

A survey of under-18 year old and 20-29 year old primigravidae delivered at the Port Moresby General Hospital: a comparative study of their sociodemographic and sexuality characteristics and contraceptive knowledge and experience

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SUMMARY

From July 1992 to August 1993, 330 under-18 year old primigravidae (cases) and 330 randomly selected 20-29 year old primigravidae (controls) who were delivered at the Port Moresby General Hospital were sequentially studied, using a standardized, pretested, precoded questionnaire. In stepwise logistic regression analysis, significantly more of the cases had menarche at less than 15 years of age, learned before menarche that sex causes pregnancy, were of highland origin, were unemployed, or had partners who were unemployed; significantly fewer of the cases thought that one sexual act could cause pregnancy, had knowledge of or had ever used a family planning method, or had planned this pregnancy.

Introduction

Adolescent sexuality and pregnancy are serious problems in many parts of the world. This is because they are common and are associated with increased reproductive health hazards and adverse socioeconomic and demographic consequences.

Although marriage reduces some of the complications of adolescent sexuality and pregnancy, such as the risk of sexually transmitted disease, criminal abortion and socioeconomic deprivation, the other problems remain. Adolescent sexuality should therefore be discouraged and adolescent pregnancy prevented. To achieve this in a community, the problem must first be studied in that community.

The Port Moresby General Hospital (PMGH) is situated in the National Capital District (NCD) of Papua New Guinea (PNG) and is the teaching hospital of the University of Papua New Guinea. The Division of Obstetrics and Gynaecology is the only maternity hospital in

the NCD. Apart from one or two private clinics that do a hundred or so normal deliveries a year, the Division caters for all the institutional deliveries in the NCD and in most of the Central Province. It is the only referral centre in the province. The NCD has a population of about 200,000. The hospital delivers about 9000 women a year, about 15% of whom are under 20 years of age.

Patients and Methods

Objectives

To compare the sociodemographic and sexuality characteristics and the contraceptive knowledge and experience of the two groups (adolescent and control mothers), with the aim of identifying factors (explanatory variables) which are associated with the risk of an adolescent becoming pregnant.

Study population and design

The study population consisted of pregnant primigravidae who attended the PMGH

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antenatal clinic (ANC), or who were unbooked but delivered at the hospital. We decided to study only primigravidae to avoid the influence of parity, and because a large proportion of adolescent deliveries are first pregnancies. The cases were patients aged less than 18 years. The controls were randomly selected 20-29 year olds. The antenatal subjects were enrolled at their first attendance at the ANC; the unbooked cases were enrolled in the postnatal ward. The cases were recruited sequentially until the predetermined sample size was obtained. A pretested, precoded questionnaire was administered by trained research assistants.

Variables

The dependent variable was adolescent pregnancy. The independent variables selected for investigation included sociodemographic, economic and sexuality characteristics, and family planning (FP) knowledge and practice. A variable was selected for one of two reasons: because it was suspected to be an associated risk factor for adolescent pregnancy; or because it was suspected to have a negative socioeconomic impact on the subject.

Sociodemographic characteristics

- a. Patients: mean age at menarche; menarche at age <15 years (yes, no); mean number of school years completed; never been to school (yes, no); never worked (yes, no); lives in urban slum (yes, no); married (yes, no); living with partner (yes, no); baby will live with patient (yes, no); patient's family happy about pregnancy (yes, no); patient's social status score. The social status score was calculated as a composite variable using total number of school years completed by the patient and her parents, occupation of father of patient (unskilled, semi-skilled, skilled), residential area of patient's parents (urban slum, village, urban), house-type, father of patient currently employed (yes, no); ethnic region of parents.
- b. Partner/husband: mean age; mean school years completed; never been to high school (yes, no); currently employed (yes, no); occupation (unskilled, semi-skilled, skilled); never worked (yes, no); has a

profession (yes, no); ethnic region; has another wife (yes, no); financially responsible for patient (yes, no); will be financially responsible for baby (yes, no); family happy about pregnancy (yes, no).

Sexuality and sex knowledge

Mean age at first sexual intercourse; average number of sex acts per month before index pregnancy; before this pregnancy, patient knew that unprotected sex causes pregnancy (yes, no); patient learned about sex and pregnancy at home (yes, no); learned about sex and pregnancy at school (yes, no); mean age at which patient learned about sex and pregnancy; patient learned about sex and pregnancy before menarche (yes, no); before the pregnancy, mean number of unprotected sex acts which patient thought were required to cause pregnancy; before pregnancy, patient knew that one unprotected sex act can cause pregnancy (yes, no).

