Socio-Demographic Determinants of Condom Use Among Sexually Active Young Adults in Rural KwaZulu-Natal, South Africa

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Abstract: *Aim:* To investigate patterns, levels and socio-demographic determinants of condom use and consistency of use among young adults aged 15-24 years.

Background: Condoms are known to prevent HIV infection. However, HIV prevalence and incidence remain high.

Methods: This study was conducted in the Africa Centre Demographic Surveillance Area (ACDSA) in rural KwaZulu-Natal. Analysis focused on resident young adults aged 15-24 years in 2005. In univariable and multivariable analyses, determinants of condom use and consistency of use among 15-24 year olds were estimated using data collected in 2005. 'Ever' condom use was defined as the proportion who reported having used a condom; consistent use among those ever using as "*always*" using condoms with most recent partner in the last year.

Results: 3,914 participants aged 15-24 years reported ever having sex, of whom 52% reported condom use. Adjusting for age, sex, number of partners, residence of partner, partner age difference, type of partner and socio-economic status (SES), having an older partner decreased likelihood (aOR=0.69, p<0.01), while belonging to a household in a higher SES increased likelihood of ever using condoms (aOR=1.82, p<0.01). Being female (aOR=0.61 p<0.01) and having a regular partner (aOR=0.65 p<0.01) were independently associated with low consistent condom use.

Conclusions: In this rural South African setting, condom use remains low, especially among females and with an older partner, situations commonly associated with increased HIV acquisition. Targeted supportive interventions to increase condom use need to be developed if HIV prevention programmes are to be successful.

BACKGROUND

In 2005, approximately 40% of pregnant women in KwaZulu-Natal, South Africa, were living with HIV [1]; in a general population of adult residents in rural KwaZulu Natal, the overall HIV prevalence was 27% among 15-50 year old females and 14% in 15-54 year old males [2], with incidence remaining high [3]. Rates peaked in the young adult ages [4]. Although health education information messaging regarding condom use is widespread and disseminated by health care providers, the media and other sources [5], the uptake of such messages is not usually evaluated. Condoms are known to be effective in preventing HIV infection if used consistently [6], and are currently one of the main prevention approaches. It is thus particularly important to identify factors associated with ever condom use [6-8] and to understand young adults' sexual behaviour and factors that influence their use of condoms [8-10].

In South Africa, injectable hormonal contraception is popular, [11, 12] which, although effective against pregnancy, does not prevent HIV acquisition. The South African Demographic Health Survey (SADHS) found that in 2003 [13], 63% of sexually active women in rural areas aged 15-49 years were currently using a modern method of family planning, with injectables being the most popular contra-ceptive method, with 38% of women reporting current use at the time of the survey. There continues to exist a risk of HIV acquisition in relations if either or both partners are not faithful or if HIV is brought into the start of a new relationship. This means that although non-barrier contra-ception use confers women protection against pregnancy, dual protection with condoms - against both pregnancy and HIV, is still required. Additional condom use is difficult to explain in settings of high hormonal contraceptive use. Knowledge about condoms and HIV prevention [14, 15] are high among young adults but general perception of risk to infection and vulnerability is low despite high HIV rates.

Several factors affect young adults' correct and consistent use of condoms. In Angola among 15-24 year olds, consistent condom use was positively associated with higher levels of education, with belief that condoms did not diminish sexual pleasure, believing that condoms were safe (among males) and having multiple partners (among males) and negatively associated with being married or being in a cohabiting relationship, and equating condom use with lack of trust (among females) [16]. Other external factors that could influence condom use are accessibility to health facilities, reliable and correct reproductive health information, operating hours and issues of confidentiality [17] and availability of condoms. Type of sexual partner, whether casual or regular, and socio-economic status of the family to which the young adult belongs, have been found to

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influence condom use [18, 19]. Such information is important in planning and providing correct information messaging to prevent acquisition of HIV infection among young people.

The aim of this study was to determine levels and patterns of, and the socio-demographic factors associated with, condom use among young adults aged 15-24 years in a largely rural demographic surveillance site in northern KwaZulu-Natal.

