FACTORS ASSOCIATED WITH PREGNANCY AMONG UNMARRIED WOMEN IN MALAYSIA

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Abstract. Pregnancy among unmarried women may have negative social and health implications in Malaysia. The number of pregnancies among unmarried women has increased in Malaysia, but the socio-demographic profile of these women is unclear. This study aims to evaluate the characteristics of unmarried pregnant women and the factors associated with unmarried pregnancies among young women in Malaysia. We conducted a cross sectional study at six hospitals and six women's shelters in Peninsular Malaysia during 2011-2012. Unmarried pregnant women were compared with married pregnant women. Participants were interviewed using a structured questionnaire asking for socio-demographic data, family background, risky sexual behavior, social support and pregnancy details. A total of 484 women (239 unmarried and 245 married) were included in the study. Most unmarried subjects were adolescents, from urban areas, from a low socioeconomic group, and lived with parents prior to pregnancy. Age (OR=0.67; 95% CI: 0.61-0.74), studying status (OR=17.33; 95% CI: 2.65-113.19), alcohol use (OR=40.46; 95% CI: 2.51-652.38) exposure to pornographic material (OR=13.48; 95% CI: 3.24-56.01), contraceptive use (OR=0.20; 95% CI: 0.08-0.51), and social support (OR=0.90; 95% CI: 0.86-0.94) were all associated with unmarried pregnancy. These factors need to be considered when designing an intervention program.

Keywords: unintended pregnancy, sexual behavior, unprotected sex, sexual and reproductive health, Malaysia

INTRODUCTION

Pregnancy among unmarried women is far more likely to be unintended and to have negative effects on both the pregnant woman and her child (Raatikainen *et al*, 2005; Shah *et al*, 2011). Pregnancy among unmarried women can result in serious public health and reproductive health problems, especially in developing countries. Many unintended pregnancies among unmarried women end in abortion (Qian *et al*, 2004) which results in the death of the child and may be associated with maternal morbidity and mortality, especially in countries where abortion is illegal and unsafe. Women who carry unintended pregnancies to a live birth are more likely to experience pregnancy problems, delayed prenatal care (Hohmann-

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Marriott, 2009; Omar *et al*, 2010), adverse birth outcomes such as premature birth (Orr *et al*, 2000; Mohllajee *et al*, 2007) and low birth weight (Mohllajee *et al*, 2007) and adverse socioeconomic consequences, such as psychosocial stress and poor mental health (Raatikainen *et al*, 2005).

In a country like Malaysia, conservative traditional values dominate societal attitudes about sex, especially sex outside marriage and unmarried pregnancy. Sexual issues are not openly discussed since sexuality is considered a taboo subject. However, several local Malaysian studies have reported an increasing trend among young people of engaging in premarital sex and having sex at an earlier age than before (Jamsiah and Hazlinda, 2009; Low, 2009; Anwar *et al*, 2010). In view of the increasing trends in premarital sexual activities, it is possible the rate of unmarried pregnancy will also increase.

Pregnancies among unmarried women tend to occur at a younger age, among those with a lower educational level, among the unemployed and among those in poverty (Jordal *et al*, 2013). Pregnancy among unmarried women may also be associated with a history of sexual abuse (Kelly and Ramaswamy, 2012) and childhood sexual abuse (Francisco *et al*, 2008). Other factors associated with unmarried pregnancy include earlier initiation of sexual activity, non-consensual sexual intercourse at first sex, multiple sexual partners and less use of a condom during their lifetime (Ma *et al*, 2008).

We postulate the underlying characteristics and causes of pregnancy among unmarried women may differ from country to country. There is little published data on the characteristics of unmarried pregnant women in Malaysia. Thus, this study aimed to identify the characteristics of unmarried pregnant women in Malaysia compared to married pregnant women and to evaluate specific factors associated with unmarried pregnancy, such as demographic factors, family background, non-sexual and sexual risk behaviors and social support of Malaysian women with an unmarried pregnancy.