Family planning (FP) knowledge and practice variables

Subjects were asked if before the pregnancy they knew that there were methods which couples could use to prevent or postpone pregnancy. Those who answered 'yes' were then asked to mention, without prompting, the methods they knew. After they had finished, the research assistant read and explained each FP method from a list and asked the subject if she had heard of, or ever used the method. FP knowledge before index pregnancy (yes, no); index pregnancy planned (yes, no); FP practised before pregnancy (yes, no).

Definition of terms

Partner/husband: the man who, according to the patient, was the putative father of the pregnancy.

Pregnant primigravida: a woman who is in her very first pregnancy.

Natural family planning method: prolonged abstinence or coitus interruptus or periodic abstinence.

Data limitations

Age was as given by the subject. If the age agreed with the date of birth, the age was taken as reliable. If the subject did not know her date of birth, but the age at menarche plus the number of years since the menarche equalled the age, then the age was taken as correct. Subjects who could not answer questions relating to their partners or parents were given forms containing those questions to take home, complete and bring back at their next visit. Pieces of information that could not be obtained, i.e. 'don't knows', were treated as missing values in analysis.

Analysis

Univariate analysis was first performed with the Epi Info version 5 software (1). The Kruskal-Wallis H test was used to compare continuous variables. The Mantel-Haenszel chi squared test, Fisher exact test and odds ratio were used to compare categorical variables. Variables that were found to be significantly associated with adolescent pregnancy in the univariate analyses were next entered into a forward stepwise multiple logistic regression model using the SPSS PC+ statistical package (2). Differences were considered significant if p was less than 0.05 or the 95% confidence interval of the odds ratio did not enclose 1.

Ethical considerations

Only patients who gave informed consent were recruited. No subject refused consent. The research proposal was reviewed and approved by the Medical Faculty Research Committee, University of Papua New Guinea.

Study period and sample size

From July 1992 to August 1993 330 cases and 330 controls were studied.

Results

The ages of the cases ranged from 12 to 17 years, mean 16.3 ± 0.88 years. The mean age of the controls was 22.8 ± 2.03 years. 54 (16%) of the 330 subjects in each group were recruited postnatally.

Predictor sociodemographic variables

These results are set out in Tables 1-3. The cases differed significantly from the controls in the following variables. The mean age at menarche of the cases was lower (13.3 ± 1.39 vs 14.6 ± 1.60 years) and more of the cases had menarche at <15 years of age (81% vs 49%). The mean number of school years completed by the cases was smaller (5.1 ± 3.07 vs 7.9 ± 3.58 years) with more of the cases having never been to school (18% vs 7%). The proportion who had never worked was larger in the cases group (88% vs 50%) and more of the cases were currently unemployed (92% vs 59%). 48 cases and 49 controls lived in villages. Of the rest who lived in the National Capital District, 37% of the cases and 25% of the controls lived in settlements (urban slums). 84 (25%) of the cases and 24 (7%) of the controls were not married. The mean social status score of the cases was less than that of the controls (10.4 ± 4.87 vs 12.5 ± 5.70); more of the cases belonged to the low social class (47% vs 33%). Highland parentage was significantly higher among the cases than the controls (28% vs 15%); and more of the partners of the cases were of highland origin (30% vs 17%). The proportion of partners who had not been in high school was 41% among the cases and 23% in controls. The mean number of school years completed by the partners of the cases and controls were 7.7 ± 3.29 and 9.6 ± 3.43 respectively. The partner was currently unemployed in 47% of the cases and in 29% of the controls. The partner had never worked in 36% and 20% of the cases and controls respectively. A higher proportion of partners of the cases had no profession (57% vs 33%). There were no significant differences between the cases and controls in the following suspected predictor variables: number of school years completed by father and mother of the patient; whether the parents of the patient were living together; whether the partner had another wife.

Predictor sex knowledge and sexuality variables

These results are set out in Tables 4-5. Before the pregnancy, more of the cases did not know that sex causes pregnancy (28% vs 11%). But the cases who knew learned it at a younger age (14.4 ± 1.67 vs 16.7 ± 3.22 years)

TABLE 1

UNIVARIATE ANALYSIS OF SOCIODEMOGRAPHIC VARIABLES

Panel A Categorical variables

Cases	Controls	OR(95% CI)	M-H p value
Menarche under 15 years: Yes 80.5%(265/329)	48.9%(157/321)	4.33(2.99-6.26)	0.0000
Patient ever been to school: No 17.9%(59/330)	7.0%(23/330)	2.91(1.70-4.99)	0.0000
Patient employed: No 91.5%(302/330)	59.1%(195/330)	0.13(0.08-0.21)	0.0000
Patient ever worked: No 87.8%(287/327)	50.2%(164/327)	7.13(4.72-10.81)	0.0000
Patient married: No 25.5%(84/330)	7.3%(24/330)	4.35(2.62-7.28)	0.0000
Patient has low socioeconomic status: Yes 46.7%(128/274)	33.4%(99/296)	1.75(1.22-2.50)	0.0012

