# MEMA kwa Vijana

## Good things for young people

MEMA kwa Vijana (MkV) is an adolescent sexual and reproductive health (ASRH) programme working in schools, health facilities and communities.

MkV has over ten years research and implementation experience in Mwanza region, Tanzania.

MkV aims to provide policymakers and programme managers with evidence and recommendations on effective interventions for preventing HIV and improving the sexual health of young people.

**KEY FINDINGS:**

HIV prevention among young people is an urgent priority.

The MEMA kwa Vijana intervention increased young people's knowledge, which is important in its own right. However this did not reduce HIV or other sexually transmitted infections. There is a gap between knowledge of how to avoid HIV and other sexual risks among young people and actual behaviour change. It is likely that wider societal norms related to adolescent sexual risk behaviours will need to be changed to permit this to occur.

Other approaches need to be developed, implemented and evaluated to find effective ways of preventing HIV among young people in sub-Saharan Africa.

# Long-term Evaluation of the MEMA kwa Vijana Adolescent Sexual Health Programme in Rural Mwanza, Tanzania: a Randomised Controlled Trial

## 1. Introduction

The MEMA kwa Vijana ("Good Things for Young People" in Swahili) Programme started in 1997 as a research project. Since January 1999, an innovative package of adolescent sexual and reproductive health interventions has been implemented by the African Medical and Research Foundation (AMREF), an East African non-governmental organization (NGO), working together with the Government of Tanzania's Health and Education Departments. The intervention package's impact has been evaluated within a community randomised trial. The rigorous evaluation of the intervention's impact on adolescents' knowledge, reported attitudes and reported behaviours, and on biomedical outcomes, including HIV, other sexually transmitted infections (STIs), and pregnancy rates, has been carried out by the Tanzanian National Institute for Medical Research. The London School of Hygiene and Tropical Medicine has collaborated on all aspects of intervention development, implementation and evaluation. MEMA kwa Vijana as a whole has been supported by the Government of Tanzania, the European Commission, Irish Aid, the UK Department for International Development (DFID), the UK Medical Research Council (MRC), and UNAIDS. It has also involved the UK MRC Social and Public Health Sciences Unit and the Liverpool School of Tropical Medicine.

## 2. The Intervention

The MEMA kwa Vijana intervention had four major components:

1. In-school sexual and reproductive health education through a teacher-led, peer-assisted programme of participatory lessons that included the use of drama, stories and games (1999 onwards).

2. Youth-friendly reproductive health services, through education of health workers about the needs and methods of providing sexual and reproductive health services to youth (1999 onwards).

3. Community-based condom promotion and distribution, for and by youth (2000-2 only).

4. Community activities to create a supportive environment for the adolescent sexual health interventions (1999 onwards).

The randomised controlled trial was conducted in twenty communities. Each community was roughly equivalent to an administrative unit called a "ward". The intervention has been implemented in the 62 primary schools and the 18 health facilities in 10 randomly chosen intervention "communities" since January 1999 with the other ten acting comparison communities. The intervention is led by government teachers and health workers, and was explicitly designed to be affordable for the Government of Tanzania and replicable on a very large scale. Over 150 teachers, 2000 peer educators, 62 head teachers, 14 ward education co-ordinators, 10 district inspectors of schools and 70 health workers were trained during the trial phase of the project. Three teacher guides, a teacher's resource book and flip chart were developed for use in Years 5, 6 and 7 of primary school. Training and supervision manuals for teachers, class and community peer educators, health workers, youth condom promoters and distributors, and community advisory committees were also developed. All of the materials used in the intervention were further improved in the light of experience and detailed process evaluation over the past four years. Final English versions of the teacher guides and teacher's resource book are available on the programme's website (www.memakwavijana.org). The Tanzanian government approved the Swahili versions for use in primary schools; these are published and available from Ben and Co. of Dar es Salaam.

The strategy of teacher-led, peer-assisted sessions within normal school hours was developed to reduce common problems of peer-only programmes (such as misinformation, teachers or parents undermining or prohibiting the activities of the peer educators, and annual turnover of class members), while also minimising the limitations of teacher-only programmes (such as a lack of credibility of information that only comes from adult authority figures).

The Tanzanian school year runs from January to December.  In the first three years of the programme (1999-2001), checks on the pupils' exercise books showed that over 80% of the in-class sessions had been taught by October of each year. External evaluations found that the sessions were very popular both with the pupils and teachers, and annual reproductive health exams (conducted from 1999 to 2002) showed that pupils' knowledge and reported attitudes related to sexual and reproductive health had substantially improved. External evaluations were also very favourable. For example: "The curriculum is very appropriate to Tanzanian culture & sexual risks and incorporates many of the characteristics that have been identified as being effective." Doug Kirby, Education, Training, Research (ETR) Associates (2000).

