvement of government officials from health and education sectors made it possible for the programme to be incorporated into the school timetable.

### IM Step 6: Evaluation plan

Step 6 in the IM process involves the development of an evaluation plan. The evaluation plan entails the mechanism for assessing the outcome of the intervention programme. The outcome of the programme is measured at two levels. The first level involves a process evaluation in which programme developers assess whether or not the programme was implemented as planned. The second level entails an outcome evaluation. This level measures whether or not the learning objectives were achieved and whether the envisaged determinants of the health promoting behaviour have been adopted.

The intervention uptake and evaluation took place over a 14-month period, March 2004 to May 2005. The programme was implemented in 12 primary schools in one district in Dar es Salaam. The programme was implemented as a predominantly extracurricular subject and was allocated one hour after regular school programmes. Each class had a maximum of 45 pupils and there were one to two teachers per session. The decision to implement the programme on an extracurricular basis was reached at a linkage board meeting on the basis that the school curriculum was already overcrowded and it would not be easy to get regular teaching time for effective implementation of the sexuality and HIV/AIDS programme.

The details of the evaluation processes have been reported in Aaro et al. [9] and the results of the outcome evaluation will be presented separately elsewhere.

## Discussion

Intervention Mapping is a framework for guiding planning, development, implementation and evaluation of health promotion programmes. It also facilitates the collaboration between researchers, programme developers, target groups (students), implementers (teachers) and other stakeholders namely, parents and government officials.

The planning phase of the sexuality and HIV/AIDS education programme in Dar es Salaam was a fairly smooth undertaking. There was clear acceptance by the authorities as well as support by the parents of the participating students. Teachers of the participating schools also demonstrated readiness and positive attitudes towards teaching sexuality education in the selected schools. The IM model provided a unique opportunity for parents and government officials to participate in programme development, which is hardly achieved in traditional health promotion programme planning.

Whilst the programme planning was a relatively smooth undertaking, we faced several challenges at the implementation phase. First of all, the IM model requires programme developers to adapt existing programmes. This strategy was impractical in the case of Tanzania because none of the analysed

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existing programmes met the minimum requirements of the SATZ project goals as well as Kirby et al.'s key characteristics [3] of effective sexuality and HIV/AIDS education programmes.

The second challenge relates to the content of the programme. The SATZ programme in Dar es Salaam envisaged promoting two key health behaviours, namely, delaying onset of sexual intercourse and promoting correct and consistent condom use. Whilst it was feasible to implement all the objectives under the first health behaviour (delaying sexual intercourse), it was practically impossible to implement many of the objectives for attaining the second health behaviour (correct and consistent condom use). This is because, though there was the individual knowledge, motivation and skills to use condoms, condom accessibility was hindered by policy constraints as distribution of condoms is not permitted in Tanzanian schools [28]. This means that teachers and students did not have the opportunity to demonstrate the use of condoms as envisaged in the programme design.

As indicated in IM step 2, the selection of performance objectives for achieving the desired health behaviour is supposed to be guided by evidence. Due to lack of published literature on the determinants of abstinence and delayed sexual intercourse in Tanzania, there was no concrete evidence to guide the formulation of objectives for the first health promoting behaviour for our programme, namely, *delaying the onset of sexual intercourse*. The formulation of performance objectives on this health behaviour was mainly guided by the results of primary data collection. This means that it may not be possible to follow all the IM steps logically in circumstances where evidence may be lacking as was the case in Tanzania.

The fourth challenge relates to the competence of the teacher competence delivering sexuality and HIV/AIDS education in schools. The needs assessment revealed that the majority of teachers in Tanzania were completely unfamiliar with teaching sexuality in schools in an interactive and participatory manner. This was a barrier given that, among other factors, the IM model requires competent deliverers of the sexuality programme who are well conversant with the participatory approaches to teaching and learning. Though teachers were given some training prior to the programme implementation, this training was too short to make teachers competent sex educators.

Furthermore, there was a lack of resources for assisting teachers with programme delivery. A sexuality and HIV/AIDS education programme works effectively if it is complemented by the availability of youth-friendly resources in the community to support what is taught in schools. However, young people in Tanzania feel intimidated to use sexual and reproductive health service outlets because most of these were specially designed to serve adults and service providers lack skills to deal with youth [29].

Lastly, it was not always smooth working with the representatives of government in the linkage board. There was, for example, no consistency in the government representation in the linkage board meetings as new delegates were appointed at various points. This considerably delayed the programme activities as quite some time was spent on orienting new delegates every the time they were appointed. Again, new delegates who came in the middle of the programme development would sometimes object to the inclusion of some performance objectives that had been agreed upon at previous meetings. For example, just two weeks before the commencement of programme implementation two newly appointed members of the linkage board from the government demanded that objectives on condom use be removed from the programme on the basis that they were not in harmony with the Tanzanian traditional values. After a lengthy discussion in the linkage board it emerged that the members who raised this view were implementing another project funded by the US government on abstinence-only education and their views might have been influenced by their involvement in this project. However, the majority of participants at the linkage board meeting were not convinced by their argument, and the objectives on condom use were retained in the programme.

## Conclusion

Despite the daunting challenges faced at the implementation phase, the IM model provided a framework for designing a sexuality and HIV/AIDS education programme in Tanzania. The IM model also provided a framework for the collaboration between researchers and programme developers on the one hand, and on the other hand, stakeholders (parents and government officials) and target groups (students as recipients and teachers as deliverers).

Special intervention may be needed at adoption and implementation levels to ensure smooth delivery of the programme in future. This should involve changing policies that hinder the availability of condoms in schools as well as more intensive teacher training in the teaching of sexuality and HIV/AIDS education. Furthermore, there is a need to ensure that sexual and reproductive health service outlets

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are youth friendly so that young people are not intimidated by them and so that they receive the services they may need.

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