MATERIALS AND METHODS

Data

Data for this analysis came from the Africa Centre Demographic Information System (ACDIS) [20, 21]. Approximately 11,000 households, with a total population of about 90,000 resident and non-resident members, are surveyed bi-annually; routine demographic information is collected on births, deaths, migrations and pregnancies [22]. Since 2003, an annual HIV and sexual behaviour surveillance has also been conducted on resident females aged 15-49 and males aged 15-54 years old [2, 20]. The analysis presented here focuses on data collected in the 2005 HIV and sexual behaviour surveillance round from household members resident in the study area; who were aged between 15-24 years on the 1st of January 2005 and reported ever having had sex. The HIV and sexual behaviour surveillance survey is conducted by a pair (one male and one female fieldworker to facilitate same sex interviews) of trained fieldworkers who administer structured questionnaires to respondents. A possible limitation in this study is reporter bias with condom use and sexual activity self-reported. It is also influenced by the person who administers the interview and social desirability of condom use.

The outcome variables were 'ever' condom use and the consistency of condom use (*"Have you and your partner ever used a condom? (IF YES) How often do you use condoms?"*). Condom use was defined as ever having used a condom with the most recent partner in the last year. In those who reported to have used condoms, consistent use was defined as "*always*" using condoms; inconsistent was defined as "*sometimes*" using condoms with the most recent partner in the last year. Explanatory variables considered were: age, sex, type of partner, highest educational level reached, household assets (socio-economic status, SES), number of sexual partners in the last year, residence of the most recent partner, age difference with partner (older, younger, same age) and HIV status [16-19]. Number of sexual partners in the last year was categorized to "one partner" and "more than one partner".

Type of partner was characterized by regular partner, defined as "current regular partner, current wife, or current husband" or a casual partner "former husband/partner, former wife/partner, visitor, or casual friend". A partner was only considered "older" if they were one year or more than the respondent and "younger" if they were a year or more *less* than the respondent; otherwise they were considered to be the same age *(Is s/he older, younger or about the same age? (IF OLDER/YOUNGER) About how many years*

[older/younger]?). To calculate the median age difference of partners, a positive sign was assigned to the reported number of years for those who responded they had an older partner and a negative sign to the reported number of years of those who reported having a younger partner and a zero to those who reported an age difference of less than twelve months in either direction (same age partners).

Household economic information is collected annually in the household survey including housing structure, sources of energy and amenities; government grants for household members; household assets; livestock and land ownership; education and employment of household members. Other available proxy measures of SES were whether the household had access to piped water and electricity, and toilet type [4, 20, 21].

Analysis

Age data was initially assessed as a categorical variable: 15-17; 18-20 and 21-24 year age groups; dividing the population into approximately equal categories. In multivariable analysis, age was included as a continuous variable because test for linear trend was significant. Highest educational level reached was a categorical variable: none/less than one year education, primary, secondary (Grade 8-11) and high school (Matric). There was no one with tertiary education. The total sum of household assets was categorized for multivariable analysis into quintiles as a proxy for socio-economic status [4]

Analyses were conducted using STATA Statistical Software (Release Version 10 Stata Corporation, College Station, TX). Means, median and interquartile ranges were calculated for continuous variables. Odds ratios and confidence intervals were calculated using logistic regression with a 5% level of significance. Multivariable analyses were stratified by sex for all outcome models as it was anticipated that condom usage patterns vary by sex [23]. Logistic regression was used to determine how the explanatory variables are associated with ever condom use and consistency of condom use with the most recent partner in the last year.

