



RISK FACTORS FOR TEENAGE PREGNANCY AMONG SEXUALLY ACTIVE BLACK ADOLESCENTS IN CAPE TOWN

A case control study

Caesar Vundule, Fidelia Maforah, Rachel Jewkes, Esmé Jordaan

Motivation. Teenage pregnancy is an important health and social problem in South Africa. So far research on adolescent sexual activity has been almost exclusively descriptive; as a result there is considerable knowledge about practices of adolescents in general and outcomes of their pregnancies, but very limited understanding of factors that place particular adolescents at increased risk of teenage pregnancy. Without this understanding, our ability to intervene effectively to reduce teenage pregnancy rates is limited.

Objective. To undertake an exploratory study to investigate risk factors for teenage pregnancy among sexually active adolescents in an urban and peri-urban context.

Methods. The study used a matched case-control design, with 191 cases and 353 age-matched controls from the same school or neighbourhood. Subjects were under 19 years of age and were recruited from township areas of Cape Town. A structured questionnaire was used to obtain information on socio-economic factors, contraceptive knowledge and use, and sexual behaviour. Conditional logistical regression was used to analyse the relationship between teenage pregnancy and the factors investigated.

Results. Teenage pregnancy was found to be most strongly associated with having frequent sex (risk ratio (RR) 30.81) without reliable contraceptive protection (RR 24.35), forced sexual initiation (RR 14.42), not owning a television set (RR 10.33), larger household size (RR 2.44), not living in a brick house (RR 5.09), not living with the biological father

(RR 3.26), talking openly about sex with a boyfriend (RR 4.72), and perceiving most friends to be pregnant (RR 4.38).

Conclusions. The findings suggest associations between the promotion of sexual health among adolescents and broader social development and promotion of gender equality. Although further research is needed, it is likely that important foci for short-term strategies should include developing assertiveness, enhancing decision-making competence, and promoting contraception and condoms as part of comprehensive sexual and reproductive health educational interventions.

S Afr Med J 2001; 91: 73-80.

Teenage pregnancy has been identified as one of the most important health, development and population problems facing South Africa.¹ Most teenage pregnancies in South Africa occur within the context of unstable relationships and are either unplanned or unwanted. A high teenage pregnancy rate indicates major problems with the sexual and reproductive health of the country's youth. This has important implications for efforts to reduce many other outcomes, such as the spread of sexually transmitted diseases (STDs) and HIV. Studies have shown that unplanned pregnancy predisposes women to unsafe abortion and even death.² Although adolescence *per se* may confer no increased obstetric risk,^{3,4} attendance at antenatal care is usually nil or late, which exposes these young women and their babies to associated health problems including undiagnosed hypertension leading to eclampsia, and complications of untreated syphilis. Usually the mothers are still in school at the time of pregnancy and financial support from the father is not forthcoming. Teenage births therefore pose a major economic burden on families. Although many pregnant teenagers intend to complete their education, they often do not return to school after the birth. As a consequence, teenage pregnancy seriously undermines efforts to uplift the nation's youth, particularly as regards the educational empowerment of women, which is so important in reducing female unemployment, increasing female economic empowerment and improving the health of the next generation.

Although adolescent sexual health is regarded as an important area for intervention and research, there are still important gaps in our understanding of the problem. Most studies of adolescent sexual and reproductive health in South Africa have been descriptive in nature and have used the following approaches: adolescent sexual knowledge, attitudes and practices; assessment of obstetric outcomes in adolescent pregnancy; or qualitative studies. As a result there is considerable knowledge about the practices of adolescents in general and outcomes of their pregnancies, but very limited understanding of factors that place particular adolescents at

Department of Health and Welfare, Mmabatho, North West
Caesar Vundule, BSc Hons (Epi), MSc

Department of Welfare, Pretoria
Fidelia Maforah, PhD

Medical Research Council, Pretoria
Rachel Jewkes, MB BS, MSc, MFPHM, MD

Centre for Epidemiological Research in Southern Africa, Medical Research Council,
Tygerberg, W Cape
Esmé Jordaan, BSc Hons, MSc



increased risk of teenage pregnancy. Without this understanding, our ability to intervene effectively to reduce teenage pregnancy rates is limited. This study tries to begin to fill this gap. The purpose of the study was to explore risk factors of teenage pregnancy in an urban and peri-urban context as a basis for appropriate intervention strategies.