MATERIALS AND METHODS

Study design and setting

We conducted a cross sectional study of women with unmarried pregnancies from February 2011 to July 2012. Participants were recruited from six public hospitals and six women's shelters located in central and eastern Peninsular Malaysia. The shelters are formally organized and registered with the Malaysian Welfare Department under the Care Center Act 1993 (Act 506) and serve as residences providing support and protection for women in a social crisis.

The marital status of the pregnant women in this study was determined at the time of conception. A woman was considered to have an unmarried pregnancy if the pregnancy was conceived when she was not legally married and a married pregnancy was defined as a pregnancy that was conceived while the woman was legally married according to Malaysian law. Under Malaysian law, a marriage is legally recognized when it is registered with the State Religious Office for Muslim or Registration Department for non-Muslim couples.

Sampling

The sample size of 520 pregnant women was calculated using a Power and Sample Size Calculation (PS Software, version 3, 2009) (Dupont and Plummer, 1998) based on the rate of postpartum depres-

sion (Arifin *et al*, 2014) among unmarried women (P_0=0.44) and married women (P_1=0.31) (power=0.8, α=0.05 and m=1).

All unmarried pregnant women who sought services at these hospitals and shelters at the time of the study were invited to participate (universal sampling). The married pregnant women were recruited from obstetrics and gynecology clinics at each hospital by systematic sampling. The sampling frame and interval were determined based on the number of attendees at each participating hospital. Every fourth attendee on the registration list of the clinic was approached to participate until we reached the required sample size.

Exclusion criteria were respondents who had debilitating physical or mental disease, cerebral damage or disease, non-Malaysians (verified by identification card numbers), intravenous drug users and women who were undergoing court cases.

Instruments and measurements

The instruments used in this study were a self-devised questionnaire and a standardized validated questionnaire. The self-devised questionnaire included questions about socio-demographics, family background, non-sexual and sexual risk behavior, pregnancy details and the partner's profile. The questionnaire was first developed in English, pilot tested for face and content validation, and then translated into Bahasa Malaysia (the national language of Malaysia).

The standard questionnaire used was the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet *et al*, 1990), a scale specifically assessing social support adequacy from three sources: family, friends and significant others. It consists of 12 items: four items inquire about family, four items inquire about friends and four items inquire about significant others. Each item was rated on a seven-point Likert-scale ranging from "very strongly disagree" (one point) to "very strongly agree" (seven points). The total social support was the sum of the scores for the 12 items. The higher the score, the higher the level of social support. The standardized questionnaire was originally in English but the psychometric properties of the Malay version of this instrument have been well documented (Ng *et al*, 2010).

The dependent variable was marital status among pregnant women at the time of conception. Date of marriage, gestation in weeks and estimated dates of conception were obtained by interview and recorded. The independent variables in this study were socio-demographic characteristics (age, ethnicity, religion, educational level, studying status, employment status and household income), family background (age of parents, educational level of parents, employment status of parents, marital status of parents and number of siblings), non-sexual and sexual risk behaviors (cigarette and alcohol use, substance abuse, exposure to pornography, age of first sexual experience, age of menarche, history of sexual abuse and contraceptive use) and social support.

Data analysis

The statistics were calculated using the Statistical Package for Social Science software, version 20 (IBM, Armonk, NY). All numerical variables were tested for normal distribution with the Kolmogorov-Smirnov goodness-of-fit test. Most numerical variables were not normally distributed and were analyzed using nonparametric tests. The Mann-Whitney *U* test was used to compare variable medians, and the chi-square test to determine significant differences among categorical variables. We calculated 95% confidence

intervals; a p-value ≤ 0.05 was considered significant.

Descriptive analyses were used to compare characteristics among unmarried and married women. Bivariate analysis was conducted for independent variables and dependent variables independently to identify predictive factors. Significant variables on bivariate analysis were entered into a regression model. Multiple logistic regression modelling was used to analyze factors affecting unmarried pregnancy and assess goodness of fit using the multicollinearity test, LR test for possible 2-way interaction check, Hosmer-Lemeshow goodness-of-fit test and the Receiver Operating Characteristic (ROC) curve.