From 1999 to 2002, youth reproductive health weeks were carried out annually in each of the intervention communities. These centred on inter-school competitions with a reproductive health focus, including sports, drama, song, rap and other creative arts. Over 100 STD/HIV awareness video shows per year were also held in the intervention communities during this period, and at least one Youth Health Day was conducted at each of the 18 health facilities annually. The turnout and active participation of the youth in these events was impressive. For example, over 400 youth usually attended each of health facility's Youth Health Day.

Treatment of sexually transmitted diseases has improved in all the health facilities, and a small study in 2000 using anonymous, adolescent "simulated patients" found staff in intervention health facilities were generally more youth-friendly than their colleagues in comparison communities.

Over 3,000 condoms per year were socially marketed by youth condom promoters and distributors during 2000-2. However, this intervention component was not found to be sustainable, so it was discontinued at the end of 2002.

With the exception of the youth condom promoters and distributors component, the intervention has been continued in the 10 intervention communities since it began in January 1999.

## 3. The Impact Evaluation

In late 1998, the twenty trial communities were randomly allocated either to receive the intervention immediately, or for this to be deferred. Allocation of communities was done using restricted randomisation, based on an initial population-based survey of 15-19 year-olds in the same communities.

The trial's primary outcomes were predefined as HIV incidence (2001-2) or prevalence (2007-8), and genital herpes (HSV-2) prevalence (both 2001-2 and 2007-8). Secondary outcomes included biological indicators of other sexually transmitted infections and pregnancy, and respondents' knowledge, reported attitudes, and reported sexual behaviours. The intervention's impact was assessed in 2001-2, and again in 2007-8.

### 3.1    Impact evaluation within the trial cohort, 1998 to 2002

The first of the impact evaluations took place in a cohort of 9,645 adolescents who had been recruited in late 1998. At that time, they were at least 14 years old, and were about to enter Years 5, 6 and 7 of primary school.

### 3.1.1  1998 - 2002 results

In 2001-2, the follow-up survey, which was conducted three years after the intervention had been initiated, showed that the MEMA kwa Vijana intervention had resulted in substantial, statistically significant improvements in knowledge and reported sexual attitudes in both males and females, with adjusted relative risks ranging from 1.3 to 1.8. An independent reproductive health examination that was taken by Year 7 students in trial primary schools in 2002 confirmed that knowledge had been substantially improved in intervention communities. 84% of students in intervention communities passed the exam (scored 50% or more) and 26% scored at least 80%, whereas the equivalent proportions were only 50% and <1% respectively in comparison communities.

Amongst males, the intervention had also delayed reported sexual debut (borderline statistical significance), reduced the reported number of sexual partners in the past 12 months, and increased reported condom use. In females, the only significant behavioural difference was increased reported first use of condoms during the follow-up period. This self-reported information suggested that the positive impact of the intervention was greater in males than females, and in those who had had the opportunity to receive more years of the in-school component of the intervention.

However, there was no consistent impact of the intervention on biological indicators of HIV, other STIs, and pregnancy rates. The two primary outcomes for the trial, HIV incidence and HSV-2

prevalence, were based on biological tests. By the time of the 2001-2 survey, only 45 participants in the trial cohort (5 males and 40 females) had sero-converted to HIV. After adjustment, HIV incidence in females was 25% lower in the intervention communities, but this difference was not statistically significant (aRR=0.75, CI 0.34, 1.66) (Table 2). Overall, 12% of males and 21% of females were HSV-2 seropositive at the 2001-2 survey, but there was no difference by trial arm for either males or females.

Secondary biological outcomes included TPPA seroprevalence (an indicator of lifetime exposure to syphilis); prevalence of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG); and, in females only, prevalence of Trichomonas vaginalis and pregnancy, and reported incidence of pregnancy during follow-up. There was no evidence of a protective effect of the intervention on any of these outcomes. In females, NG prevalence was higher in the intervention arm, and this difference was of borderline significance (Table 2). Given the large number of outcomes that were studied, this difference might have occurred by chance. This possibility was supported by the fact that the difference between the two trial arms was found entirely in young people who had only received one year of the in-school intervention.

There was a slight tendency for the impacts on knowledge and HIV incidence to be greater among young women who had never been married, but there was no consistent difference by marital status for any of the behavioural or other biological outcomes.