SUBJECTS AND METHODS

A matched case-control study design was used to ensure an adequate number of pregnant teenagers and to control for age, which was anticipated to be the most important confounder. Cases were black adolescents under 19 years of age who booked in at two antenatal clinics in black townships and informal settlements in Cape Town, namely Gugulethu and Khayelitsha, between July and November 1995. Controls were non-pregnant adolescents who said they had never been pregnant; they were matched for age and school if the case was still in school at the time of conception, or matched for neighbourhood if the case was not in school. Ethical approval was granted by the Medical Research Council's Ethics Committee.

All the study subjects were recruited by two trained fieldworkers. Each day they visited the two antenatal clinics and invited all the pregnant attendees under 19 years of age to participate in the study. Ages of the subjects were double-checked against the ages given in their clinical records. The controls were age-matched teenagers who said they were not pregnant and did not have a history of pregnancy. Each case was asked to name 8 peers of the same age at their school (not necessarily from the same class), if they were attending school, or who lived in the same neighbourhood, if they were not in school. The last 2 names given as possible controls were approached first and invited to participate in the study. This was done to reduce bias as it was anticipated that they would be less 'case-like' than the first few mentioned. None of the subjects refused to participate in the study.

A structured questionnaire was used to interview all the study subjects. The development of the questionnaire was informed by in-depth interviews that were undertaken with 24 pregnant teenagers recruited from one of the two antenatal clinics that participated in the survey, as well as some previously tested questions from other surveys. The questionnaire contained questions on demographic and socio-economic characteristics, substance abuse, circumstances around sexual activity, attitudes towards adolescent sexual activity, sources of information regarding sex and sexuality, contraceptive use and attitudes towards contraception, and, for cases, circumstances around pregnancy. The questionnaires were translated into and administered in Xhosa, the first language of the subjects.

A total of 597 subjects (199 cases and 398 controls) were

recruited into the survey. On first inspection of the data, it was apparent that 42 of the selected controls (10.5%) had never had intercourse, and 23 of these had never had boyfriends. They were excluded from further analysis as they were not at risk of pregnancy and were too few in number for reliable conclusions to be drawn about them as a sub-group. A further 3 controls were dropped because they had not provided information about contraceptive use. As a result of their exclusion, 29 cases had only 1 control (162 had 2 controls) and 8 cases were dropped from the study because both their controls were excluded. As a consequence the analysis presented here is based on a total of 544 subjects (191 cases and 353 controls). All the teenagers had had at least one boyfriend and all had had sexual intercourse.

Conditional logistical regression⁵ was used to investigate the relationship between the outcome 'pregnant/non-pregnant' and a set of prognostic factors, for example, demographic information, household and socio-economic influences, attitudes, etc. Conditional logistical regression was performed by forming strata for each age-matched set. The likelihood function for the conditional logistical regression reduces to that of the Cox model for the continuous time scale when there is only one control.

Model-building was achieved by requesting backward as well as forward selection of predictor variables. The best subset selection was requested for the selection of 9 variables out of a possible 14 for the final model. As in the case of ordinary logistical regression, the conditional risk ratios (RRs) (computed by exponentiation of the parameter estimates) were used to interpret the relationship of pregnancy to the prognostic factors considered. If the risk was larger than 1, an increment in the factor would increase the hazard rate. If the RR was less than 1, an increment in the factor would decrease the hazard rate.

The RR should be interpreted as an estimate of the incidence-density ratio,⁶ which is considered to be a measure of the instantaneous rate of development of disease outcome in a population. For the continuous covariates, the RR gives the chance in the log odds for an increase of 1 unit in the covariate. The log-likelihood for the model is presented as summary measures of goodness-of-fit.