Panel B Continuous variables

	Cases mean (sd)	Controls mean (sd)	K-W H p value
Age at menarche	13.3(1.39)	14.6(1.60)	0.0000
Patient's school years	5.1(3.07)	7.9(3.58)	0.0000
Social status score	10.4(4.87)	12.5(5.70)	0.0000

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

sd = standard deviation

K-W H = Kruskal-Wallis H test

and learned it before menarche (51% vs 32%); they were more likely to have learned it from a family member (48% vs 37%), whereas more of the controls learned it at school (51% vs 33%). The association with where the subject learned about sex and pregnancy (home or school) was further explored by the Mantel-Haenszel summary statistics method, stratifying for knowledge acquired before and after menarche. The analysis showed the difference between the two groups to be confined to those who acquired the knowledge after menarche. In this category, significantly more of the cases were taught at home than at school. The cases thought it required a larger number of acts of sexual intercourse to cause pregnancy (3.4±2.30 vs 2.7±2.20); 81% of the cases thought it required more than one act compared with 56% of the controls. The age

at first sexual intercourse was 15.8±1.00 years for the cases and 21.4±2.36 years for the controls. The average number of times the patients were having sex in a month was 4.1±2.88 for the cases and 3.7±2.48 for the controls. The mean number of past sexual partners was 0.25±0.86 and 0.30±0.72 for the cases and controls respectively.

Predictor FP knowledge and FP practice variables

These results are set out in Tables 6-9. Before the index pregnancy, significantly fewer of the cases knew of FP (33% vs 66%). Fewer of the cases mentioned the following methods: intrauterine device (19% vs 39%), a natural method (14% vs 41%), permanent (surgical) contraception (23% vs 35%). There

TABLE 2

UNIVARIATE ANALYSIS OF SOCIODEMOGRAPHIC VARIABLES (CONTINUED)

Panel A Categorical variables

Cases	Controls	OR(95% CI)	M-H p value
National Capital District dweller lives in an urban slum: Yes 36.5%(103/282)	24.6%(69/281)	1.77(1.21-2.59)	0.0021
Patient's parents together: No 22.8%(75/329)	26.7%(88/330)	0.81(0.56-1.18)	0.2499
Patient's parents of highland origin: Yes 27.6%(91/330)	14.5%(48/330)	2.24(1.49-3.37)	0.0000
Patient's father ever been to school: No 58.6%(173/295)	56.4%(177/314)	1.10(0.79-1.59)	0.5707
Patient's mother ever been to school: No 41.5%(127/306)	43.1%(137/318)	0.94(0.67-1.30)	0.6901

Panel B Number of school years completed

	Cases mean (sd)	Controls mean (sd)	K-W H p value
Patient's father	4.3(4.40)	4.3(4.64)	0.8886
Patient's mother	2.8(3.74)	2.6(3.60)	0.9050

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

sd = standard deviation

K-W H = Kruskal-Wallis H test

was no difference in the proportions of cases and controls that mentioned a hormonal method (83% vs 90%), a barrier method (75% vs 80%) or a traditional method (22% vs 22%). A higher proportion of controls than cases had heard of a modern FP method. Significantly more of the controls had ever used a FP method (33% vs 12%); and significantly more had used a modern method (18% vs 7%). The proportion of patients who had ever used the following methods was significantly higher among the controls than among the cases: safe period (18% vs 5%), withdrawal method (18% vs 8%), condom (15% vs 5%). In the controls and cases groups, the ever-users of a hormonal method (14/330 vs 6/330) or the loop (0/330 vs 1/330) were both small. 65% of the cases and 93% of the controls said they had planned the pregnancy, i.e. they had decided they wanted a baby before they became pregnant. The difference was significant. But of the subjects who said the pregnancy was planned, only 4% of the cases and 12% of the controls had used a

modern FP method before the pregnancy. This difference was also significant.

Logistic regression analysis

Of the predictor variables which were significant in univariate analyses, 9 remained significantly associated with adolescent pregnancy in stepwise logistic regression analysis (Table 10), the others proving redundant. Age at menarche under 15 years and highland parentage were more frequent among the cases than among the controls. The frequency or proportion of the following variables was lower among the cases: patient employed; partner currently employed; patient knew about sex and pregnancy before menarche; patient knew that one unprotected sexual act could cause pregnancy; patient had knowledge of FP before this pregnancy; patient had ever used a FP method before this pregnancy; this pregnancy was planned.