RESULTS

Background Characteristics

Fig. (**1**) shows the sampling and sample size selection. A total of 14,946 respondents were aged between 15-24 years on the first of January 2005. Excluding migrants, refusals and people who died between surveillance rounds, left 10,591 young adults. A total of 4,355 young people could not be contacted for this survey, of whom, 72 had died (2% 72/4,355). Of those who died, 7(10%) were HIV negative, 13(18%) were HIV positive and 52(72%) had unknown status. Among those not included in the 2005 survey, HIV status was only available if they participated in the 2003/4 survey and so the information is incomplete. Further excluding those who reported to never have had sex or who did not respond and those who had had no recent partner in the last year left 3,914 for analysis.
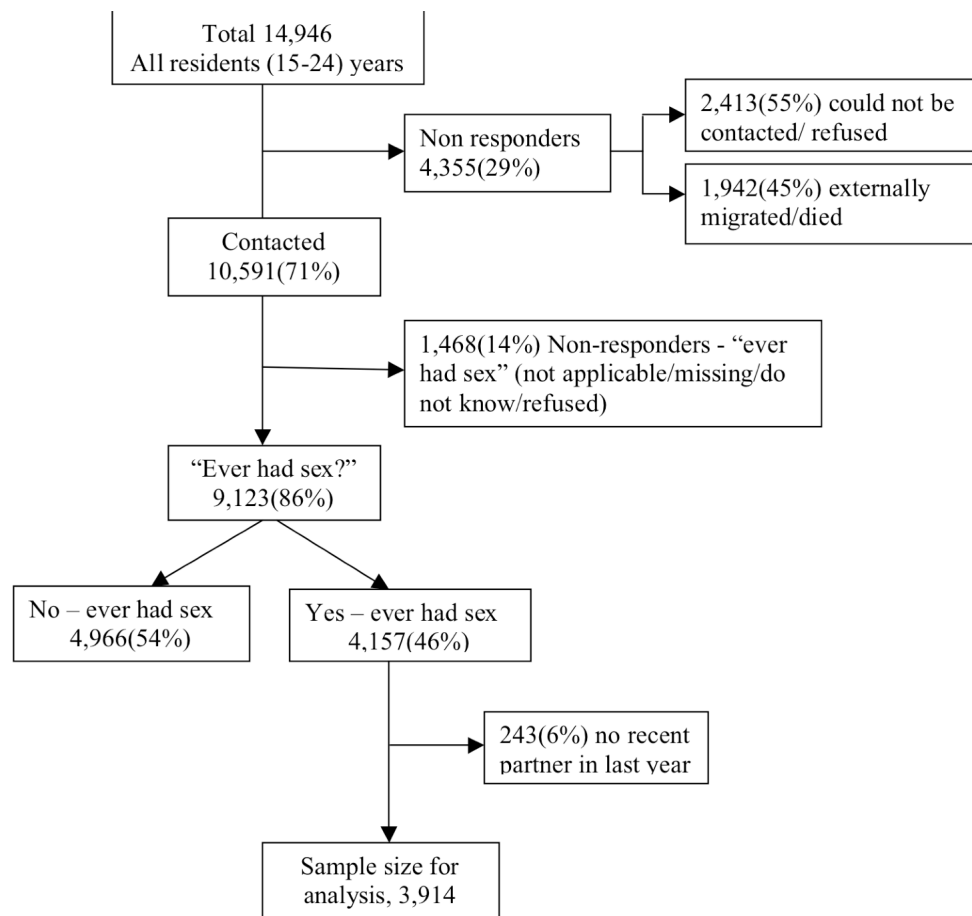
Fig. (1). Sampling procedure and sample size selection for young adults who reported ever having had sex in the study, in 2005.

More than half (57% 2,248/3,914) of the eligible young adults were females. The sex distribution in the initial cohort of 14,946 was 52% females (7,747/14,946), which is in line with the DSA as a whole in the same year (10 963 (51%) females and 10 362 males). About 80% had reached between grade 8 and grade 12 (secondary and high school). Overall, the median age among those who had sexually debuted was 17 years (IQR 16; 18), 17 years (range 12-24 years) for females and 16 years (range 9-24 years) for males. A total of 2,612 participants had participated in the 2005 HIV surveillance and their HIV status was recorded; of these 507 were HIV positive (19% 507/2,612), 2,105 (81% 2,105/2,612) were negative, leaving 1,302 of the 3,914 with unknown HIV status.

The majority (79%) of those who had ever had sex reported having a regular partner in the last year. The overall median age difference (including those with same age partners) between women and their partner was 3 years (IQR 2; 5) older and for men the median age difference with their partner was 2 years (IQR 1; 3) younger. A total of 479 were the same age and 279 either did not know their age difference or refused to report them.

Thirteen percent (503/3,914) of young adults who were sexually active in the last year reported having more than one partner. Of these, 370 reported having two partners only, with 42% (156/370) reporting using condoms with both partners, 33% (122/370) reporting condom use with only one

but not the other partner and 24% (90/370) did not use a condom with either of the partners and two refused to respond (0.5%). Those who reported having three partners, 37% (33/90) used a condom with all three partners, 34% (31/90) with either of the three partners and 18% (16/90) with none of the three partners and ten refused to respond to the question (11%). Data on condom use was only available for up to three partners.