### 3.1.2  Interpretation of the 2001-2 trial results

In 2002, the MEMA kwa Vijana Trial Team advanced three possible explanations for the lack of consistent impact on biological outcomes, despite substantial differences in knowledge, reported attitudes and some reported sexual behaviours:

#### a. The intervention only changed knowledge and reported skills, but not sexual risk, at least in the short-term

· Reported behaviour is notoriously unreliable in young people and may be subject to differential reporting bias (intervention vs comparison) in the presence of an intervention. Hence, reported behaviour may reflect knowledge of desired behaviours more than actual behaviour.

· The pressures to engage in unprotected sex are very strong within many African communities. Cultural norms within the wider community, such as gender power relations, age-related power relations, and marriage and fertility norms, may mitigate against behaviour change. Also, rural young women have few avenues for material gain except through sex and marriage.

#### b. Additional intervention components were needed

· Additional interventions might be needed to achieve an impact on HIV, other STIs and pregnancy rates in the short-term. These might include:

    * Intensified mass media approaches

    * Specific interventions targeting out-of-school youth

    * Sexual health promotion interventions for the general community

    * Provision of accessible facilities for HIV counselling and testing

· However, such interventions may not be cost-effective, and delivering them in rural areas on a large scale may be very challenging.

#### c. The intervention needed more time to work

· By the time of the 2001-2 survey, 40% of the evaluation cohort had only received one year of the in-school intervention.

· The highest risk group (Year 6 at recruitment) had the least exposure to the in-school component of the intervention.

· The duration of follow-up (3 years) may have been too short to see the impact of any improvement in young men's risk-taking on biological outcomes in young women, due to the substantial differences in the average age of sexual partners.

### 3.2  2007-8 long-term evaluation survey

The 2007-8 trial survey evaluated the long-term impact of the intervention, as by that time nine consecutive school year groups had participated in the in-school component of the intervention, and the health services intervention had also been in place for 8-9 years. External evaluations conducted in 1999-2002 had found that the multi-sectoral intervention was well implemented, and achieved high coverage. Though the intervention was maintained in the 10 intervention communities after 2002 with continued support from AMREF, no such external evaluations were carried out in the trial communities after 2002. The long-term evaluation survey in 2007-8 was therefore restricted to young people who had attended at least one year of school Years 5-7 within the period from 1999-2002 inclusive.

In 2007-8, 13,814 young people were surveyed, almost twice as many as were seen in the 2001-2 survey (7,040). The median ages of the young men and women included in the 2007-8 survey were higher than for those in the 2001-2 survey, so their HIV and HSV-2 prevalences were also higher. The combination of these two factors meant that the 2007-8 survey had much greater power to detect any true differences in the two primary trial

outcomes. Furthermore, approximately 40% of the trial cohort included in the 2001-2 survey had only received one year of the in-school component of the intervention, with approximately 30% each having received 2 or 3 years, respectively. However, in the 2007-8 survey, 67% had received 3 years of the in-school component, 17% 2 years, and only 16% had received 1 year.

## 3.2.1 Results of the 2007-8 long-term evaluation survey

15,707 young people attended the survey, 13,814 of whom met the eligibility criteria for inclusion; 7,083 (51%) from intervention communities and 6,731 (49%) from comparison communities (Figure 1).

The detailed results of the 2007-8 survey are shown in Table 1, and are compared with the results from the 2001-2 survey in Table 2.

### Knowledge and reported attitudes

Correct knowledge and desirable attitude reports were higher in intervention communities than comparison communities, and these differences were all statistically significant or borderline significant, except for the "attitudes to sex" score in females (Table 1). However, these differences were not as great as those observed in the 2001-2002 survey.

### Reported sexual behaviours

Sexual debut and numbers of partners: Males in intervention communities reported sexual debut before the age of 16 years less often than males in comparison communities. Male and female intervention participants also tended to report fewer lifetime sexual partners (Table 1). These differences were of borderline statistical significance, and were consistent with what had been observed in 2001-2 (Table 2a).

Condom use: The absolute proportions of respondents who reported using condoms at last sex within the past 12 months were relatively low in both intervention and comparison communities, even when this was restricted to sex with a non-regular partner (Table 1). Reported condom use was higher in intervention communities, although this difference was only statistically significant for reported condom use with a non-regular partner among young women (Table 1).

Contraceptive use: Reported use of modern contraceptives (condoms, oral contraceptive pills, injectable contraceptives) was only assessed among young women in the 2007-8 survey. Modern contraceptive use ever and specifically at last sex were both reported more frequently by sexually active young women in intervention communities, but neither difference was statistically significant (Table 1).