TABLE 3

UNIVARIATE ANALYSIS OF SOCIODEMOGRAPHIC VARIABLES (CONTINUED)

Panel A Categorical variables

Cases	Controls	OR(95% CI)	M-H p value
Partner/husband of highland origin: Yes 30.4%(100/329)	16.7%(55/329)	2.18(1.47-3.21)	0.0000
Partner/husband was in high school: No 40.7%(120/295)	22.9%(73/319)	2.31(1.61-3.34)	0.0000
Partner/husband has a profession: No 56.8%(175/308)	33.3%(107/321)	2.63(1.87-3.70)	0.0000
Partner/husband under 20 years of age: Yes 30.4%(72/237)	0.3%(1/289)	0.01(0.00-0.05)	0.0000
Partner/husband currently employed: No 47.2%(153/324)	29.4%(97/330)	2.15(1.54-3.01)	0.0000
Partner/husband ever worked: No 36.1%(117/324)	19.7%(65/330)	2.30(1.59-3.35)	0.0000
Partner/husband has another wife: Yes 11.5%(37/321)	8.2%(27/329)	1.46(0.84-2.54)	0.1558

Panel B Continuous variables

	Cases mean (sd)	Controls mean (sd)	K-W H p value
Age of partner (years)	21.1(3.60)	25.1(3.36)	0.0000
Partner's school years	7.7(3.29)	9.6(3.43)	0.0000

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

sd = standard deviation

K-W H = Kruskal-Wallis H test

Socioeconomic consequences variables

The results are set out in Tables 1, 3 and 11. 36 (11%) of the cases were schooling when they became pregnant. Of the 36, 15 (42%) said they would continue school after confinement. Compared with the controls the cases were socioeconomically disadvantaged. They and their partners were more likely to be less educated, unemployed and unmarried. The proportion of cases who were not living with their partners/husbands was higher than that of the controls (64% vs 36%). The baby was not going to live with the patient in 50% of the cases and in 28% of the controls.

88 (27%) of parents of the cases were not happy about the pregnancy compared with 6% of the controls. The partner's family were unhappy in 29% of the cases and in 8% of the

controls. The mean age of the cases' partners was 21.1±3.60 years compared with 25.1±3.36 years for the controls'. The partner was more likely to be under 20 years of age (30% vs 0.3%) and to have no profession (57% vs 33%).

The partner was not financially responsible for the patient in 57% of the cases and 25% of the controls; and he was not going to be financially responsible for the baby in 54% of the cases and in 22% of the controls. The patient had had a relationship with her partner for less than 12 months in 48% of the cases and 27% of the controls.

Discussion

The term 'adolescence' includes those aged between 10 and 19 years (3). True adolescence is the period during which the individual is

TABLE 4

UNIVARIATE ANALYSIS OF SEXUALITY AND SEX KNOWLEDGE BEFORE INDEX PREGNANCY

Case	Control	OR(95% CI)	M-H p value
Before this pregnancy, patient knew that sex causes pregnancy: No 27.9%(92/330)	11.2%(37/330)	3.06(1.98-4.75)	0.0000
Patient learned about sex and pregnancy before menarche: Yes 51.2%(169/330)	32.1%(106/330)	2.22(1.59-3.09)	0.0000
<i>Analysis restricted to subjects who before index pregnancy knew that sex causes pregnancy</i>			
Patient learned about sex and pregnancy from a family member: Yes 48.4%(108/223)	37.4%(105/281)	1.57(1.08-2.29)	0.0126
Patient learned about sex and pregnancy at school: Yes 33.2%(74/223)	50.9%(143/281)	0.48(0.33-0.70)	0.0000
One unprotected sexual intercourse can cause pregnancy: No 80.6%(112/139)	56.0%(94/168)	3.27(1.89-5.58)	0.0000

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

TABLE 5

UNIVARIATE ANALYSIS OF SEXUALITY AND SEX KNOWLEDGE BEFORE INDEX PREGNANCY (CONTINUED)

Case Mean (sd)	Control Mean (sd)	K-W H p value
Age at which subject learned that sex causes pregnancy (years) 14.4(1.67)	16.7(3.22)	0.0000
The number of sexual acts patient thought had to be performed before pregnancy could occur 3.4(2.30)	2.7(2.20)	0.0004
Age at first sexual intercourse (years) 15.8(1.00)	21.4(2.36)	0.0000
Average number of sexual acts per month before index pregnancy 4.1(2.88)	3.7(2.48)	0.0142
Number of past sexual partners 0.25(0.86)	0.30(0.72)	0.0366

sd = standard deviation

K-W H = Kruskal-Wallis H test

undergoing physical, emotional, psychological and social maturing from childhood to adulthood. Economic independence follows much later. The journey from adolescence to maturity is full of pitfalls and traps. The future health, success and happiness of the individual depend on the individual completing this

course unscathed. Two dangerous traps on the journey from adolescence to adulthood are sexually transmitted disease and pregnancy.