RESULTS

The mean age of both cases and controls was 16.4 years (standard deviation (SD) 1.10 for cases and 1.08 for controls). Their mean age at first menstruation was 13.7 years (SD 1.10) for cases and 13.5 years (SD 1.10) for controls. All the teenagers had had a boyfriend and had had sexual intercourse. Most of the 191 pregnancies in this study (97.4%) were not planned, and 65 teenagers (34.1%) said they had considered terminating the pregnancy. One hundred and eighty-one teenagers (94.8%)



had told the father of the child about the pregnancy, 164 (85.9%) were still continuing with the relationship, and 114 (59.7%) said that the father would support the child financially. More commonly, teenagers anticipated that their parents would support their child financially ($N = 156, 81.7\%$). However, 28 teenagers (14.7%) said they were forced to leave their homes after their parents discovered the pregnancy. At the time of interview, 177 girls (92.7%) intended to complete school.

Table I shows the household structure of the teenagers, namely size, composition and quality of relationship. Pregnant

teenagers were more likely to come from larger households and less likely to live with their biological parents. Parental strictness was seen as a protective factor and was particularly related to the presence of the father for the controls ($P = 0.001$) but not the cases.

Table II shows educational and socio-economic characteristics of the teenagers and their families. In total, 87.5% were able to state the highest educational level their mothers had attained. Higher levels of parental education, particularly that of the teenagers' mothers, was a protective

Table I. Household structure

	Pregnant	Non-pregnant	RR (95% CI)
Mean No. of people in household (SD)	5.0 (1.9)	3.8 (1.5)	1.48 (1.31 - 1.66)
Household not a nuclear family (N)	84.5% (161)	57.2% (202)	4.00 (2.52 - 6.34)
Living with biological mother (N)	60.7% (116)	72.5% (256)	0.58 (0.39 - 0.86)
Not living with biological father (N)	74.4% (142)	52.1% (184)	2.62 (1.76 - 3.90)
Biological parents live together (N)	35.6% (67)	50.7% (176)	0.55 (0.39 - 0.79)
Parents/guardians more strict than those of friends (N)	35.1% (67)	56.3% (198)	0.39 (0.26 - 0.58)

RR = risk ratio; CI = confidence interval.

Table II. Social and economic characteristics

	Pregnant		Non-pregnant		RR (95% CI)
	%	N	%	N	
Highest level of schooling attained					1.00
Up to Std 5	25.7	49	21.6	76	0.32 (0.12 - 0.89)
Stds 6 - 7	51.8	99	54.0	190	0.31 (0.09 - 2.17)
Stds 8 - 10	22.5	43	24.4	86	0.97 (0.67 - 1.40)
Repeated a year at school	37.4	71	38.9	136	1.15 (0.69 - 1.91)
Schooling interruption before pregnancy	15.7	30	14.7	52	1.43 (0.88 - 2.33)
Drinks alcohol	17.9	34	13.9	49	1.00
Importance of religion					1.00
Very important	4.7	9	1.4	5	0.38 (0.12 - 1.17)
Important	85.8	163	87.8	308	0.34 (0.88 - 2.33)
Not very important	17.9	18	10.8	38	1.00
Highest level of schooling attained by mother					1.00
Up to Std 5	55.3	89	43.4	119	0.76 (0.49 - 1.17)
Stds 6 - 8	36.7	59	38.3	105	0.34 (0.17 - 0.69)
Stds 9 - 10, other	8.1	13	18.3	50	0.68 (0.45 - 1.01)
Father employed	55.6	95	65.9	195	0.59 (0.41 - 0.86)
Mother employed	52.1	99	64.2	224	3.09 (2.02 - 4.74)
Non-brick house	65.3	124	42.5	147	0.73 (0.62 - 0.87)
Mean No. of rooms (SD)	3.3	1.3	3.7	1.1	2.98 (1.97 - 4.51)
No television set	49.2	94	26.4	93	

RR = risk ratio; CI = confidence interval.



factor and was significant for schooling levels of Standard 9 and above. That of fathers is not included in the table as many of the teenagers (44.3%) did not know the level of schooling attained by their father. Of those who did, non-pregnant teenagers reported that their fathers had attained substantially higher levels. Very few of the teenagers reported having ever taken drugs (less than 1%) or ever having smoked (approximately 3%).