Concurrency: The period prevalence of reported concurrency of sexual partnerships was assessed in two ways within the 2007-8 survey (more than one partner within the same time period in the past 12 months, and more than one partner within the past 4 weeks). Both outcomes were reported less frequently by young men in the intervention communities, but neither difference was statistically significant. The two outcomes were inconsistent and not statistically significant in young women (Table 1).

Use of health services for suspected STIs: For participants who reported STI symptoms within the past 12 months, there were no statistically significantly differences by intervention status in who reported attending a health facility for treatment (Table 1).

### Reported clinical/biological outcomes

Current genital discharge was only reported by 8% of young men and 5% of young women in the 2007-8 survey. Although reported less frequently by both young men and women in the intervention communities, these differences were not significant. Current genital ulcers were also reported less frequently by both young men and women in the intervention communities, and both differences were of borderline statistical significance (Table 1).

No consistent or statistically significant differences were seen in the various measures of the frequency of reported pregnancies (Table 1).

### Primary biological outcomes

The predefined primary outcomes of the trial were both based on biological outcomes, measured using laboratory tests on serum: HIV prevalence, and HSV-2 prevalence.

HIV: The participants' median age of 22 years in males and 21 years in females, and the large sample size meant that a substantial number of HIV cases were identified in the 2007-8 survey (133 in males, 262 in females). However, the HIV prevalence was very similar in intervention and comparison communities for both males (RR=0.91, 95%CI 0.50,1.65) and females (RR=1.07, 95%CI 0.68,1.67). The lower limit of the 95% confidence interval shows that it is extremely unlikely that the true impact of the intervention on HIV prevalence could have been greater than 50% in males or greater than 32% in females (Table 1).

HSV-2: There was no evidence of any impact on HSV-2 prevalence in either direction, with tight confidence intervals (Males: RR=0.94, 95%CI 0.77,1.15; Females: RR=0.96, 95%CI 0.87,1.06).
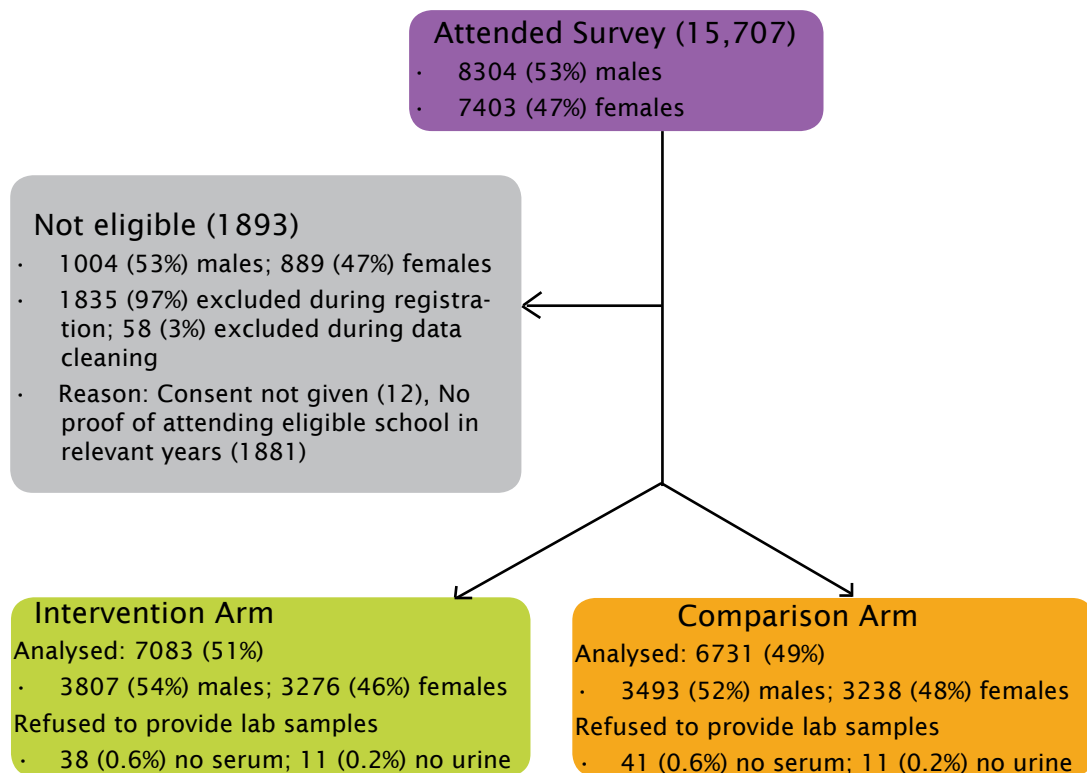
### Secondary biological outcomes

Syphilis, chlamydia, gonorrhoea: There was no evidence of any impact in either direction on syphilis (Table 1). The prevalence of CT had been slightly higher in the intervention communities

than in the comparison communities at baseline in 1998, and this difference persisted among both males and females in both 2001-2 and 2007-8, though it was not statistically significant on either occasion. The prevalence of gonorrhoea was not measured at the baseline survey in 1998. The prevalence of (unconfirmed, threshold OD>1.0)) gonorrhoea was also higher, in both males and females, in intervention communities than in comparison communities in 2001-2. In 2007-8, the prevalence of gonorrhoea (unconfirmed, but threshold OD>2.0) was higher in males and slightly lower in females, but these differences were not statistically significant.