In most parts of the world, adolescent sexuality and premarital sexual activity are serious problems. In Ibadan, Nigeria, 49% of

TABLE 6

UNIVARIATE ANALYSIS OF FP KNOWLEDGE BEFORE INDEX PREGNANCY

Case	Control	OR(95% CI)	M-H p value
Patient knew of FP before index pregnancy: Yes 32.7%(108/330)	66.1%(218/330)	0.25(0.18-0.35)	0.0000
<i>Analysis restricted to subjects who knew of FP before index pregnancy</i>			
Patient mentioned a natural method: Yes 13.9%(15/108)	40.8%(89/218)	0.23(0.12-0.45)	0.0000
Patient mentioned an intrauterine contraceptive device: Yes 18.5%(20/108)	39.0%(85/218)	0.36(0.19-0.64)	0.0002
Patient mentioned a surgical (permanent) method: Yes 23.1%(25/108)	34.9%(76/218)	0.56(0.32-0.99)	0.0316
Patient mentioned a hormonal method: Yes 83.3%(90/108)	90.4%(197/218)	0.53(0.26-1.11)	0.0659
Patient mentioned a vaginal barrier method: Yes 75.0%(81/108)	80.3%(175/218)	0.74(0.41-1.33)	0.2757
Patient mentioned a traditional (customary) method: Yes 22.2%(24/108)	21.6%(47/218)	1.04(0.57-1.89)	0.8917
Patient mentioned a modern method: Yes 95.4%(103/108)	96.3%(210/218)	0.79(0.22-2.86)	0.6772

FP = family planning

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

16-year-old boys and 28% of 16-year-old girls reported premarital intercourse (4). In Monrovia, Liberia, among 14-17 year olds interviewed, 62% of boys and 46% of girls had had sexual intercourse (5). In Banjul, The Gambia, premarital sexual activity was common and began at an early age among 14-24 year olds (6). In a survey carried out in the USA the percentage of unmarried girls aged 15-19 years who said they had had sexual intercourse increased from 28% in 1971 to 43% in 1982. They also began to have intercourse at younger ages. Among the 15 year olds surveyed, 1 in 7 was sexually active in 1971; in 1982 the ratio was 1 in 5 (7,8). In our survey the mean age at first sexual intercourse was 15.8 years for the cases and 21.4 years for the controls.

In most developing countries, because of the young age at marriage, most pregnancies occur in marriage and most end in childbirth: hence the high adolescent fertility rates in the

developing world. As examples, the age-specific fertility (birth) rates per 1000 women per year for 15-19 year olds for selected developing countries were 124 for Ghana in 1983-1988 (9), 173 for Nigeria in 1981-1982, 237 for Bangladesh in 1975-1976 (10), and 94 for Mexico in 1982-1987 (11). On the other hand, the majority of adolescent pregnancies in the developed world are conceived outside marriage, and most end in legal abortion (12). As a result, the adolescent fertility rates in the developed world are low. For example, in 1983 it was 52/1000 women aged 15-19 years in the USA. The association with highland parentage found in this study may be due to the fact that marriageable age is generally lower in the highlands than in the other regions. In Papua New Guinea the marriageable age as set out under the Marriage Act is 16 years. However, customary law allows marriage at menstruating age. The National Council of Women recently called for a revision of the marriageable age to 21 years because of the

TABLE 7

UNIVARIATE ANALYSIS OF FP KNOWLEDGE BEFORE INDEX PREGNANCY

Case	Control	OR(95% CI)	M-H p value
Patient had heard of a traditional (customary) FP method: Yes 13.0% (43/330)	24.5% (81/330)	0.46(0.30-0.71)	<0.0002
Patient had heard of an intrauterine contraceptive device: Yes 20.3% (67/330)	54.5% (180/330)	0.21(0.15-0.31)	0.0000
Patient had heard of a hormonal FP method: Yes 46.4% (153/330)	74.2% (245/330)	0.30(0.21-0.42)	0.0000
Patient had heard of a vaginal barrier FP method: Yes 52.7% (174/330)	77.3% (255/330)	0.33(0.23-0.47)	0.0000
Patient had heard of a natural method: Yes 35.5% (117/330)	62.4% (206/330)	0.33(0.24-0.46)	0.0000
Patient had heard of a surgical (permanent) method: Yes 48.8% (161/330)	75.2% (248/330)	0.32(0.22-0.45)	0.0000
Patient had heard of a modern FP method: Yes 61.5% (203/330)	83.6% (276/330)	0.31(0.21-0.46)	0.0000