Table III presents some indicators of the boyfriend relationships of the teenagers, focusing on the first-ever relationship and the current relationship. Both groups of teenagers had started dating at roughly the same age and had been dating for a mean of 2.4 years at the time of enrolment in the study. Twenty-six of the girls reported having more than one current boyfriend.

Table IV describes some aspects of the circumstances of the teenagers' first sexual experience and experiences since that time. There were no differences between cases and controls in the mean age of first intercourse, which was approximately 3 - 6 months after first menstruation. Most had intercourse with their first boyfriend. There were no differences in the usual places of sexual encounters, with shacks (58.2%) and back rooms (34.3%) proving the most common venues. There was also no difference between the groups in terms of the perception that most of their friends (85.6%) were having sexual relationships.

As shown in Table V, the vast majority of teenagers in both groups did not use contraception when they first had intercourse, but many started subsequently. Those who had used contraception were asked which methods they had used:

Table III. Boyfriends of teenagers

Variable	Pregnant	Non-pregnant	RR	95% CI
Mean age with first boyfriend (SD)	14.0 (1.4)	13.8 (1.3)	1.06	0.92 - 1.24
Mean age difference between girl and first boyfriend (SD)	3.5 (1.8)	2.7 (1.3)	1.41	1.23 - 1.61
Mean age difference between girl and current boyfriend (SD)	5.1 (3.3)	4.0 (2.5)	1.16	1.08 - 1.24
Mean current number of boyfriends (SD)	1.2 (0.4)	1.1 (0.5)	1.91	1.25 - 2.93
Mean No. of boyfriends ever (SD)	2.0 (1.0)	1.9 (1.0)	1.06	0.89 - 1.26
Mean No. of sexual partners ever (SD)	1.8 (1.0)	1.8 (1.0)	1.08	0.89 - 1.31
Boyfriend still at school (N)	47.6% (91)	68.0% (240)	0.42	0.29 - 0.62

RR = risk ratio; CI = confidence interval.

Table IV. Circumstances of first sexual intercourse and subsequent experiences

	Pregnant (N)	Non-pregnant (N)	RR	95% CI
First intercourse				
Mean age at first intercourse (SD)	14.0 (1.6)	14.0 (1.4)	0.97	0.84 - 1.12
Sexual initiation —	31.9% (61)	18.1% (64)	2.35	1.53 - 3.61
Forced or raped				
Relationship with boyfriend				
Met recently	82.2% (157)	53.3% (188)	1.00	—
Known for a while	11.0% (21)	36.5% (129)	0.20	0.11 - 0.34
Steady	6.8% (13)	10.2% (36)	0.47	0.23 - 0.97
Subsequent experiences				
Intercourse frequency at time of pregnancy at least once per week	94.7% (180)	72.5% (253)	9.22	4.19 - 20.29
Coercive sex				
Forced to have sex	72.0% (137)	59.7% (113)	1.76	1.20 - 2.59
Raped	11.1% (21)	9.4% (18)	1.18	0.64 - 2.16
Previous suspected pregnancy	23.2% (44)	10.7% (37)	2.67	1.61 - 4.41
Previous STD	14.7% (28)	4.0% (14)	5.17	2.41 - 11.08

RR = risk ratio; CI = confidence interval.



Table V. Contraceptive knowledge and use

Variable	Pregnant		Non-pregnant		RR	95% CI
	%	N	%	N		
No contraception at first intercourse	88.4	169	82.3	291	1.83	1.04 - 3.23
Ever used contraception	36.7	70	70.3	248	0.21	0.13 - 0.32
Ever used injection	33.5	64	69.2	243	0.2	0.13 - 0.30
Contraception during past year	19.6	37	59.1	205	0.15	0.10 - 0.25
Depo-Provera not used in past year	84.1	159	42.9	148	7.57	4.56 - 12.57
Discussed contraception with boyfriend	37.0	70	31.8	47	1.3	0.88 - 1.92
Talks openly about sex with boy	37.6	71	20.4	71	2.69	1.72 - 4.19
Mother advised against contraception	13.6	26	9.7	34	1.42	0.82 - 2.46
Source of sexual information						
Mother	3.7	7	4.0	14	-	-
School	32.5	62	23.0	81	1.61	1.06 - 2.45
Friends	94.2	180	96.6	340	0.58	0.25 - 1.36
Boyfriend	97.9	187	98.6	348	0.63	0.17 - 2.33
Medical	24.1	46	54.7	193	0.17	0.10 - 0.29
Television	74.2	141	79.5	279	0.75	0.45 - 1.23
Books	77.4	148	78.4	277	1.12	0.64 - 1.97
Perception that talking with parents or guardians about sex is easy	9.5	18	12.9	45	0.63	0.34 - 1.17
Perception that most friends are pregnant	51.6	97	21.1	73	6.01	3.65 - 9.88