Ever Condom Use

Table **1** shows results of univariable and multivariable analyses examining the association between respondent characteristics and condom use. The overall proportion of respondents reporting ever using a condom with the most recent partner in the last year was 52% (2,051/3,914). Condom use was higher in males than females but this did not reach statistical significance in multivariable analysis (Table **1**). With every one year increase in age, females were less likely to use condoms, but this association was not significant for males.

Education level attained was not statistically significantly associated with ever condom use; the likelihood of condom use with a regular partner was significantly decreased for females only. Having a partner older by at least a year significantly reduced the likelihood of using condoms compared to those whose partners were the same age. Those whose partners resided outside the immediate residential area

Table 1.   **Determinants of Condom Use of Young Adults Aged 15-24 Years who Reported Ever Having Sex in 2005 in Rural KwaZulu-Natal (N=3914)**

Variable	N (% Ever Condom Use)	Univariable Analysis		Multivariable Analysis					
				Both Males and Females N=3914		Females N=2248		Males N=1666	
		OR* (95% CI)	p-Value	AOR§ (95% CI)	p-Value	AOR§ (95% CI)	p-Value	AOR§ (95% CI)	p-Value
Sex									
Male	1666 (58)	1.00	-	1.00	-	-	-	-	-
Female	2248 (48)	0.69 (0.60-0.78)	<0.01	0.85 (0.65-1.12)	0.25				
Age (years)									
(15-24)		0.98 (0.95-1.00)	0.08	0.97 (0.94-1.00)	0.04	0.96 (0.92-0.99)	0.02	0.99 (0.94-1.03)	0.54
15-17	773 (53)	1.00	-						
18-20	1532 (54)	1.02 (0.86-1.21)	0.83						
21-24	1609 (51)	0.91 (0.77-1.08)	0.29						
Highest education level reached									
None	24 (38)	1.00	-	1.00	-	1.00	-	1.00	-
Primary	418 (40)	1.07 (0.46-2.50)	0.88	1.00 (0.42-2.37)	0.99	0.73 (0.23-2.37)	0.60	1.31 (0.37-4.70)	0.68
Secondary	3231 (54)	1.94 (0.85-4.45)	0.12	1.79 (0.77-4.16)	0.18	1.22 (0.39-3.85)	0.73	2.41 (0.69-8.42)	0.17
Missing	241 (50)	1.65 (0.70-3.92)	0.26	1.32 (0.52-3.32)	0.56	0.87 (0.25-2.99)	0.82	1.76 (0.43-7.23)	0.43
Type of partner									
Casual	828 (56)	1.00	-	1.00	-	1.00	-	1.00	-
Regular	3086 (52)	0.86 (0.74-1.00)	0.06	0.95 (0.81-1.12)	0.55	0.77 (0.60-0.98)	0.03	1.15 (0.92-1.44)	0.21
Partner age difference (>1 year)									
Same age	479 (57)	1.00	-	1.00	-	1.00	-	1.00	-
Older	2097 (48)	0.65 (0.53-0.79)	<0.01	0.69 (0.54-0.88)	<0.01	0.73 (0.54-0.98)	0.04	0.54 (0.33-0.87)	-
Younger	1295 (58)	0.98 (0.79-1.22)	0.88	0.96 (0.75-1.22)	0.72	0.89 (0.37-2.14)	0.80	0.88 (0.67-1.17)	0.01 0.38
Refused/don't know	43 (51)	0.74 (0.40-1.39)	0.14	0.75 (0.40-1.42)	0.38	0.53 (0.21-1.35)	0.18	1.10 (0.43-2.79)	0.84
Partner residence									
With member	268 (40)	1.00	-	1.00	-	1.00	-	1.00	-
Outside *isigodi*	2257 (53)	1.65 (1.27-2.13)	<0.01	1.64 (1.26-2.13)	<0.01	1.59 (1.12-2.24)	0.01	1.67 (1.11-2.52)	0.02
In *isigodi*	1389 (54)	1.71 (1.31-2.23)	<0.01	1.57 (1.20-2.06)	<0.01	1.30 (0.90-1.87)	0.17	1.89 (1.25-2.85)	<0.01
Partners in the last 12 months									
1 partner	3411 (52)	1.00	-	1.00	-	1.00	0.25	1.00	-
> 1 partner	503 (55)	1.16 (0.96-1.40)	0.13	0.90 (0.73-1.10)	0.31	0.73 (0.43-1.24)		0.92 (0.73-1.15)	0.47
Assets									
Low SES	1253 (45)	1.00	-	1.00	-	1.00	-	1.00	-
Medium SES	1481 (53)	1.40 (1.20-1.62)	<0.01	1.36 (1.17-1.58)	<0.01	1.35 (1.11-1.65)	<0.01	1.39 (1.09-1.77)	<0.01
High SES	945 (62)	1.99 (1.67-2.36)	<0.01	1.82 (1.53-2.17)	<0.01	1.79 (1.42-2.27)	<0.01	1.92 (1.47-2.50)	<0.01
Missing	235 (54)	1.44 (1.09-1.90)	0.01	1.68 (1.13-2.50)	0.01	1.20 (0.74-1.98)	0.46	3.06 (1.48-6.31)	<0.01
HIV Status									
HIV negative	2105 (51)	1.00	-	1.00	-	1.00	-	1.00	-
HIV positive	507 (53)	1.14 (0.93-1.39)	0.20	1.34 (1.09-1.65)	<0.01	1.39 (1.10-1.76)	<0.01	1.05 (0.64-1.71)	0.86
HIV unknown	1302 (55)	1.21 (1.05-1.39)	0.01	1.20 (1.04-1.39)	0.01	1.14 (0.93-1.38)	0.20	1.31 (1.06-1.62)	0.01