## Interpretation of the 2007-2008 Survey Results

The 2007-8 survey investigated whether the lack of any significant beneficial impact of the intervention on the key biological outcomes seen in the 2001-2 survey was because such interventions needed more time to work. The results showed that, even when the intervention had been implemented for over 8 years, and 67% of the young people surveyed had received 3 years of the in-school intervention, there was no significant impact on either HIV or HSV-2, nor any consistent or clearly significant impact on other STIs, nor on reported pregnancy rates. However, the 2007-8 survey showed that the interventions had had a sustained beneficial impact on knowledge related to sexual health, although the impacts were less substantial in 2007-8 than in 2001-2.

## Figure 1: MEMA kwa Vijana Trial Further Survey

**Attended Survey (15,707)**
- 8304 (53%) males
- 7403 (47%) females

**Not eligible (1893)**
- 1004 (53%) males; 889 (47%) females
- 1835 (97%) excluded during registration; 58 (3%) excluded during data cleaning
- Reason: Consent not given (12), No proof of attending eligible school in relevant years (1881)

**Intervention Arm**
Analysed: 7083 (51%)
- 3807 (54%) males; 3276 (46%) females
Refused to provide lab samples
- 38 (0.6%) no serum; 11 (0.2%) no urine

**Comparison Arm**
Analysed: 6731 (49%)
- 3493 (52%) males; 3238 (48%) females
Refused to provide lab samples
- 41 (0.6%) no serum; 11 (0.2%) no urine

### Key to tables
1. Adjusted for: Age group (2001-2: <=17, 18, >=19y at 2001-2 survey) (2007-8: <21, 21-22, 23-24, >=25y at 2007-8 survey), stratum, ethnic group (Sukuma vs non-Sukuma). 2001-2 also adjusted for number of lifetime partners at baseline (0, 1, 2, >=3)
2. Among those who reported never having had sex at recruitment in 1998
3. Among those who reported having had sex at the 2001-2 survey, who had not reported ever using a condom at recruitment in 1998
4. Among those who reported having had sex at the 2001-2 survey
5. Among those who reported having had sex in past 12m
6. Among those who reported having ever had sex with a non-regular partner in past 12m
7. Among those reporting STI symptoms (genital discharge or genital ulcer) within past 12m
8. Measured in females only
9. Among those who reported never having been pregnant at recruitment in 1998
10. Modern contraceptive = condom, oral contraceptive pill, injectable contraceptives
11. Denominators vary depending on missing values and unless specified have the following ranges: Male Int: 3786-3807; Males Comp: 3473-3493; Female Int: 3256-3276; Female Comp: 3220-3238
NA  No. of cases too small to justify comparison (<10 in each group)
-   not measured
I   Intervention communities
C   Comparison communities

## Table 1. Impact of intervention on knowledge, reported attitudes, reported behaviours, and biological outcomes by sex in 2007-8