Ethical considerations

This study was approved by the Medical Ethics Committee of the University of Malaya Medical Centre, Kuala Lumpur [PPUM/MDU/300/04/03(800.3)], Research Ethics Committee (Human) of the Universiti Sains Malaysia, Kubang Kerian [USMKK/PPP/JEPeM [233.4.(1.1)] and the Medical Research and Ethics Committee of the Ministry of Health, Malaysia (NMRR-10-901-6800). Written informed consent was obtained from each respondent prior to data collection. All participants and their backgrounds were kept anonymous and confidential.

RESULTS

Characteristics of respondents and family background

A total of 549 eligible pregnant women were invited to participate and 506 women agreed to be in the study, giving a participation rate of 92.2%. Of the 40 women who refused to participate (7.3%), the following reasons were given: busy (n=16), having family problems (n=10), not feeling well (n=7) and did not have the consent of their parents (n=7). Twenty-two women who were raped were excluded from analysis giving a total of 239 unmarried and 245 married women included in the study.

The majority of women participated in the study (>95%) were ethnic Malay and Muslims. The unmarried participants were significantly younger, with a mean age of 19.0 ± 4.0 years compared to married women, with a mean age of 29.4 ± 4.9 years (p<0.001). Forty-three point one percent of the unmarried participants had a primary education, 48.5% were still studying, 93.7% were unemployed and 53.3% were from a low economic group (household monthly income <RM1,000 = USD307). Among married participants, 60.4% had a tertiary education, 93.1% had finished studying, 66.9% were employed and 45.3% were from a higher economic group (household monthly income >RM3,000 = USD921). There were significant differences in education levels, studying status, employment status and average household income between unmarried and married participants (Table 1).

All family background variables were significantly different between the two groups (p ≤ 0.05), except for the education level of the respondent's father and marital status of the respondents' parents (Table 1).

Non-sexual and sexual risk behavior

Unmarried women were more likely to engage in risky behavior (cigarette and alcohol use, substance abuse, exposure to pornographic material, involvement in premarital sexual activity, and history of sexual abuse) than married women (Table 2). They also experienced their first sexual contact earlier (mean age 17.5 ±

Table 1
Characteristics of participants.

Variable	*N*	Unmarried pregnancy *n* (%)	Married pregnancy *n* (%)	*p*-value
Age (years)	484			
Mean (SD)		19.0 (4.0)	29.4 (4.9)	<0.001[a]
Median (Range)		18.0 (13-37)	29.0 (15-47)	
Age group				
Adolescent (10-19 years)		155 (64.9)	2 (0.8)	<0.001[b]
Young adult (20-24 years)		65 (27.2)	30 (12.2)	
Adult (≥ 25 years)		19 (7.9)	213 (87.0)	
Ethnicity	484			
Malay		226 (94.6)	239 (97.6)	0.090[b]
Non-Malay		13 (5.4)	6 (2.4)	
Religion	484			
Islam		231 (96.7)	242 (98.8)	0.117[b]
Others		8 (3.3)	3 (1.2)	
Formal education level	484			
None		1 (0.4)	0	<0.001[b]
Primary		103 (43.1)	15 (6.1)	
Secondary		97 (40.6)	82 (33.5)	
Tertiary		38 (15.9)	148 (60.4)	
Studying in school	484			
Yes		116 (48.5)	2 (0.8)	<0.001[b]
No, finished studying		88 (36.8)	228 (93.1)	
No, stopped studying		35 (14.6)	15 (6.1)	
Employment status	484			
Employed		15 (6.3)	164 (66.9)	<0.001[b]
Not employed		224 (93.7)	81 (33.1)	
Average household income	474			
Low (< RM1,000)		122 (53.3)	48 (19.6)	<0.001[b]
Middle (RM1,000-RM3,000)		82 (35.8)	86 (35.1)	
High (> RM3,001)		25 (10.9)	111 (45.3)	
Living arrangement prior to pregnancy	484			
With parents		166 (69.4)	10 (4.1)	<0.001[b]
With partner		14 (5.9)	224 (91.4)	
Others		59 24.7)	11 (4.5)	
Age of respondent's mother (years)	451			
Mean (SD)		47.1 (7.1)	57.2 (7.1)	<0.001[a]
Median (Range)		46 (30-69)	56 (40-80)	
Education level of respondent's mother	378			0.006[b]
Lower		146 (85.9)	196 (94.2)	
Higher		24 (14.1)	12 (5.8)	
Employment status of respondent's mother	451			<0.001[b]
Working		94 (40.7)	44 (20.0)	
Housewife		137 (59.3)	176 (80.0)	

