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*ORIGINAL ARTICLES*

## Trends in reproductive health knowledge following a health education intervention among adolescents in Zimbabwe

*S RUSAKANIKO, *MT MBIZVO, *J KASULE, *V GUPTA, **SN KINOTI, **W MPANJU-SHUMBUSHU, ***J SEBINA-ZZIWA, ***R MWATEBA, ***J PADAYACHY

***Background:*** Unwanted teenage pregnancy, sexually transmitted infections and the attendant morbidity and mortality necessitate the need for understanding factors influencing adolescent sexuality and the implementation of programmes designed to improve their knowledge, reproductive behaviour, sexual and reproductive health.
***Objective:*** To determine the impact of an intervention package on knowledge levels of various reproductive health issues through trend analysis.
***Design:*** Randomized controlled trial of a health education intervention in schools stratified for representativeness.
***Setting:*** Rural and urban secondary schools in Zimbabwe.
***Subjects:*** 1 689 students recruited from 11 secondary schools in Mashonaland Central.
***Main Outcome Measure:*** Knowledge level before and after intervention.
***Results:*** The demographic characteristics of the pupils at baseline, five months and nine months were comparable between the two groups.There was an overall increase in knowledge on menstruation. Students from the intervention schools were more likely to have correct knowledge over time on aspects of reproductive biology. A significant linear trend ($p = 0.017$) was observed in the area of family planning and contraception. A linear decreasing trend ($p = 0.001$) was observed on pregnancy risk. Though not significantly linear, the general trend of knowledge levels in all the areas of reproductive health, pregnancy risk, STDs and HIV/AIDS showed an upward trend, from 20% to 96%. Worth noting was that in all the areas the intervention group had knowledge above that in the control group.
***Conclusion:*** The reproductive health education intervention had an impact on aspects of reproductive biology and contraception as measured by the increased scoring at follow up when comparing intervention and control schools. The overall findings point to the need for early school based reproductive health education programmes incooperating correct information on reproductive biology and the prevention of subsequent reproductive morbidity by imparting information on non-risk behaviour during the early developmental years.

### Introduction

The question of what young people do and don't do and why, where and with whom is influenced not only by their age and sex, but also their knowledge, attitude and self esteem. Appropriate mechanisms for the youth to be educated about self protection from adverse reproductive outcomes are limited. Generally adolescents are ill-informed on how to cope and deal with sexual feelings. As a result they lack the knowledge that empowers them to make informed decisions on sexual

*Department of Obstetrics and Gynaecology
University of Zimbabwe
PO Box A178, Avondale
Harare, Zimbabwe
Fax 263-4-791995
**Reproductive Health Research Programme
Commonwealth Regional Health Secretariat
PO Box 1009
Arusha, Tanzania

***Teenage Reproductive Health Project Group of East, Central and Southern Africa

Correspondence to:
Prof MT Mbizvo

Supported by The Commonwealth Regional Health Community Secretariat, for East, Central and Southern Africa

and reproductive health matters. There is a great lack of health education on various aspects of reproductive health. This in turn places them at risk of early unsafe sex. The major determinants of increased prevalence of teenage pregnancy and abortion could be centred on their inability to negotiate for abstinence, poor knowledge of contraception, improper and inconsistent use of condoms.

Stout *et al*[1] found that the goals of sexual health education today were hampered by the failure to include knowledge on topics related to sexuality including STDs, pregnancy, abortion, contraception including menstrual cycle; values clarification including dating, sex, marriage, drugs and alcohol; decision making, (self image, self esteem and self efficacy) and communication skills. Despite the problems related to adolescent sexuality in most developing countries and sub-Saharan Africa today, not many studies have advocated or shown the impact of school based reproductive biology education.

The effect of modernization has been seen through the traditional family and community social proscriptions on sexuality in youth which is rapidly disappearing. A number of studies in Africa show that girls are starting coitus at very young ages[2] and adolescent sexual activity is on the increase.[3]

Unplanned pregnancies among teenagers can be attributed to lack of knowledge on reproductive biology[4] and inadequate reproductive health services that are targeted at teenagers. Needless to say, reproductive health issues of adolescents deserve special attention. This should be seen and influenced positively, within their perspective, their social and cultural context. Thus, lack of coordinated provision of education, information and counselling services on reproductive health for teenagers could be leaving them vulnerable to ill-informed peer pressure and media misinformation.