| Outcome | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | Prevalence[11] | | Adjusted RR[1] (CI) | Prevalence[11] | | Adjusted RR[1] (CI) |
| | Intervention (N=3807) n (%) | Comparison (N=3493) n (%) | | Intervention (N=3276) n (%) | Comparison (N=3238) n (%) | |
| **Knowledge (% with all 3 responses "correct")** | | | | | | |
| HIV acquisition | 2773 (73%) | 2295 (66%) | 1.11 (0.99,1.23) | 2233 (68%) | 1952 (61%) | 1.11 (1.00,1.24) |
| STD acquisition | 2056 (54%) | 1591 (46%) | 1.18 (1.04,1.34) | 1253 (38%) | 974 (30%) | 1.24 (0.97,1.58) |
| Pregnancy prevention | 3133 (83%) | 2410 (69%) | 1.19 (1.12,1.26) | 230 (71%) | 1934 (60%) | 1.17 (1.06,1.30) |
| **Reported Attitudes (% with all 3 responses "correct")** | | | | | | |
| Attitudes to sex | 1053 (28%) | 759 (22%) | 1.31 (0.97,1.77) | 359 (11%) | 332 (10%) | 1.09 (0.67,1.77) |
| **Reported Sexual Behaviour  (% with outcome)** | | | | | | |
| Age at first sex <16y | 954 (25%) | 956 (28%) | 0.91 (0.80,1.05) | 903 (28%) | 865 (27%) | 1.01 (0.80,1.28) |
| >2 (female) or >4 (male) lifetime sexual partners | 1532 (40%) | 1656 (48%) | 0.87 (0.77,0.98) | 1096 (34%) | 1191 (37%) | 0.89 (0.75,1.05) |
| >1 partner in last 12m | 1542 (41%) | 1557 (45%) | 0.92 (0.79,1.08) | 333 (10%) | 325 (10%) | 0.97 (0.76,1.23) |
| Used condom at last sex in past 12m[5] | 1021/2988 (34%) | 795/2776 (29%) | 1.19 (0.91,1.54) | 541/2832 (19%) | 407/2775 (15%) | 1.27 (0.97,1.67) |
| Used condom at last sex in past 12m with non-regular partner | 903/1821 (50%) | 760/1746 (44%) | 1.15 (0.97,1.36) | 189/427 (45%) | 136/434 (31%) | 1.34 (1.07,1.69) |
| Ever used modern contraceptive[10] | | | | 1561 (48%) | 1371 (42%) | 1.11 (0.95,1.30) |
| Used modern contraceptive at last sex[5,10] | | | | 632/2841 (22%) | 538/2796 (18%) | 1.16 (0.91,1.47) |
| >1 partner in same time period in past 12m | 1087 (29%) | 1132 (32%) | 0.90 (0.76,1.06) | 209 (6%) | 219 (7%) | 0.87 (0.63,1.20) |
| >1 partner in past 4 weeks | 435 (11%) | 464 (13%) | 0.87 (0.65,1.15) | 57 (2%) | 53 (2%) | 1.04 (0.66,1.66) |
| Went to health facility for most recent STI symptoms within past 12m[7] | 192/401 (48%) | 195/451 (43%) | 1.19 (0.91,1.56) | 102/216 (47%) | 154/326 (47%) | 1.02 (0.77,1.37) |
| **Reported clinical / biological outcomes** | | | | | | |
| Genital discharge prevalence | 288 (8%) | 320 (9%) | 0.83 (0.63,1.09) | 122 (4%) | 178 (6%) | 0.70 (0.45,1.09) |
| Genital ulcer prevalence | 193 (5%) | 245 (7%) | 0.76 (0.59,0.99) | 149 (5%) | 216 (7%) | 0.69 (0.47,1.01) |
| >2 reported pregnancy (lifetime) | | | | 587 (18%) | 605 (19%) | 0.96 (0.80,1.15) |
| Reported pregnancy while in primary school | | | | 102 (3%) | 91 (3%) | 1.16 (0.68,1.97) |
| Reported>=1 unplanned pregnancy | | | | 792 (25%) | 759 (24%) | 1.03 (0.83,1.26) |
| **Primary biological outcomes** | | | | | | |
| HIV prevalence | 74 (2.0%) | 59 (1.7%) | 0.91 (0.50,1.65) | 126 (3.9%) | 136 (4.2%) | 1.07 (0.68,1.67) |
| HSV-2 prevalence | 948 (25%) | 928 (26.7%) | 0.94 (0.77,1.15) | 1313 (40.3%) | 1369 (42.5%) | 0.96 (0.87,1.06) |
| **Secondary biological outcomes** | | | | | | |
| "Lifetime" syphilis exposure (TPPA+) | 218 (5.8%) | 183 (5.3%) | 1.06 (0.74,1.52) | 206 (6.3%) | 241 (7.5%) | 0.86 (0.62,1.21) |
| Active syphilis prevalence (TPPA+, RPR+) | 144 (3.8%) | 113 (3.3%) | 1.11 (0.72,1.72) | 147 (4.5%) | 167 (5.2%) | 0.91 (0.65,1.28) |
| Chlamydia prevalence | 80 (2.1%) | 73 (2.1%) | 1.24 (0.66,2.33) | 85 (2.6%) | 69 (2.1%) | 1.27 (0.87,1.86) |
| Gonorrhoea prevalence (OD>=2.0) | 25 (0.7%) | 22 (0.6%) | 1.28 (0.63,2.60) | 29 (0.9%) | 23 (0.7%) | 0.91 (0.49,1.70) |