*Adjusting for age.

§Adjusting for; sex, age, highest education level reached, type of partner, partner age difference, partner residence, partners in the last 12 months, assets (SES) and HIV status.

(*isigodi;* an area for which a single *Induna*/chief is responsible) were more likely to use condoms than those residing with their partners in the same household. Belonging to a household with a high socio-economic status was associated with a significantly increased likelihood of ever using condoms. Having more than one partner in the last 12 months was not significantly associated with condom use while a positive HIV test result in the surveillance was associated with an independent 34% increased likelihood to use condoms compared to those with an HIV negative test result.

Consistent Condom Use

Of the 3,914 respondents who reported ever having had sex, 1,863 (48%) reported *"never"* using condoms, 980 (25%) reported *"sometimes"* and 1,071 (27%) reported "*always*" using condoms with the most recent partner. Those who reported "*never*" were excluded from further analysis, leaving 2,051 people who reported either "*sometimes*" or "*always*" using condoms.

Table **2** shows results of univariable and multivariable analyses examining the association between respondent

Table 2.   Determinants of Consistency of Condom Use of Young Adults Aged 15-24 Years who Reported Ever Having Used Condoms in 2005 in Rural KwaZulu-Natal (N=2051)

Variable	N (% Consistent Condom Use)	Univariable Analysis		Multivariable Analysis					
				Both Males and Females N=2051		Females N=1087		Males N=964	
		OR* (95% CI)	p-Value	AOR§ (95% CI)	p-Value	AOR§ (95% CI)	p-Value	AOR§ (95% CI)	p-Value
Sex									
Male	964 (59)	1.00	-	1.00	-	-	-	-	-
Female	1087 (46)	0.60 (0.50-0.71)	<0.01	0.61 (0.41-0.89)	0.01				
Age (years)									
(15-24)		0.89 (0.86-0.92)	<0.01	0.89 (0.86-0.93)	<0.01	0.88 (0.83-0.92)	<0.01	0.91 (0.85-0.96)	<0.01
15-17	411 (64)	1.00	-						
18-20	822 (53)	0.64 (0.50-0.82)	<0.01						
21-24	818 (46)	0.48 (0.38-0.61)	<0.01						
Education									
None	9 (56)	1.00	-	1.00	-	1.00	-	1.00	-
Primary	167 (50)	0.68 (0.17-2.70)	0.59	0.56 (0.14-2.28)	0.42	0.83 (0.13-5.47)	0.85	0.36 (0.03-3.78)	0.40
Secondary	1754 (52)	0.81 (0.21-3.11)	0.76	0.68 (0.17-2.69)	0.58	1.00 (0.16-6.25)	1.00	0.45 (0.04-4.54)	0.50
Missing	121 (51)	0.78 (0.19-3.11)	0.72	0.57 (0.13-2.51)	0.46	0.85 (0.12-6.24)	0.87	0.38 (0.03-4.31)	0.43
Type of partner									
Casual	460 (62)	1.00	-	1.00	-	1.00	-	1.00	-