RR = risk ratio; CI = confidence interval.

the injection, pill, condom and 'safe period' were mentioned. The most commonly used contraceptive was the injection, which had been used by all but 9 contraceptive users. The data show that the prevalence of contraceptive use over the year before the interview was substantially lower than lifetime prevalence. The table also shows that mothers were rarely a source of sexual information; similarly few girls cited sisters and female relatives. Friends, boyfriends, books and television were the most important sources.

Table VI presents the multiple regression result. Teenage pregnancy was most strongly associated with having frequent sex (once a week or more) without reliable contraceptive

protection, forced sexual initiation not owning a television set, larger household size, not living in a brick house, not living with the biological father, talking openly about sex with boyfriend, and perceiving most friends to be pregnant.

DISCUSSION

This study should be regarded as an initial exploration of risk factors for pregnancy among sexually active adolescents and as being essentially hypothesis-generating rather than testing. The study is none the less important in that it represents a first attempt to move beyond descriptive studies of adolescent sexual practices in South Africa. However, there are limitations to the interpretation of the data imposed by the study design and analysis. Ideally, sexual activity would have been a matching criterion for the controls, but logistically this was not possible as the relevant information could only be gained reliably after an extended period of interviewing. A decision was therefore made to adjust for sexual activity in the analysis stage, although we recognise that this is not ideal and that it resulted in the loss of some controls as well as cases.

Sexual activity among the respondents started at a very early age and was initially unprotected, with many girls subsequently failing to commence or sustain contraceptive use. The overall level of sexual activity and mean age at first intercourse among the controls in this study differed from those found by Richter⁷ in her cross-sectional household study of 16 - 20-year-olds living in Soweto, Umlazi and Khayelitsha.

Table VI. Multiple model for conditional logistic regression analysis

Variable	RR	95% CI
Average number of people in house	2.44	1.71 - 3.46
Did not live with biological father	3.26	1.28 - 8.30
Did not live in a brick house	5.09	2.01 - 12.88
Did not own a television set	10.33	3.35 - 31.82
Sex once a week or more	30.81	6.72 - 141.37
Did not use injection method	24.35	7.34 - 80.79
Most friends have been pregnant	4.38	1.45 - 13.23
Forced sex	14.42	3.76 - 55.33
Talked openly about sex with boyfriend	4.72	1.62 - 13.82

Model χ^2 is 206.61 with 9° of freedom.
RR = risk ratio; CI = confidence interval.



She found that only 66% of respondents reported having ever had sex, with a mean age for sexual initiation of 16.4 years. Our findings were closer to those of Buga *et al.*⁸ in their large study of Transkei school attenders. The latter reported a mean age of sexual initiation of 14.9 years among the 76% of female respondents who were sexually active. The differences between these studies and our control group are of interest but not of great concern; as ours was a matched case-control study the controls would not be expected to have the same characteristics as would be found in a random cross-section of the population.

The household structure of pregnant teenagers differed from that of the controls in size, composition and quality of relationships. The households of pregnant teenagers were significantly larger and were significantly less likely to have a nuclear family structure. Pregnant teenagers were significantly less likely to live with both or either of their biological parents. Multiple regression analysis indicates that the most important factor in household composition is the presence of the girl's father. For the controls, this was related to the important protective effect of parental discipline.