## Table 2. Impact of intervention by sex in 2001/2 vs 2007/8

| Outcome | Male | | | | | | Female | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2001-2 | | | 2007-8 | | | 2001-2 | | | 2007-8 | | |
| | I | C | Adjusted RR[1] (95% CI) | I | C | Adjusted RR[1] (95% CI) | I | C | Adjusted RR[1] (95% CI) | I | C | Adjusted RR[1] (95% CI) |
| **Knowledge** (% with all 3 responses "Correct") | | | | | | | | | | | | |
| HIV acquisition | 65% | 45% | 1.44 (1.25,1.67) | 78% | 66% | 1.11 (0.99,1.23) | 58% | 40% | 1.41 (1.14,1.75) | 68% | 61% | 1.11 (1.00,1.24) |
| STD acquisition | 52% | 40% | 1.28 (1.07,0.54) | 54% | 46% | 1.18 (1.04,1.34) | 36% | 25% | 1.41 (1.06,1.88) | 38% | 30% | 1.24 (0.97,1.58) |
| Pregnancy prevention | 84% | 50% | 1.66 (1.55,1.78) | 83% | 69% | 1.19 (1.12,1.26) | 72% | 46% | 1.58 (1.26,1.99) | 71% | 60% | 1.17 (1.06,1.29) |
| **Reported Attitudes** (% with all 3 responses "correct") | | | | | | | | | | | | |
| Attitudes to sex | 22% | 12% | 1.77 (1.42,2.22) | 28% | 22% | 1.31 (0.97,1.77) | 27% | 19% | 1.42 (1.11,1.81) | 11% | 10% | 1.09 (0.67,1.77) |
| **Reported Sexual Behaviour** (% with outcome) | | | | | | | | | | | | |
| Sexual debut during follow-up[2] | 60% | 72% | 0.84 (0.71,1.01) | | | - | 68% | 67% | 1.03 (0.91,1.16) | | | - |
| Age at first sex <16y | | | - | 25% | 28% | 0.91 (0.80,1.05) | | | - | 28% | 27% | 1.01 (0.80,1.28) |
| >2 (female) or >4 (male) lifetime sexual partners | | | - | 40% | 48% | 0.87 (0.77,0.98) | | | - | 34% | 37% | 0.89 (0.75,1.05) |
| >1 partner in last 12 months | 19% | 28% | 0.69 (0.49,0.95) | 41% | 45% | 0.92 (0.79,1.08) | 9% | 8% | 1.04 (0.58,1.89) | 10% | 10% | 0.96 (0.75,1.22) |
| First used condom during follow-up[3] | 39% | 28% | 1.41 (1.15,1.73) | | | - | 38% | 28% | 1.30 (1.03,1.63) | | | - |
| Used condom at last sex[4] | 29% | 20% | 1.47 (1.12,1.93) | | | - | 27% | 22% | 1.12 (0.85,1.48) | | | - |
| Used condom at last sex in past 12m[5] | | | - | 34% | 29% | 1.19 (0.91,1.54) | | | - | 19% | 15% | 1.27 (0.97,1.67) |
| Used condom at last sex in past 12m with non-regular partner[6] | | | - | 50% | 44% | 1.15 (0.97,1.36) | | | - | 45% | 31% | 1.34 (1.07,1.69) |
| Went to health facility for most recent STI symptoms within past 12m[7] | 29% | 35% | 0.84 (0.50,1.41) | 48% | 43% | 1.19 (0.91,1.56) | 36% | 34% | 1.02 (0.62,1.70) | 47% | 47% | 1.02 (0.77,1.37) |
| **Primary biological outcomes** | | | | | | | | | | | | |
| HIV incidence (/1,000py) | 0.43 | 0.30 | NA | | | - | 3.2 | 4.7 | 0.75 (0.34,1.66) | | | - |
| HIV prevalence | | | - | 2.0% | 1.7% | 0.91 (0.50,1.65) | | | - | 3.9% | 4.2% | 1.07 (0.68,1.67) |
| HSV-2 prevalence | 11.3% | 12.5% | 0.92 (0.69,1.22) | 25% | 26.7% | 0.94 (0.77,1.15) | 21.3% | 20.8% | 1.05 (0.83,1.32) | 40.3% | 42.5% | 0.96 (0.86,1.06) |
| **Secondary biological outcomes** | | | | | | | | | | | | |
| 'Lifetime' syphilis exposure (TPPA+) | 1.4% | 1.8% | 0.78 (0.46,1.30) | 5.8% | 5.3% | 1.06 (0.74,1.52) | 3.3% | 3.6% | 0.99 (0.67,1.46) | 6.3% | 7.5% | 0.86 (0.62,1.21) |
| Active syphilis prevalence (TPPA+, RPR+) | | | - | 3.8% | 3.3% | 1.11 (0.72,1.72) | | | - | 4.5% | 5.2% | 0.91 (0.65,1.28) |
| Chlamydia prevalence | 0.5% | 0.5% | 1.14 (0.53,2.43) | 2.1% | 2.1% | 1.24 (0.66,2.33) | 4.9% | 3.6% | 1.37 (0.98,1.91) | 2.6% | 2.1% | 1.27 (0.87,1.86) |
| Gonorrhoea prevalence (OD>=2.0) | 0.4% | 0.1% | NA | 0.7% | 0.6% | 1.28 (0.63,2.60) | 2.4% | 1.2% | 1.93 (1.01,3.71) | 0.9% | 0.7% | 0.91 (0.49,1.70) |
| Trichomonas prevalence[8] | | | - | | | - | 28.6% | 25.8% | 1.13 (0.92,1.37) | | | - |
| Pregnancy (test) prevalence[8] | | | - | | | - | 19.2% | 18.0% | 1.09 (0.85,1.40) | | | - |
| **Reported clinical / biological outcomes** | | | | | | | | | | | | |
| Genital discharge prevalence | | | - | 8% | 9% | 0.83 (0.63,1.09) | | | - | 4% | 6% | 0.70 (0.45,1.09) |
| Genital ulcer prevalence | | | - | 5% | 7% | 0.76 (0.59,0.99) | | | - | 5% | 7% | 0.69 (0.47,1.01) |
| Reported pregnancy during follow-up[8, 9] | | | - | | | - | 46.9% | 45.5% | 1.03 (0.89,1.20) | | | - |
| >2 reported pregnancy (lifetime) | | | - | | | - | | | - | 18% | 19% | 0.96 (0.80,1.15) |
| Reported pregnancy while in primary school | | | - | | | - | | | - | 3% | 3% | 1.16 (0.68,1.97) |
| Reported >=1 unplanned pregnancy | | | - | | | - | | | - | 25% | 24% | 1.03 (0.83,1.26) |
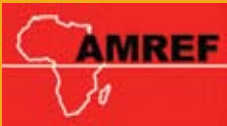
## 4. Conclusions