FP = family planning
 OR = odds ratio
 95% CI = 95% confidence interval
 M-H = Mantel-Haenszel chi squared test

TABLE 8

UNIVARIATE ANALYSIS OF FAMILY PLANNING PRACTICE

Case	Control	OR(95% CI)	M-H p value
FP ever used*: Yes 12.4% (41/330)	33.3% (110/330)	0.28(0.19-0.43)	0.0000
Patient had used a hormonal FP method: Yes 1.8% (6/330)	4.2% (14/330)	0.42(0.14-1.19)	0.0695
Patient had used a vaginal barrier FP method: Yes 6.1% (20/330)	14.8% (49/330)	0.37(0.21-0.66)	<0.0005
Patient had used a natural method: Yes 10.9% (36/330)	27.9% (92/330)	0.32(0.20-0.50)	0.0000
Patient had used periodic abstinence (safe period): Yes 5.2% (17/330)	18.5% (61/330)	0.24(0.13-0.44)	0.0000
Patient had used coitus interruptus (withdrawal): Yes 7.6% (25/330)	18.2% (60/330)	0.37(0.22-0.62)	<0.0005
Patient had used a male condom: Yes 5.2% (17/330)	14.8% (49/330)	0.31(0.17-0.57)	0.0000
Patient had used a modern method*: Yes 7.0% (23/330)	17.6% (58/330)	0.35(0.20-0.60)	0.0000

OR = odds ratio
 95% CI = 95% confidence interval
 M-H = Mantel-Haenszel chi squared test
 FP = family planning
 * One subject may use more than one method

TABLE 9

UNIVARIATE ANALYSIS OF FAMILY PLANNING PRACTICE (CONTINUED)

Case	Control	OR(95% CI)	M-H p value
Index pregnancy was planned: Yes 65.5%(216/330)	93.3%(308/330)	0.14(0.08-0.23)	0.0000
<i>Analysis restricted to subjects who said they had planned the index pregnancy</i>			
FP used before index pregnancy: Yes 13.0%(28/216)	33.4%(103/308)	0.30(0.18-0.48)	0.0000
Modern FP method used before index pregnancy: Yes 4.2%(9/216)	11.7%(36/308)	0.33(0.14-0.74)	0.0025

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

FP = family planning

TABLE 10

VARIABLES SIGNIFICANT IN STEPWISE LOGISTIC REGRESSION ANALYSIS

Variable	Significance of LLR
Age at menarche <15 years	0.0000
Highland origin of parents	0.0017
Partner unemployed	0.0036
Patient knew before menarche that sex causes pregnancy	0.0002
Patient knew that one unprotected sex can cause pregnancy	0.0155
Patient had FP knowledge before pregnancy	0.0127
FP ever used before pregnancy	0.0443
Patient currently unemployed	0.0000
This pregnancy was planned	0.0000

LLR = log likelihood ratio

FP = family planning

overwhelming problems surrounding teenage marriages (13).

The dangers of adolescent sexuality and pregnancy are: (a) sexually transmitted diseases (STDs) - the sequelae are chronic pelvic inflammatory disease, ectopic pregnancy and infertility; (b) unwanted pregnancy, and the complications of illegal abortion; (c) higher risks of maternal morbidity and mortality; and (d) higher risks of perinatal and neonatal morbidity and mortality (11). The higher maternal morbidity and mortality are

chiefly from illegal abortion, severe malaria and anaemia, preeclampsia and eclampsia, inadequate antenatal care, obstructed labour from cephalopelvic disproportion, and puerperal sepsis. Criminal abortion and its complications constitute a major tragedy for the individual, the family and the community. Hospital records from cities in Africa show that 38-68% of women treated for abortion complications are under 20 years of age (14). Women younger than 15 who are also poor have the greatest risk. The increased adverse perinatal and neonatal outcomes are chiefly