Table 1 (Continued).

Variable	*N*	Unmarried pregnancy *n* (%)	Married pregnancy *n* (%)	*p*-value
Age of respondent's father (years)	397			
Mean (SD)		51.2 (7.7)	61.8 (7.4)	<0.001[a]
Median (Range)		51 (30-75)	61 (43-85)	
Education level of respondent's father	325			0.061[b]
Lower		122 (79.7)	152 (88.4)	
Higher		31 (20.3)	20 (11.6)	
Employment status of respondent's father	395			<0.001[b]
Not working		26 (12.5)	79 (42.2)	
Working		182 (87.5)	108 (57.8)	
Marital status of respondent's parents	471			
Married		173 (73.0)	165 (70.5)	0.562[b]
Other		64 (27.0)	69 (29.5)	
Number of siblings	484			
Mean (SD)		5 (2)	6 (3)	<0.001[a]
Median (Range)		5 (1-13)	6 (1-13)	

[a]Chi-square test, [b]Mann-Whitney *U* test.
RM = Ringgit Malaysia (USD1 = RM 3.1)
Lower education level ≤upper secondary; higher education level >upper secondary.
The totals (*N*) are not equal due to missing data.

3.2 years, the youngest age was 11 years) than married women (mean age 24.4 ± 4.0 years, the youngest age was 15). Thirty-one point eight percent of the unmarried women reported having more than one partner during their life, and of these, 39.0% reported having multiple partners during the previous year.

Among the unmarried women, 56.7% had never used contraception, while 88.6% of married women had never used contraception (Table 2). Among unmarried women who used contraception (*n*=103), withdrawal was the most common method (23.5%), followed by condoms (21.8%), birth control pills (4.2%), an intrauterine device (0.4%) and douching (0.4%).

Social support

Table 3 shows the social support scores among unmarried and married women as measured by the Multidimensional Scale of Perceived Social Support (MSPSS). The total mean score among unmarried women (62.5 ± 10.7) was significantly ($p<0.001$) lower than married women (68.1 ± 8.8). The mean scores for the various subgroups (family, friends, and significant others) showed married women perceived they had greater social support than unmarried women ($p \leq 0.05$).

Partner profile

All unmarried participants were pregnant due to consensual sexual intercourse, but 9 of the unmarried women (3.8%) did not know who the father of the baby was, because of having a casual relationship with multiple partners. Ninety-one unmarried women (40.4%) had been in a relationship with the baby's father for less than one year. Out of 230 who knew the fa-

Table 2
Sexual and non-sexual behavior of participants.