4.1      The MEMA kwa Vijana trial has shown that a local African NGO and existing government health and education staff can successfully implement an intensive, innovative adolescent sexual health programme on a large scale.  The trial has also shown this intervention caused substantial improvements in knowledge, reported attitudes, and some reported sexual risk behaviours in the short-to-medium term. Significant benefits in knowledge were still present after 8 years of intervention implementation, among a group of young people who had, on average, last had exposure to the in-school intervention 5.4 years prior to the survey.

4.2      However, in rural Tanzania this carefully designed, implemented and monitored intervention did not result in any significant impact on HIV or genital herpes (HSV-2) among the young people exposed to the intervention, either after 3 years or after 8 years of implementation.

## 5. Implications for further research

5.1      Effective ways of preventing HIV, STIs, and unwanted pregnancies in young people are urgently needed, and research to develop and evaluate such interventions should remain a high priority.

5.2      Positive changes in knowledge, attitudes and reported behaviours do not always lead to a positive impact on HIV, STDs and unwanted pregnancies. Exercise considerable caution when drawing conclusions about the effectiveness of adolescent sexual and reproductive health interventions if biological outcome data are not available.

5.3      More work is needed to explore:
- Whether alternative interventions among young people can be more effective, and cost-effective
- How to design and implement effective interventions for changing population norms related to sexual risk behaviours
- Whether there is a cost-effective combination of prevention methods that will result in reducing the incidence of HIV in young people
- What factors were important in changing population norms, sexual behaviour and in reducing HIV incidence in African countries where this has occurred, such as Uganda, Zimbabwe and Ethiopia

## 6. Implications for policy

6.1      Interventions such as MEMA kwa Vijana can increase young people's knowledge about HIV, STIs and pregnancy prevention, which is important. However, these interventions on their own will not be sufficient to reduce HIV and other STIs in young people in sub-Saharan Africa. Additional efforts need to be made to achieve this, perhaps through efforts to successfully change population norms more generally.

6.2      In order to reduce HIV incidence among young people in sub-Saharan Africa, additional efforts are needed to:

- Increase young people's access to effective HIV prevention interventions including condoms, male circumcision, early STD treatment and HIV testing and counselling, and clean injecting services for IV drug users

- Design, implement and rigorously evaluate interventions to change population norms related to sexual risk behaviours among adults as well as young people, with support from strong political leadership

- Address structural (societal) issues, such as gender inequality, that are drivers of the HIV epidemic

For more information on this, or any other details concerning MEMA kwa Vijana, please visit

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