Regular	1591 (49)	0.60 (0.49-0.75)	<0.01	0.65 (0.52-0.81)	<0.01	0.73 (0.52-1.03)	0.07	0.60 (0.44-0.81)	<0.01
Partner age difference (>1year)									
Same age	281 (61)	1.00	-	1.00	-	1.00	-	1.00	-
Older	998 (46)	0.58 (0.44-0.76)	<0.01	0.76 (0.54-1.07)	0.12	0.60 (0.40-0.90)	0.01	1.22 (0.59-2.53)	0.60
Younger	750 (57)	0.94 (0.70-1.24)	0.65	0.80 (0.58-1.11)	0.19	0.21 (0.05-0.82)	0.03	0.94 (0.65-1.35)	0.73
Missing	22 (45)	0.54 (0.22-1.29)	0.17	0.47 (0.19-1.14)	0.09	0.31 (0.07-1.43)	0.14	0.52 (0.17-1.60)	0.25
Residence of partner									
With member	108 (51)	1.00	-	1.00	-	1.00	-	1.00	-
Outside *isigodi*	1193 (53)	1.07 (0.72-1.59)	0.75	1.06 (0.70-1.59)	0.79	1.53 (0.87-2.67)	0.14	0.64 (0.33-1.23)	0.18
In *isigodi*	750 (51)	0.90 (0.59-1.35)	0.60	0.77 (0.50-1.17)	0.22	0.94 (0.52-1.71)	0.84	0.54 (0.28-1.05)	0.54
Partners in the last 12 months									
1 partner	1772 (52)	1.00	-	1.00	-	1.00	-	1.00	-
> 1 partner	279 (53)	1.06 (0.82-1.37)	0.65	0.77 (0.58-1.02)	0.07	1.46 (0.65-3.31)	0.36	0.70 (0.52-0.95)	0.02
Assets									
Low SES	559 (51)	1.00	-	1.00	-	1.00	-	1.00	-
Medium SES	784 (50)	0.96 (0.77-1.19)	0.70	0.93 (0.75-1. 17)	0.55	0.93 (0.69-1.25)	0.63	0.93 (0.66-1.31)	0.67
High SES	582 (56)	1.23 (0.97-1.56)	0.09	1.14 (0.90-1.46)	0.26	1.15 (0.82-1.60)	0.42	1.15 (0.81-1.65)	0.43
Missing	126 (54)	1.12 (0.76-1.66)	0.56	1.16 (0.65-2.04)	0.62	1.17 (0.52-2.60)	0.71	1.12 (0.49-2.53)	0.79
HIV Status									
HIV negative	1068 (55)	1.00	-	1.00	-	1.00	-	1.00	-
HIV positive	268 (40)	0.64 (0.49-0.85)	<0.01	0.78 (0.59-1.05)	0.10	0.85 (0.61-1.19)	0.34	0.61 (0.32-1.19)	0.15
HIV unknown	715 (53)	1.04 (0.86-1.27)	0.67	1.04 (0.85-1.26)	0.73	1.05 (0.79-1.40)	0.75	1.04 (0.79-1.37)	0.80

*Adjusting for age.
§Adjusting for; sex, age, highest education level reached, type of partner, partner age difference, partner residence, partners in the last 12 months, assets (SES) and HIV status.

characteristics and consistency of condom use. Females were 40% less likely to use condoms consistently than males. With each one year increase in age, consistent use of condoms declined by about 10%; and was less likely with a regular than a casual partner. Partner age difference was significant univariably, but no longer after adjustment except for females. Having an HIV positive surveillance test result significantly reduced the likelihood of consistent condom use by about a third in univariable analysis, but this did not reach statistical significance in multivariable analyses after allowing for age, likely due to limited numbers and resulting lack of statistical power.