Risky behavior	*N*	Unmarried pregnancy *n* (%)	Married pregnancy *n* (%)	*p*-value
Cigarette use	484			
Ever		48 (20.1)	3 (1.2)	<0.001[a]
Never		191 (79.9)	242 (98.8)	
Alcohol use	484			
Ever		18 (7.5)	1 (0.4)	<0.001[a]
Never		221 (92.5)	244 (99.6)	
Substance use	484			
Ever		7 (2.9)	0 (0)	0.008[a]
Never		232 (97.1)	245 (100.0)	
Exposure to pornography	484			
Yes		117 (49.0)	6 (2.4)	<0.001[a]
No		122 (51.0)	239 (97.6)	
Premarital sexual activity	484			
Yes		231 (96.7)	1 (0.4)	<0.001[a]
No		8 (3.3)	244 (99.6)	
History of past sexual abuse	484			
No		218 (91.2)	244 (99.6)	<0.001[a]
Yes		21 (8.8)	1 (0.4)	
Age at menarche (years)	480			
Mean (SD)		12.4 (1.3)	12.7 (1.2)	0.001[b]
Median (Range)		12 (9-17)	13 (9-16)	
Age of first sexual intercourse (years)	480			
Mean (SD)		17.5 (3.2)	24.4 (4.0)	<0.001[b]
Median (Range)		17 (11-33)	25 (15-46)	
Number of sexual partners in lifetime	239			
1		163 (62.5)	NA	NA
2-4		63 (24.1)		
5 or more		13 (5.0)		
Contraception used	483			
Yes		103 (43.3)	28 (11.4)	<0.001[a]
No		135 (56.7)	217 (88.6)	

[a]Chi-square test, [b]Mann-Whitney *U* test.
NA, Not applicable; The totals (*N*) are not equal due to missing data.

ther of the baby, 211 (92.5%) disclosed their pregnancy to their partners; of whom 31 (13.0%) had disappeared, 82 (34.3%) were no longer in contact with the participant and 126 (52.7%) were still in contact with the participants. Eleven unmarried participants (4.8%) married their male partners during the pregnancy. Out of the 239 who had consensual sex, 76 (31.8%) claimed their partners had abused them during sex.

Table 3
MSPSS social support score (*N*=484).

MSPSS subscales	Unmarried pregnancy Mean (SD)	Married pregnancy Mean (SD)	*p*-value[a]
Support from significant other	21.6 (4.5)	23.5 (3.3)	<0.001
Support from family	22.3 (4.9)	23.6 (3.3)	0.009
Support from friends	18.6 (4.9)	21.0 (3.6)	<0.001
Total score for social support	62.5 (10.7)	68.1 (8.8)	<0.001

[a]Mann-Whitney *U* test.

Table 4
Pregnancy details of participants.

Pregnancy details	*N*	Unmarried pregnancy *n* (%)	Married pregnancy *n* (%)	*p*-value[a]
Parity	483			
Primipara (1)		217 (90.8)	63 (25.6)	<0.001
Multipara (2-4)		18 (7.5)	152 (62.2)	
Grand multipara (>5)		4 (1.7)	30 (12.2)	
Intention of pregnancy	484			
Planned		13 (5.4)	136 (55.5)	<0.001
Unplanned		226 (94.6)	109 (44.5)	
Received antenatal care	484			
Yes		217 (90.8)	245 (100.0)	<0.001
No		22 (9.2)	0	
Time of first antenatal visit	462			
Month 1 to 3 (first trimester)		66 (30.4)	196 (80.0)	<0.001
Month 4 to 6 (second trimester)		104 (47.9)	46 (18.8)	
Month 7 to 9 (third trimester)		47 (21.7)	3 (1.2)	

[a]Chi-square test; The totals (*N*) are not equal due to missing data.

Pregnancy details

This was the first pregnancy for most (90.8%) of the unmarried participants but only 25.6% of the married participants. Ninety-four point six percent of unmarried participants reported their pregnancy was unplanned, while 44.5% married participants reported their pregnancy was unplanned (Table 4).

Most of the unmarried participants were shocked (79.5%), frightened (76.6%), or confused (39.3%) when they initially discovered they were pregnant. Thirty-five unmarried participants (14.6%) had used folk remedies to attempt an abortion, 19 (7.9%) had sought an abortion at a clinic and 8 (3.3%) had planned to commit suicide when they first found out they were pregnant.

All the married participants received antenatal care, and 90.8% of the unmarried participants did. Forty-eight percent

Table 5
Factors associated with unmarried pregnancy.