The present study was aimed at providing a health education, information and counselling intervention on aspects of reproductive health including contraception among teenage pupils drawn from selected schools in Zimbabwe. The impact of the intervention was evaluated through measuring trends in knowledge overtime.

## Materials and Methods

**Study design.**

A randomized controlled study was undertaken among secondary school pupils in rural and urban areas of Zimbabwe. The schools in each area were purposively selected to include the types of institutions in Zimbabwe which are made up of boys only, girls only, co-education, boarding and day schools.

The students were distributed proportionally according to the rural and urban population distribution (1992 National Census). The majority of the schools were rural based. Thus, of the estimated sample size, two thirds were drawn from the rural based schools and the other one third from the urban schools. Three schools (one urban area and two rural) were chosen to serve as controls.

**Sampling and Population.**

About 30 students were randomly selected from each form at each school to come up with a sample of approximately 180 from each rural school and 120 from each urban school (20 students per class). Systematic sampling was used to select pupils at each school and the questionnaire was administered if the students were willing to participate. The sampling frame was forms one to six in each case. One Catholic school and two Salvation army schools were included in the study. The Catholic schools do not promote sexual health, but of late sexual health education in schools has been trigered by some NGOs. Thus, there is minimal bias that is introduced by religion and hence the results.

**Intervention package.**

Following collection of baseline information, a health education intervention programme was developed and implemented. The intervention package included lectures, videos and IEC materials in the form of leaflets and pamphlets which covered the main areas of:

1. Male reproductive function, sexuality, STDs and AIDS.
2. Female reproductive function, anatomy and STDs
3. Human sexuality and responsible sexual behaviour.
4. Unwanted/unplanned pregnancy and contraception.

Posters were given to teachers at each school, who decided on where they could be located. The lectures covered areas of reproductive biology; STD/HIV; unwanted pregnancy and contraception; human sexuality and responsible behaviour.

**Data analysis and management.**

The main outcome variables analyzed were trends in knowledge level in the areas of reproductive biology, family planning, STD and HIV/AIDs. For the four areas scores were used for correctness of responses. For each of the knowledge levels, each variable that contributed to the knowledge was scored as one if the student had correct knowledge and zero otherwise. Proportions of students with knowledge were computed and compared between the two groups.

All data were entered into Epi Info files and Epi Info statistical software was used to analyze the data. The chi-square test for trend was used to test the trend in knowledge gains over the three time periods following the interventions between the two groups.

## Results

**Background.**

A total of 1 689, 1 605 and 1 589 pupils participated in the study at baseline , five months and nine months follow up respectively. Of the 1 689 who participated at baseline, 1 159 (68.7%) were randomly allocated to the intervention schools and 530 (31.3%) to the control schools. There were 817 (48.4%) males and 856 females who participated at baseline. The mean age of study population at baseline was 13.5±1.3 years (mean±SD) and that at first post intervention was 14.5±7.8 years. The distribution of the pupils by socio-demographic characteristics at baseline, five months and nine months is shown in Table I.

The reported mean age at which menarche took place for the whole female study population at baseline was 13.5±1.3 years, and that at which boys reported experiencing wet dreams was 14.5±7.8 years.

**Reproductive Biology and Sexual Behaviour.**

Pupils were asked if menstruation meant blood coming out of the vagina in monthly cycles or from other areas. Overall, 86.5% correctly knew about menstruation. There was an

*Table I: Social demographic characteristics of study population at baseline, five months and nine months.*

| Characteristic | Baseline Total = 1 673 % | 5 Months Total 1 568 % | 9 Months Total 1 589 % |
|---|---|---|---|
| **Age (years) mean (SD)** | 13.5 (1.3) | 14.5 (7.8) | 14.4 (5.4) |
| **Sex** | | | |
| Male | 48.4 | 49.3 | 51.3 |
| Female | 50.7 | 48.3 | 48.3 |
| Unknown | 0.9 | 1.4 | 0.4 |
| **Education (Form)** | | | |
| 1 | 17.1 | 19.8 | 1.1 |
| 2 | 21.1 | 20.4 | 14.9 |
| 3 | 20.6 | 23.7 | 34.6 |
| 4 | 21.1 | 17.8 | 27.5 |
| 5 and 6 | 11.4 | 8.3 | 19.0 |
| Unknown | 8.8 | 6.0 | 2.9 |
| **School Status** | | | |
| Intervention | 68.6 | 68.7 | 67.4 |
| Control | 31.4 | 31.3 | 32.6 |
| **Location** | | | |
| Rural schools | 59.3 | 60.4 | 61.4 |
| Urban schools | 40.7 | 39.6 | 38.6 |

overall increase in knowledge on family planning following intervention for the three time periods and a decrease at nine months for the non-intervention schools (Figure I). On the issue of menstrual practice, wet dreams, FP methods and contraception there was an increase in knowledge overtime. Knowledge of newer family planning methods such as subdermal implants was higher in the intervention group.