DISCUSSION

In this largely rural setting, with continued high HIV prevalence and incidence, especially among young people [2, 3], only about half of sexually active young people used condoms similar to that reported in other studies in South Africa [7, 24, 25]. Availability of condoms is generally high and in principle easily accessible in this study area. Condoms are freely distributed by the Department of Health in all public areas (including health care facilities) and they are also sold in most shops (on average five rands per condom); therefore the observed low uptake of condoms may reflect choice rather than availability and accessibility of condoms.

Alternatively, young adults may not have the courage to take or ask for condoms and instead may perceive stigma associated with condom use in primary health care settings and in the community. In addition, more young females attend health clinics than young males (primarily for family planning services) which may result in differential access to condoms by gender, but women's difficulties in negotiating male condom use with partners remain a barrier to successful use of condoms [26]. It is also important to note that a high proportion reported having a regular partner which could influence low condom use, and only 13% reported more than one partner in the last year.

General prevention messages "Abstinence; Being faithful and Condom use" (ABC) promote abstinence and delayed sexual debut; having one faithful partner and condom use. Being in a monogamous relation or even marriage is not a protective measure from infection as there is need for mutual faithfulness or consistent condom use. This study sought to determine levels and patterns of, and the factors associated with, condom use among young adults aged 15-24 years in this study site. Condom use and consistent condom use were less likely among women and decreased with increasing age, confirming the low rates (12%) reported earlier in 2004 in the DSA among women participating in a microbicide feasibility study [12]. This could possibly be associated with the formation of stable relationships, in which consistent condom use is less likely [27] and high levels of hormonal injectable contraception use which makes condom use to prevent pregnancy unnecessary [11].

Condoms are a male-determined method; it is usually the man who determines whether or not a condom is used and when and this could explain why males are more likely to report use than females in our study. Further, condoms at younger ages may be used as a means to avoid pregnancy, rather than as an HIV preventative approach. As people get older, they may switch to alternative modern non-barrier contraception methods [11, 28] which require less, if any, negotiation with a male partner. Although these methods are effective against pregnancy prevention, the HIV epidemic is partially driven by intra-conjugal acquisition of HIV where a female spouse becomes infected by her partner; non-barrier contraception methods are not protective against HIV acquisition [12]. Intra-conjugal transmission can also occur in either direction where the male partner is infected by his partner [29].

We found belonging to a family with a middle or high SES to be a positive determinant of condom use among the young adults. We tested for interaction between educational status and SES with condom use and the term was not significant. We therefore argue that there could be other factors related to belonging to a higher SES household such as ability to comprehend HIV prevention messages or other unmeasured factors which could be leading to this relationship. An earlier study in KwaZulu-Natal showed that for girls, being employed and earning an average wage were positively associated with condom use [30]. The other probable explanation could be that those who are better off socio-economically are more able to negotiate for safer sex practices which include condom use than those in lower SES and they are also more likely to be older than their partners [31].

Young adults were more likely to use condoms with partners who are not co-resident, independent of age. This may be associated with length of relationship and the extent of trust and expectations within longer term relationships. It could also imply that young adults assess the risks before engaging in a sexual relationship. Marriage rates are low in this area, and age at first marriage high; pre-marital sexual relationships are common, with or without co-habitation [32]. Cohabitation has been found in other studies to be associated with low condom use [16].

The finding of a negative relationship between consistent condom use and having a regular partner is consistent with findings in other studies [18, 23] which show that condom use varies with the type of relationship. Some studies suggest that casual relationships are less formal, and in some cases, even commercial; in such cases, women may find it easier to negotiate for condom use and men may be more willing to use condoms [19]. Further, in this area, early child bearing and teenage pregnancies are usually followed by high contraceptive use (especially injectables and pills) which could also lower condom usage among young adults [11, 33]. The majority of those who had ever had sex reported having a regular partner in the last year which is in line with the prevention message "Abstinence; Being faithful and Condom use" (ABC) [34] as well as social desirable. Although this policy is relevant, abstinence and being faithful maybe difficult in some cases, and there is thus a need to continue to emphasize the "C" component even with regular partnerships unless both partners are faithful and HIV negative.