Variables	b	Adjusted odds ratio (95% CI)	*p*-value
Age (years)	-0.403	0.67 (0.61-0.74)	<0.001
Studying Finished/stopped (0), Study (1)	2.852	17.33 (2.65-113.19)	0.003
Alcohol used No (0), Yes (1)	3.700	40.46 (2.51-652.38)	0.009
Pornographic film/video No (0), Yes (1)	2.601	13.48 (3.24-56.01)	<0.001
Contraceptive used No (0), Yes (1)	-1.620	0.20 (0.08-0.51)	0.001
Social support (MSPSS score total)	-0.103	0.90 (0.86-0.94)	<0.001

Forward multiple logistic regression model was applied with married pregnancy (0) as reference, multicollinearity and interaction terms were checked and none were found; Hosmer-Lemeshow test ($p = 0.54$), classification table (overall correctly classified percentage 93.4%), and the area under the ROC curve (97.6%).
MSPSS, Multidimensional Scale Perceived Social Support.

of unmarried participants first sought antenatal care during their second trimester, while 21.7% and 30.4% first sought care during their third and first trimesters, respectively. In contrast, 80.0% of married participants first sought antenatal care during their first trimester. Unmarried participants gave the following reasons for not seeking antenatal care: embarrassment about their unmarried status (65.2%), fear of being scolded by the doctor or nurse (34.8%), not being given advice to seek antenatal care (8.7%), not having someone to bring them for antenatal care (8.7%), and not being aware they were pregnant (8.7%).

Factors associated with unmarried pregnancies

We used multivariate logistic regressions analysis, using marital status at the time of conception as the dependent variable, to determine factors associated with unmarried pregnancy. Twenty-two significant variables identified on bivariate logistic regression analysis were tested as predictor variables. In the final regression model, six independent variables correctly classified 93.4% of the data set (Table 5). The strongest predictor for unmarried pregnancy was alcohol use (OR=40.46). Women who were studying (OR=17.33) and who were exposed to pornographic material (OR=13.48) were more likely to become pregnant outside marriage. Women who had never used contraception were 0.20 times less likely to become pregnant outside marriage. Women one year older and who had one more point on their social support score were 0.67 and 0.90 times less likely to become pregnant outside marriage.

DISCUSSION

Most unmarried participants in our study were adolescents, with the youngest being 13 years old. Our results are similar

to another local study where adolescent pregnant mothers were more likely to be unmarried (Omar *et al*, 2010). Unmarried women began having sex at an earlier age, with the youngest in our study having first sexual intercourse at 10 years old. An early age of first sexual experience increases the likelihood of becoming pregnant (Kalmuss *et al*, 2003). These findings highlight the importance of effective prevention with a safe sex or abstinence education program beginning at an early age. Unmarried participants in our study were significantly more likely to have a lower education level, to be unemployed, and to have a lower socioeconomic status. These findings have been found in other studies (Woo and Twinn, 2004; Omar *et al*, 2010).

Most unmarried mothers in this study were living with their parents and still in school. This is in contrast with other studies who found sexually experienced young people lived away from their parents or family (Zulkifli and Low, 2000; Low *et al*, 2007). This could be due to the fact that the unmarried women in our study were younger. Younger age also explains their dependency on their parents. The fact that many unmarried women in our study were still living with their parents shows residing with parents does not offer protection against unmarried pregnancy. One possible explanation could be that young women living with their parents may have limited access to sexual and reproduction information and there was less monitoring of their activities by their parents (Noor Azlan *et al*, 2010), particularly when both parents were working. A local study (Wong, 2012a,b) found nearly all parents had low permissiveness regarding unmarried sex which led to fewer opportunities for sexual activity (intermittent intercourse) among young females who were living with their parents compared to young females who were living away from their parents (regular intercourse). However, many of these women reported their parents were unaware they had already started having sex (Wong, 2012a,b).