TABLE 11

SOCIOECONOMIC IMPACT OF PREGNANCY ON SUBJECT VARIABLES

Case	Control	OR(95% CI)	M-H p value
Baby will live with patient: No 50.0%(165/330)	27.6%(91/330)	2.63(1.88-3.68)	0.0000
Partner/husband's parents happy that patient is pregnant: No 29.2%(92/315)	7.9%(26/328)	4.79(2.93-7.87)	0.0000
Patient's parents happy that patient is pregnant: No 26.7%(88/330)	6.4%(21/329)	5.33(3.14-9.13)	0.0000
Partner/husband financially responsible for patient: No 57.3%(189/330)	24.5%(81/330)	4.12(2.92-5.83)	0.0000
Partner/husband financially responsible for baby: No 54.2%(179/330)	21.5%(71/330)	4.32(3.03-6.17)	0.0000
Partner/husband's occupation skilled: Yes 68.4%(130/190)	84.4%(206/244)	2.50(1.54-4.17)	0.0000
Patient's relationship with partner/husband <12 months: Yes 47.5%(153/322)	26.8%(88/328)	2.44(1.75-3.45)	0.0000
Patient living with husband/partner: No 64.0%(210/328)	36.4%(120/330)	3.11(2.24-4.34)	0.0000

OR = odds ratio

95% CI = 95% confidence interval

M-H = Mantel-Haenszel chi squared test

due to low birthweight and prematurity, preeclampsia and eclampsia, and fetal death in utero from malaria (15-17). Moreover, adolescents generally do not attend for antenatal care, or are late and irregular attenders. A study of 20,000 births in two cities in Mali and Burkina Faso found that adolescents were 45% more likely than older women to have infants of low birthweight and, after controlling for socioeconomic and demographic factors, their children faced a 35% greater risk of dying within the first 24 months of life. The most important factor for the increased risk was behaviour. The adolescents were less likely to seek antenatal care and to get complete sets of vaccinations for their children. They also weaned their babies earlier and were less able to take care of their children. To hide their pregnancy, the adolescents who were at school tried to lose weight by dieting (18). Although antenatal care can markedly reduce mortality from these complications, it does not reduce it down to the rate found in the 20-24 year age group (11).

Compared with a woman who delays

childbearing until her 20s, the adolescent mother is likely to be disadvantaged. She is likely to have less education; be out of work; have a lower-paying job and less income; and be separated from her partner. In addition, her partner is likely to be financially and socially less able and responsible than the partner of a woman who begins childbearing after the age of 20 years.

Demographically, adolescent fertility hinders social development by increasing population growth at a rate which is beyond the capacity of governments to provide services and jobs. Women who marry or enter into consensual union at an early age tend to have larger families than women who marry later, regardless of contraceptive use. Early marriage also increases population growth by shortening the time between generations, thus increasing the total number of children born in a given time span (11).

Various factors contribute to the increasing prevalence of adolescent sexuality and pregnancy in the developing world: (a) the

average age at menarche has dropped 1 to 2 years to 12-14 years in the past 50 years, which has resulted in an extension of the period between sexual maturity and sexual desire on the one hand, and physical, emotional, social and economic maturity and independence on the other - as Malcolm Potts (14) observed, "For most of human history, teenagers were not reproductive. It's a tragic accident of our physiology that because of better nutrition, we're able to reproduce earlier"; (b) village-to-urban migration; (c) lack of education - premarital intercourse is usually more common among poorer and less educated young people (4); (d) low socioeconomic status; (e) lack of sex and FP education; and (f) failure to practise FP.

In this study, past contraceptive use was low in both groups: 12% of cases and 33% of controls had used a method. Coitus interruptus, the safe period, and the condom were the most commonly used methods. Although 65% of the cases and 93% of the controls said the index pregnancy had been planned, only 13% and 33%, respectively, of these planners had used any FP method before the pregnancy; and only 4% and 12% respectively had practised modern FP before the pregnancy. The differences were significant. With the rapid urbanization and modernization that are occurring in Papua New Guinea, and with more and more people moving from the villages to live in settlements (urban slums), and with little hope of employment, the incidence of adolescent pregnancy can be expected to increase as the pressures of urban modern life which encourage premarital sex are added to those of early marriage.

Counselling and education which focus on the biology of reproduction and on helping adolescents understand the consequences of their behaviour will encourage many to postpone sexual activity. Many parents and leaders fear that sex education will encourage promiscuity among adolescents, although studies have shown that this is not true (11,19-22). In the present study subjects who were taught about sex and pregnancy at home were more likely to become pregnant than those who were taught at school. This may mean that home sex education is usually incomplete. Many mothers wait on the menarche to teach

their daughters about sex and pregnancy. In counselling their children about responsible sexual behaviour, parents may be inclined to emphasize the fearful consequences of sexual activity and exhort abstinence, and ignore the FP aspects of sex education. To be effective counsellors, parents need to be taught how to teach their children reproductive and family health. Sexual abstinence is the only complete protection against the harmful results of early sexual activity. But the adolescents who reject this message should have access to family planning methods which will reduce the risks. Studies have shown that more knowledge about contraceptives and how to use them is associated with greater likelihood of not being pregnant (19,22).