On assessing whether there is a linear trend in knowledge gains in this area Table II shows the overall knowledge trends in the intervention and control schools on reproductive biology and family planning.

From the table a significant linear trend was only observed in the area of FP and contraception.

**Pregnancy Knowledge.**

Knowledge on pregnancy was generally high at baseline but decreased with time. Knowledge increases were observed on relating ability of adolescents to make girls pregnant and pregnancy at first sexual encounter. Table III shows the knowledge trends following interventions. A significant linear decreasing trend was observed on pregnancy ($p = 0.001$). In the other two there was no linear trend but an upward trend was experienced.

**STDS Knowledge.**

The overall knowledge on STDs at baseline was very low in both groups, but increased with time especially in the intervention schools (Figure II). Table IV shows the knowledge trends in the area of STDs. There was no significant linear trend in knowledge observed in all the areas but an upward trend was apparent.

There was a well pronounced trend in both groups on the STD symptoms (Figure III), with the intervention group having higher knowledge at all the three time points.

**HIV/AIDS Knowledge.**

The overall knowledge of HIV/AIDs was generally high (96%) at baseline but following intervention there was some decrease in knowledge level at five months (Table V). On the other hand though not significantly linear, there was an upward trend in knowledge of symptoms associated with HIV transmission and knowledge of whether a healthy looking person can carry HIV. While both groups showed similar trends, they were more pronounced in the intervention groups.

*Figure I: Trends in knowledge of family planning methods by intervention status.*