Alcohol use and exposure to pornographic materials were associated with unmarried pregnancy. Any single risk behavior increases the likelihood of involvement in other risky behaviors or its recurrence (Tu *et al*, 2012), and adolescents in our study who were sexually experienced were more likely to engage in two or more non-sexual risky behaviors than those who were not sexually experienced. It was reported in a previous study that adolescents who were more frequently exposed to pornography had their first sexual experience at a younger age and engaged in risky sexual behavior, such as anal sex and sex with multiple partners (Haggstrom-Nordin *et al*, 2005; Owens *et al*, 2012).

Although half the unmarried pregnant women in this study used contraception, most used the withdrawal method. The withdrawal method is not as effective as other contraception methods (Jones *et al*, 2009). The reason for choosing this method is unknown, since it was not explored in this study. Access to a more effective contraception among unmarried couples in Malaysia may be difficult in view of the stigma surrounding nonmarital sex and public health policy on restricted provision of contraceptives to the unmarried (Tong *et al,* 2014). Unmarried young people may have difficulty in asking for family planning services and purchasing condoms (Zulkifli and Low, 2000; Wong, 2012a).

In our study, unmarried women who had ever used contraception still became pregnant. Using less effective contracep-

tion, inconsistently using contraception and lacking a proper knowledge about contraception may explain the reasons for contraception failure among young people (Low *et al*, 2007). Wong (2012a) found young women lacked knowledge about contraception, pregnancy and the fertile period; suggesting that education in Malaysia among young people may be inadequate, especially regarding their bodies, sexual changes, reproduction and birth control. A limitation of our study was that we did not ask about the frequency of sexual intercourse and its correlation with contraceptive use, since these factors are known to be important predictors of pregnancy risk (Wang *et al*, 2003; Ma *et al*, 2008).

Perceived lack of social support was associated with unmarried pregnancies in our study, similar to previous studies (Majumdar, 2006; Reininger *et al*, 2012). The presence of social support from family and friends may decrease the occurrence of risky behavior among young people (Reininger *et al*, 2012).

Women in Malaysia may fear stigmatization, embarrassment, and community rejection following unmarried pregnancy. They may deny the pregnancy or conceal it from family members, avoiding early antenatal care. In our study, the proportion of unmarried participants who received early antenatal care was small. This finding is of concern, since unmarried pregnant women were younger and had poorer social support in our study. Adolescent mothers have more pregnancy complications, such as premature labor and low birth weight infants (Sulaiman *et al*, 2013). Early antenatal care can enable health care providers identify problems and provide necessary support. Our results differed from a previous study from Singapore (Nadarajah and Leong, 2000) that found pregnant adolescents had sought their first antenatal care visit during the third trimester. The unmarried pregnant women in our study who lived in a shelter may have sought antenatal care earlier because of the support they receive in the shelters.

There were some limitations in our study. The control group was not age matched with the study group. This could influence the differences between the two groups, but the age difference did not seem to have a significant effect on the overall result. Missing data might have affected the power of the study and biased the results. However, we believe this had a minimal effect on the overall conclusion. The participants in our study were mainly from one ethnic group; thus, the findings cannot be generalizable to other ethnic groups in Malaysia. Selecting participants from women's shelters may have introduced selection bias. To avoid selection bias, we recruited respondents from health care facilities, since hospitals are a place to receive health checkups and have deliveries. It was difficult to find unmarried pregnant women in the community due to the sensitivity of the situation and these women tend to hide their presence in the community. Consequently we recruited subjects from women's shelters who carried their pregnancy to term. This resulted in exclusion of women who had no access to shelters or the hospitals used for the study or who had terminated their pregnancy. This type of sampling limits the generalizability of the findings.

The unmarried pregnant participants in our study tended to be younger, less educated, unemployed, from a low socio-economic status, engaged in risky behavior and received less social support. A variety of factors were associated with unmarried pregnancy. Involvement of

people at different community levels, such as family, friends, teachers, neighbors and religious people, is important in reducing unmarried pregnancy. Good social support for young women may reduce their chance of having a pregnancy outside marriage. It is important to educate young people about reproductive health, safe sex and abstinence beginning at an early age. Better access to antenatal care is also needed. Further studies are needed to define the health needs of unmarried pregnant women.