Several factors explored in the study are in some respects indicative of socio-economic status. These included household size, number of rooms at home, materials used to construct the home, maternal and paternal employment, and consumer goods ownership (television). Increased risk of pregnancy was found to be associated with many of these factors, notably larger household size, fewer rooms at home, use of materials other than brick for the structure, maternal employment and not owning a television. Household size, materials and television ownership emerged as independent and highly significant risk factors on multiple regression analysis. This suggests that their roles in teenage pregnancy, at least as regards television ownership and household size, may well extend beyond serving as possible indicators of socio-economic status. The presence of the biological father as an independent variable in the multiple regression model suggests that there are other features of larger households that put female teenagers at greater risk of pregnancy. One possible mechanism is that adolescents from bigger families receive less attention from their households and may more easily be subjected to pressures from outside the home. Indeed, less restrictive family supervision has been identified as one factor associated with teenage pregnancy.^{9,10}

Television ownership is also a complicated factor as access is related to ability to afford a set as well as access to and ability to afford electricity. However, televisions also have educational, recreational and social roles. Although many of the teenagers without sets at home indicated that they watched television, those who owned sets were much more likely to report having received sexual health information from television programmes ($P < 0.001$). The social dynamics of television watching and ownership are complex. In households with television sets

adults may stay up late to watch evening programmes, so increasing surveillance of adolescent girls and reducing opportunities to slip out to visit boyfriends. Not owning a set may necessitate visits to neighbours to watch programmes, which could provide more opportunity to visit boyfriends. Televisions also potentially provide alternative entertainment to going out with boys and having sex.

There was very little difference between cases and controls in terms of schooling achievement or problems. The controls had attained a slightly higher level of schooling than the cases, despite being the same age, but the difference was only significant at Standard 6 and 7 level. The findings suggest that in this population poor school performance is not a risk factor for teenage pregnancy. There were no differences in religiosity between the two groups, suggesting that this is also not a protective or risk factor.

The forms of risk-taking sexual behaviour that result in pregnancy have been found to be associated with other patterns of teenage risk-taking behaviour, particularly smoking, drinking alcohol and drug use.⁷ This observation is not supported by the findings of this study. Very few of the teenagers had smoked or used drugs, and the proportion who said they drank alcohol was also quite low, with a non-significant difference between cases and controls.

In general the qualitative study¹¹ reported findings that were very similar to the experiences reported by respondents during these interviews. There were no significant differences between cases and controls as regards age at initiation of dating and sexual initiation. On average, controls started dating at a slightly younger age than the cases, and a significantly greater proportion had known their partner for a while or were 'going steady' before having intercourse. Most of the cases and half of the controls, however, had first had intercourse with someone they had only recently met. This confirms findings of the qualitative study¹¹ and the survey of Flisher *et al.*¹² The pregnant teenagers dated, both initially and at the time of interview, boys who were several years older than those dated by controls. Similar findings regarding the age of male partners of adolescent girls who became pregnant have been reported in other countries.¹³ Both groups of girls initiated dating with boys who were nearer their own age, but then moved on to boys who were older. The higher age of the boyfriends of the cases may explain the finding that they were significantly less likely to still be in school. Cases had significantly more boyfriends, although the number of girls who reported having more than 1 boyfriend at the time of interview was small. There was no difference between the two groups in terms of the number of sexual partners they had ever had. Dating of older men by the cases may be associated with their socio-economic situation and an expectation that older working men are more likely to be able to provide for them.



The meanings of a forced first sexual experience are complex. The term equates with date rape but is not described as 'rape' by teenagers. Overall, one-third of the cases reported having been forced to have sex or having been raped when they first had intercourse. This was significantly more likely to have been reported by cases than controls, although a substantial number of controls had similar experiences. While it is possible that the experience of pregnancy could have led the teenagers to represent their first experience in a more negative light, Buga *et al.*⁸ also found very high levels (28%) of forced sexual initiation. Coercion was also a feature of subsequent sexual encounters for many of the teenagers. By the time of interview, the majority of both groups reported having been forced to have sex (this was significantly more common among cases), and 1 in 10 had been raped. The risk of pregnancy associated with forced sexual initiation was substantial and cannot simply be explained by conception following a first episode of unprotected intercourse. This suggests that perceptions of non-voluntariness of sexual initiation are carried over, directly and indirectly, into subsequent sexual experiences. The mechanism by which this occurs is a subject for further research.