Women's education has implications for their health and fertility. Better educated women are more likely to marry and begin childbearing later and to take better care of their children; they are also more likely to use contraception (19). Promoting education of girls, and encouraging them to stay on longer at school, will reduce adolescent pregnancy. The partner's education is also important, as was shown in this study.

ACKNOWLEDGEMENT

This research was funded by the University of Papua New Guinea Medical Faculty Research Committee.

REFERENCES

- 1 **Dean DG, Dean JA, Burton AH, Dicker RG.** Epi Info, version 5: a Word Processing, Database, and Statistics Program for Epidemiology on Microcomputers. Stone Mountain, Georgia: USD, Incorporated, 1990.
- 2 **SPSS Inc.** Statistical Package for the Social Sciences, SPSS/PC+. Chicago: SPSS Inc., 1990.
- 3 **World Health Organization.** The Reproductive Health of Adolescents. A Strategy for Action. A Joint WHO/UNFPA/UNICEF Statement. Geneva: World Health Organization, 1989.
- 4 **Nichols D, Ladipo OA, Paxman JM, Otolorin EO.** Sexual behaviour, contraceptive practice and reproductive health among Nigerian adolescents. *Stud Fam Plann* 1986;17:100-106.
- 5 **Nichols D, Woods ET, Gates DS, Sherman J.** Sexual behavior. Contraceptive practice, and reproductive health among Liberian adolescents. *Stud Fam Plann* 1987;18:169-176.
- 6 **Kane TT, De Buysscher R, Taylor-Thomas T, Smith T, Jeng M.** Sexual activity, family life education, and contraceptive practice among young

- adults in Banjul, The Gambia. *Stud Fam Plann* 1993;24:50-61.
- 7 **Kantner JF, Zelnik M.** Sexual experience of young unmarried women in the United States. *Fam Plann Perspect* 1972;4:9-18.
- 8 **Pratt WF, Mosher WD, Bachrach CA, Horn MC.** Understanding US fertility: findings from the National Survey of Family Growth, Cycle 3. *Pop Bull* 1984;39:1-42.
- 9 **Studies in Family Planning.** Ghana 1988: results from the demographic and health survey. *Stud Fam Plann* 1990;21:236-240.
- 10 **Studies in Family Planning.** Mexico 1987: results from the demographic and health survey. *Stud Fam Plann* 1990;21:181-185.
- 11 **Liskin L, Kak N, Rutledge AH, Smit LC, Stewart L.** Youth in the 1980s: Social and Health Concerns. Population Report Series M, No 9. Baltimore: Johns Hopkins University Population Information Program, Nov-Dec 1985:M349-M388.
- 12 **Bury JK.** Teenage pregnancy. *Br J Obstet Gynaecol* 1985;92:1081-1083.
- 13 **Butut L.** Increase marriage age: Kopkop. Papua New Guinea *Post-Courier* 1991 Feb 18:5.
- 14 **Robinson ET, Henry K, Wang G.** Adolescents and fertility. *FHI Network* 1988;10:1-12.
- 15 **Chen LC, Gesche MC, Ahmed S, Chowdhury AI, Mosley WH.** Maternal mortality in rural Bangladesh. *Stud Fam Plann* 1974;5:334-341.
- 16 **Williams LL.** Some observations on maternal mortality in Jamaica. *West Indian Med J* 1973;22:1-14.
- 17 **Elster AB.** The effect of maternal age, parity and prenatal care on perinatal outcome in adolescent mothers. *Am J Obstet Gynecol* 1984;149:845-846.
- 18 **LeGrand TK, Mbacké CSM.** Teenage pregnancy and child health in the urban Sahel. *Stud Fam Plann* 1993;24:137-149.
- 19 **Pick de Weiss S, Atkin LC, Gribble JN, Andrade-Palos P.** Sex, contraception and pregnancy among adolescents in Mexico City. *Stud Fam Plann* 1991;22:74-82.
- 20 **Zelnik M, Kim YJ.** Sex education and its association with teenage sexual activity, pregnancy and contraceptive use. *Fam Plann Perspect* 1982;14:117-126.
- 21 **Furstenberg FF Jr, Moore KA, Peterson JL.** Sex education and sexual experience among adolescents. *Am J Public Health* 1985;75:1331-1332.
- 22 **Blaney CL.** Adolescents: does sex education work? *FHI Network* 1993;14:7-11.