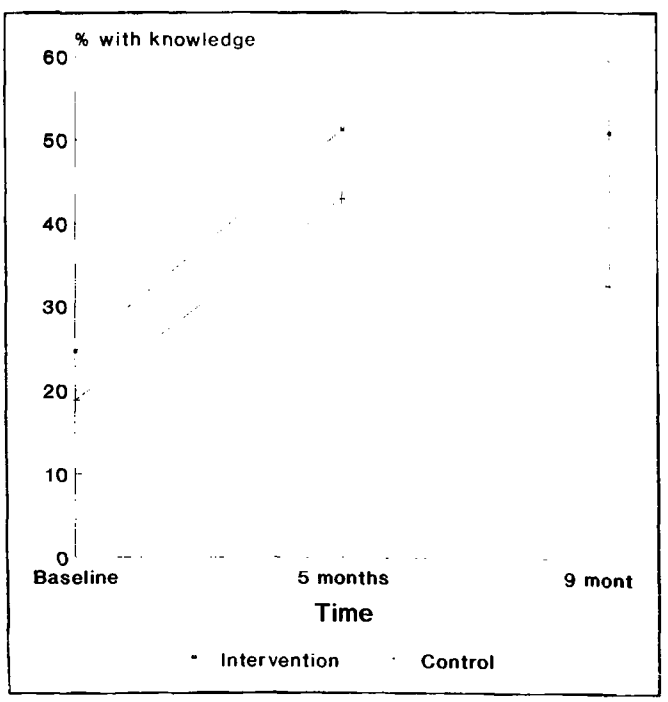



*Figure II: Trends in knowledge of STDs intervention status.*

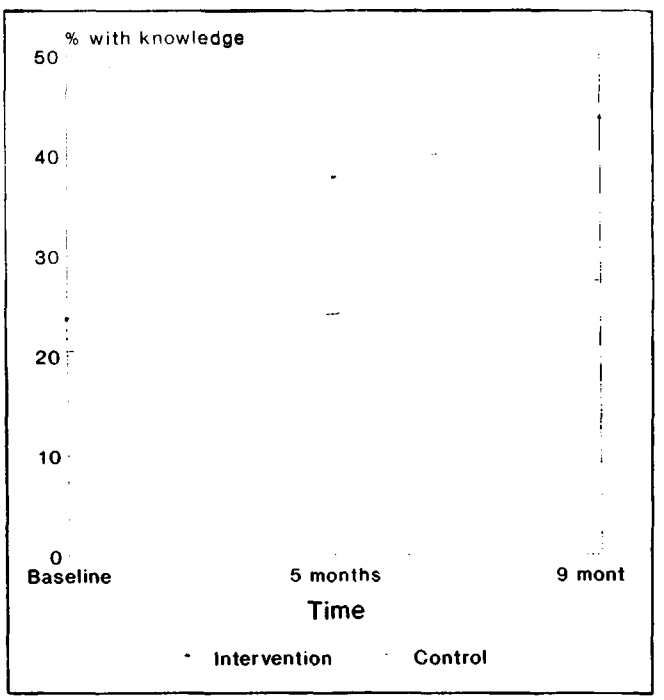
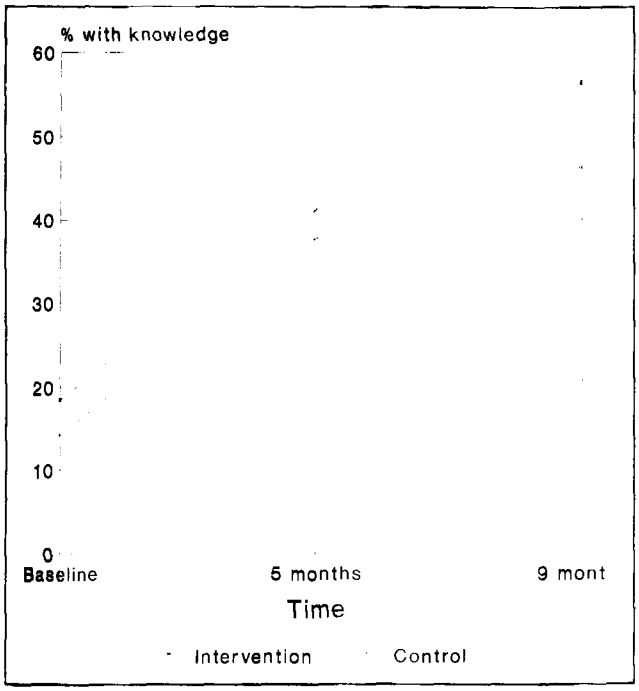


*Figure III: Trends in knowledge of STDs symptoms by intervention status.*




## Discussion

The health education intervention had a significant impact on aspects of reproductive biology and contraception as measured by the increased knowledge score at follow up when comparing intervention and control schools.

Pupils from intervention schools were more likely to understand the meaning of menstruation and wet dreams and to know that this onset heralded important pubertal changes associated with the risk of pregnancy. This trend was sustained with health education intervention. Although more pupils were likely to know that puberty ushered biological changes in girls that included menarche, fewer students knew about wet dreams in boys and its association with the likelihood of boys being able to make girls pregnant. Thus, more information on changes that take place in boys needs to be emphasized. There is need for both teachers and parents to communicate with their adolescent children on the various aspects of reproductive biology such as menstruation and wet dreams. This will help in reinforcing long term sustainability of information.

Few pupils had correct information on when a girl was most likely to get pregnant during a menstrual cycle, although the health education intervention had a significant impact on

*Table II: Trends in knowledge of reproductive health and family planning by intervention status.*

| Variable | Baseline | | 5 Months | | 9 Months | | | |
|---|---|---|---|---|---|---|---|---|
| | Inter. Total = 1 159 % | Control Total = 530 % | Inter. Total = 1 103 % | Control Total = 502 % | Inter. Total = 1 071 % | Control Total = 518 % | $x^2$ | p |
| Menstruation | 86.5 | 87.2 | 91.3 | 70.1 | 98.0 | 96.2 | 0.21 | 0.651 |
| Menstrual practice | 79.5 | 81.3 | 98.0 | 96.0 | 97.6 | 95.0 | 0.04 | 0.839 |
| Wet dreams | 73.1 | 80.0 | 84.8 | 81.3 | 97.9 | 95.8 | 0.58 | 0.446 |
| Family planning methods | 24.6 | 18.8 | 51.4 | 43.1 | 51.2 | 32.8 | 1.25 | 0.263 |
| Family planning and contraception | 54.9 | 42.5 | 88.5 | 87.6 | 94.3 | 88.6 | 5.67 | 0.017 |