Frequency of intercourse and use of injectable contraceptives were visible in the multiple regression model as strong factors associated with biological exposure to risk of pregnancy. Cases reported that at the time they conceived they were having sexual relations significantly more frequently than the control group. The majority of teenagers in both groups, however, reported having intercourse at least weekly. The pattern of contraceptive use reported by cases and controls was of initial non-use followed by intermittent use, with controls being twice as likely to report some subsequent use, mostly involving injectable contraceptives. Unfortunately reasons for not using contraceptives were not sufficiently explored in this study. The researchers tried to collect data on perceptions and experiences of contraceptive service quality but unfortunately used open questions to do so, and these were not completed in sufficient detail to enable analysis. This remains an important area for future research.

Teenagers who became pregnant were more likely to have had an STD and a previous pregnancy scare (actual or suspected) before the present pregnancy. Although the proportion of respondents reporting a previous STD was low, it is nonetheless very worrying considering the youth and small number of reported sexual partners of the teenagers. The figures clearly indicate that STDs and HIV are important risks within the Cape Town teenager sexual network. This also highlights some of the challenges involved in changing sexual practices, as even these events, which revealed risk of pregnancy and STDs to be very real, were insufficient to change the behaviour of individuals, at least among the cases.

Boyfriends were regarded as the most important source of sexual information. However, most girls had not discussed

contraception with them and few reported talking openly together about sex. Cases were significantly more likely to report talking openly about sex with their boyfriends, a risk factor that was accentuated in the multiple regression model. The significance of such discussions may relate to their content, but may also be indicative of a quality in the relationship that predisposes to (or even follows) pregnancy. Varga¹⁴ found that 'open' discussion of sex was regarded by Zulu adolescents as a feature of really close sexual relationships. Indications of the content of boyfriend/girlfriend communication about sex was provided by the qualitative interviews.¹¹ These indicate that boys primarily used discussions about sex to reinforce gender roles, emphasising in particular the importance of male sexual needs and female subservience to these.

In keeping with the findings of other South African research,^{15,16} very few teenagers mentioned family members (mothers, sisters and other relatives) as being important sources of sexual information. Teenagers were much more likely to have been advised against contraceptive use by their mothers than to have received sexual information from them. Very few teenagers reported that talking about sex with their parents or guardians was 'easy'. There were no differences between cases and controls on reported intra-family communication, suggesting that contrary to popular opinion,¹⁷ poor communication about sex in families is not necessarily a risk factor for teenage pregnancy.

Friends and boyfriends were the most commonly reported sources of information; this supports the findings of the qualitative research done in Khayelitsha.¹¹ Next most common were books and television. There were no differences between cases and controls in terms of the frequency with which these sources were identified. There were two sources of information that differed significantly in importance between the two groups. Cases were much more likely to identify school as a source of information, and controls were more than twice as likely to identify a medical source, namely a doctor, nurse or clinic. Receiving information from a medical source was therefore strongly protective, but further analysis indicated that it was related to use of services for contraception. It is not clear why receiving information from school should be a risk factor for pregnancy, but the relevance or accuracy of information provided should be explored.

The perception that most friends are pregnant emerged as a strong risk factor. It is very difficult to interpret this as it could be accounted for by an alteration in patterns of friendships that occurs after pregnancy, a desire to perceive one's situation as 'normal', a perception that it would not be too serious if one fell pregnant because everyone else is, or a perception that this is what happens to teenagers and you cannot do much to stop it.

The exploratory nature of this study means that its main value lies in providing pointers for future research. Throughout



this discussion several such areas have been identified. Several of the areas of uncertainty of interpretation of the findings arose because of the 'snap shot' nature of the data. A study of a cohort of teenagers would be needed to establish the sequence of events and the impact of pregnancy on adolescent relationships and attitudes. The case control design also precluded further analysis of risk factors associated with the confounders, frequency of intercourse and contraceptive use. These areas should be examined in future studies.