This study also found that having an older partner was associated with lower odds of condom use and less consistent use among women. Power inequalities in sexual relationships affect mainly women's relationship control [35, 36] in negotiating for safer sex; where older partners are more likely to determine and make decisions in a relationship than younger or same age partners and are also less likely to use condoms [32]. Young women may get into relationships with men older than themselves [7] with the expectation of marriage which may further reduce consistency of condom use [23, 36].. Despite condoms being male driven, young men may find condom use with older partners reduced because of socio-economic gain that usually follows such age differential relationships [31].

Recorded HIV positivity was significantly associated with condom use. Participant's knowledge of their HIV status is of critical importance when analysing condom use as it modifies behaviour. Information on whether the respondents knew their status was not available and our findings cannot be taken to indicate that knowledge of HIV status affects sexual behaviour. However, high perception of risk among HIV infected people has been suggested to result in higher condom use [27] as could increased knowledge of HIV prevention [15].

This study was based on self-reports of condom use and sexual activity in an interviewer administered questionnaire, which may be a possible limitation. However, in an attempt to limit reporter bias and embarrassment, the HIV survey was conducted in respondents' households by a pair of (one male and one female) trained fieldworkers to facilitate same sex interviews. A further possible limitation was the lack of data on reasons for using or not using condoms. The focus of these analyses was resident young adults. A total of 3,914 of all residents aged 15-24 years (3,914/14,946) participated in the survey. Despite 74% not participating, the proportion reporting having sexually debuted is consistent with other data from rural South Africa [37]. One of the prevention messages provided as standard is to delay sex to an older age or not to have extramarital sex. Therefore, those not having sex might be considered as "adherent" to the prevention messages [37]. Other behavioral factors such as substance use and cultural norms and beliefs that were not controlled for in this study could affect condom use and its consistency of use. A further study into reasons for use of condoms, and circumstances in which they can be consistently applied as an HIV prevention tool would be important for planning and evaluating interventions.

We did not adjust for the possibility that some of the condom use reports are not independent of each other because sexual relationships exist between pairs of individuals within this study sample, but this was not adjusted for in the analysis. Although, we are able to identify and link sexual partners who are members of the same household, previous work from this area [38], showed that very few men (0%) and women (1%) aged 18-24 years are married in this area, and only 6% of partnered resident women aged 18-24 years are a member of the same household as their partner. Our ability to identify couples in this study sample is thus limited. However, the lack of adjustment for the non-independence of reports is likely to have minimal influence on the results, since it would not change the estimate of association, but only widen the confidence intervals. In addition, among those who have sexually debuted in this age group, the median age difference between partners suggests that for women at least, some of their partners are not included in the cohort of 15-24 year old men considered in this analysis.

The results of this study point to the need to intensify existing HIV prevention strategies to increase their effectiveness. Prevention messages need to emphasize the importance of condom use in all types of relationships where the HIV status is unknown or where the commitment to being faithful is likely not maintained. Condom use should not only be restricted to "high risk" groups but should be extended to all young adults, and health care facilities should be more 'welcoming' to young people. Future public health strategies should aim at decreasing stigma, marginalization and discrimination associated with condom use. Empowerment of women to be economically independent could lead to better negotiation skills to use condoms and hence prevent transmission of HIV [39]. In addition, any comprehensive HIV prevention programme requires political commitment, community mobilisation and involvement of local organisations, as well as practical measures such as HIV testing and counselling, treatment of STIs, and facilities that are easy to access; that are confidential, and efforts to promote gender equality for full benefits to be achieved

CONCLUSION

In a rural South African setting, condom use was low, especially for females and with older partners. Young adults who were not residing with their partners in the same household and those who belonged to a household with a higher SES were more likely to use condoms, while females, having a regular partner, increasing age and having an older partner independently decreased the likelihood of both use and consistency of use of condoms. The HIV prevalence and incidence in this area does not show any sign of declining [40]; this together with our finding of low uptake of the major prevention method currently available, suggests that targeted supportive interventions need to be developed to increase condom use if HIV prevention programmes are to be successful.

AUTHOR'S CONTRIBUTIONS

NZC, NM, KH, KST and MLN devised the study and developed the analysis plan. NZC did the analysis, and drafted the paper. KH was involved in the supervision of research work, the design and execution of the analysis. NM contributed to the analysis, and commented on the drafts. MLN provided oversight and commented on the draft papers. KST was involved in the early stages of this work as part of the Master's research supervision. All authors approved the final manuscript.

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