*Inter. = Intervention.*

*Table III: Trends in knowledge of pregnancy by intervention status.*

| Variable | Baseline | | 5 Months | | 9 Months | | | |
|---|---|---|---|---|---|---|---|---|
| | Inter. Total = 1 159 % | Control Total = 530 % | Inter. Total = 1 103 % | Control Total = 502 % | Inter. Total = 1 071 % | Control Total = 518 % | $x^2$ | p |
| Pregnancy | 83.7 | 88.5 | 31.6 | 33.5 | 37.5 | 24.9 | 10.42 | 0.001 |
| Ability of adolescents to make girls pregnant | 95.9 | 93.4 | 96.2 | 94.0 | 97.9 | 95.8 | 0.61 | 0.434 |
| Pregnancy at first sex encounter | 80.1 | 75.1 | 87.0 | 83.1 | 97.8 | 94.6 | 1.20 | 0.272 |

*Inter. = Intervention.*

*Table IV: Trends in knowledge of STDs by intervention status.*

| Variable | Baseline Inter. Total = 1 159 % | Baseline Control Total = 530 % | 5 Months Inter. Total = 1 103 % | 5 Months Control Total = 502 % | 9 Months Inter. Total = 1 071 % | 9 Months Control Total = 518 % | $x^2$ | p |
|---|---|---|---|---|---|---|---|---|
| Overall knowledge on STDs | 23.6 | 20.4 | 37.8 | 50.2 | 43.6 | 27.4 | 2.51 | 0.114 |
| Knowledge on symptoms | 18.5 | 14.2 | 41.1 | 37.7 | 56.4 | 46.3 | 0.281 | 0.596 |
| Knowledge on outcomes of failure to treat STDs | 17.7 | 10.5 | 26.6 | 16.4 | 40.2 | 22.6 | 0.005 | 0.942 |
| Knowledge STDs that cannot be cured | 89.8 | 84.5 | 78.3 | 73.7 | 82.4 | 74.5 | 0.03 | 0.856 |

***Inter. = Intervention.***

*Table V: Trends in knowledge of HIV/AIDS Transmission by Intervention Status.*

| Variable | Baseline Inter. Total = 1 159 % | Baseline Control Total = 530 % | 5 Months Inter. Total = 1 103 % | 5 Months Control Total = 502 % | 9 Months Inter. Total = 1 071 % | 9 Months Control Total = 518 % | $x^2$ | p |
|---|---|---|---|---|---|---|---|---|
| Knowledge of HIV transmission | 96.0 | 91.2 | 70.9 | 72.9 | 73.6 | 68.5 | 0.26 | 0.607 |
| Knowledge of symptoms associated with HIV infection | 53.7 | 48.6 | 64.3 | 64.3 | 74.4 | 64.3 | 0.00 | 0.996 |
| Knowledge of a healthy looking person carrying HIV/AIDS virus | 79.9 | 73.4 | 80.3 | 78.5 | 85.4 | 78.2 | 0.38 | 0.539 |

*Inter. = Intervention.*

knowledge level in the younger and still less educated pupils. The reported current contraceptive use among sexually active teenage pupils in the present study was higher than that reported in an earlier survey of young adults by Boohene and others[6] in Harare. Logistic regression analysis of the Gambia survey[7] showed that attendance at family life education lectures in school had a significant relationship with both knowledge and use of contraceptives.

In the present study, pupils who reported that they were sexually active and did not use family planning said this was because they did not appreciate the possibility of falling pregnant. They also had little knowledge of both reproductive biology and contraception.

The present findings show that health education in schools has an impact on knowledge and positive trends of knowledge on reproductive health, STDs and HIV/AIDS have been experienced. The only statistically significant change was in knowledge of family planning and contraception. This study has indicated important findings that most health promotional campaigns show little or no change in knowledge, attitudes and behaviour. Although such a knowledge level often increases with age, there was no significantly increased knowledge level correlated with age, and when such levels were adjusted for age, they remained significantly higher following the health education intervention. On some aspects of reproductive biology, knowledge levels also increased, but not significantly, in non-intervention control schools. This could be attributed to the sensitization of teachers and the school system on the need for a study addressing reproductive health knowledge, as well as religion. Overall, however, the benefits and the favourable position of schools as a medium for reproductive health education in this socio-cultural setting, in light of present risks, was demonstrated. The burden of reproductive ill health demands that health education programmes that target the adolescent be promoted early.

Teachers could also be adequately trained in reproductive health science in order to impart, within the family life education programme, an effective intervention. Such strategies should counter the pressure on adolescents to become sexually active or to be placed at risk, which comes from both the media and peers. Governments are also encouraged to come up with policies aimed at increasing awareness of reproductive biology and potential risks from mis-information and poor behaviour.

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