Although hypothesis-generating, the study findings point to a conclusion that the promotion of sexual health among adolescents is probably closely linked to the context of broader social development, particularly poverty eradication and concomitant enhancement of stability and security within the home, and promotion of gender equality. The findings suggest that short-term strategies should focus on the promotion of contraception and use of condoms as part of comprehensive sexual and reproductive health educational interventions that pay specific attention to gender relations and the acquisition of assertiveness and negotiation skills.

This study was funded by the Medical Research Council. We would like to thank the following people for their assistance in undertaking this project: our field workers, Nosisi Dingani and Lebohang Sekholomi; Zodumo Mvo for help with data cleaning; Debbie Bradshaw and Jonathan Levin who gave advice on earlier drafts of the paper; and the respondents who gave their time and shared their experiences with us. We are also grateful to Groote Schuur Hospital for giving permission for the study, to staff of the Midwife Obstetric Units for allowing us to identify and interview our cases on their premises, and to staff of the schools for assisting us in locating the controls.

References

1. Department of Health. *National Framework and Guidelines for Contraceptive Services*. First draft document for discussion. Pretoria: Directorate of Maternal, Child and Women's Health, Department of Health, 1998.
2. Mbizvo MT, Bounduelle MMJ, Chadzuka S, Lindmark G, Nystrom L. Unplanned pregnancies in Harare: What are the social and sexual determinants. *Soc Sci Med* 1997; **45**: 937-942.
3. Ncayiyana DJ, Ter Haar G. Pregnant adolescents in rural Transkei. *S Afr Med J* 1989; **75**: 231-232.
4. Varga C. Health care utilisation, nutrition and pregnancy outcome among adolescent primigravids in KwaZulu-Natal. PhD dissertation, University of Pennsylvania, 1998.
5. SAS Institute Inc, SAS Technical Report P-229, SAS/STAT Software: Changes and Enhancement, Release 6.07. Cary, NC: Institute Inc., 1992: 620.
6. Nurminen M. To use or not to use the odds ratio in epidemiologic analyses? *Eur J Epidemiol* 1995; **11**: 365-371.
7. Richter L. *A Survey of Reproductive Health Issues among Urban Black Youth in South Africa*. Final Grant Report. Pretoria: Medical Research Council, 1996.
8. Buga GAB, Amoko DHA, Ncayiyana D. Sexual behaviour, contraceptive practices and reproductive health among school adolescents in rural Transkei. *S Afr Med J* 1996; **86**: 523-527.
9. Nash ES. Teenage pregnancy — need a child bear a child? *S Afr Med J* 1990; **77**: 147-151.
10. Mamdani M, Garner P, Harpham T, Campbell O. Fertility and contraceptive use in poor urban areas of developing countries. *Health Policy and Planning* 1993; **8**(1): 1-18.
11. Wood K, Maforah F, Jewkes R. 'He forced me to love him': putting violence on the adolescent sexual health agenda. *Soc Sci Med* 1998; **47**: 233-242.
12. Flisher AJ, Ziervogel CF, Chalton DO, Leger PH, Robertson BA. Risk-taking behaviour of Cape Peninsula high-school students. Part VIII. Sexual behaviour. *S Afr Med J* 1993; **83**: 495-497.
13. Millar WJ, Wadhwa S. A perspective on Canadian teenage births, 1992-4: older men and younger women? *Can J Public Health* 1997; **88**: 333-336.
14. Varga CA. Sexual decision-making and negotiation in the midst of AIDS: youth in KwaZulu/Natal, South Africa. *Health Transition Review* 1997; **7**: suppl 3, 45-67.
15. Nicholas LJ. Intra-familial communication about contraception: a survey of black South African freshmen. *International Journal for the Advancement of Counselling* 1993; **16**: 291-300.
16. National Progressive Primary Health Care Network. *Youth Speak Out For a Healthy Future*. Johannesburg: National Progressive Primary Health Care Network, 1996.
17. Ncayiyana D. Teenage pregnancy in Transkei: perspective of a devil's advocate. *Transkei Medical Quarterly* 1992; **4**: 24-31.

Accepted 9 September 1999.