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REFERENCES

Anwar M, Sulaiman S, Ahmadi K, Khan T. Awareness of school students on sexually transmitted infections (STIs) and their sexual behavior: a cross-sectional study conducted in Pulau Pinang, Malaysia. *BMC Public Health* 2010; 10: 47.

Arifin SRM, Ahmad A, Rahman RA, Loh HS, Ng CG. Postpartum depression in Malaysian women: the association with the timing of pregnancy and sense of personal control during childbirth. *Int J Acad Res* 2014; 6: 143-9.

Dupont WD, Plummer WD. Power and sample size calculation for studies involving linear regression. *Control Clin Trials* 1998; 19: 589-601.

Francisco MA, Hicks K, Powell J, Styles K, Tabor JL, Hulton LJ. The effect of childhood sexual abuse on adolescent pregnancy: an integrative research review. *J Spec Pediatr Nurs* 2008; 13: 237-48.

Haggstrom-Nordin E, Hanson U, Tyden T. Associations between pornography consumption and sexual practices among adolescents in Sweden. *Int J STD AIDS* 2005, 16: 102-7.

Hohmann-Marriott B. The couple context of pregnancy and its effects on prenatal care and birth outcomes. *Matern Child Health J* 2009; 13: 745-54.

Jamsiah M, Hazlinda H. Factors affecting social misconduct amongst adolescents in Melaka Tengah District. *J Kesihatan Masyarakat* 2009; 15: 21-31.

Jones RK, Fennell J, Higgins JA, Blanchard K. Better than nothing @ savvy risk-reduction practice? The importance of withdrawal. *Contraception* 2009; 79: 407-10.

Jordal M, Wijewardena K, Olsson P. Unmarried women's ways of facing single motherhood in Sri Lanka - a qualitative interview study. *BMC Womens Health* 2013; 13: 5.

Kalmuss D, Davidson A, Cohall A, Laraque D, Cassell C. Preventing sexual risk behaviors and pregnancy among teenagers: Linking research and programs. *Perspect Sex Reprod Health* 2003; 35: 87-93.

Kelly PJ, Ramaswamy M. The association between unintended pregnancy and violence among incarcerated men and women. *J Community Health Nurs* 2012; 29: 202-13.

Low WY. Malaysian youth sexuality: Issues and challenges. *J Univ Malaya Med Centre (JUMMEC)* 2009; 12: 3-14.

Low WY, Ng C-J, Fadzil KS, Ang E-S. Sexual issues: let's hear it from the Malaysian boys. *J Mens Health Gend* 2007; 4: 283-91.

Ma Q, Ono-Kihara M, Cong L, *et al*. Unintended pregnancy and its risk factors among university students in Eastern China. *Contraception* 2008; 77: 108-13.

Majumdar D. Social support and risky sexual

behavior among adolescents: The protective role of parents and best friends. *J Appl Soc Sci* 2006; 23: 28-43.

Mohllajee AP, Curtis KM, Morrow B, Marchbanks PA. Pregnancy intention and its relationship to birth and maternal outcomes. *Obstet Gynecol* 2007; 109: 678-6.

Nadarajah S, Leong NK. Adolescent pregnancies managed at KK Hospital. *Singapore Med J* 2000; 41: 29-31.

Ng CG, Amer Siddiq AN, Aida SA, Zainal NZ, Koh OH. Validation of the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) among a group of medical students in Faculty of Medicine, University Malaya. *Asian J Psychiatr* 2010; 3: 3-6.

Noor Azlan MN, Mohamad Ismail MY, Bazlin Darina AT. Islam and gender: Statutory rape cases among Malays in Kuala Lumpur, Malaysia. In: Nor MRM, ed. Islam and gender. Kuala Lumpur: Department of Islamic History and Civilization, Academy of Islamic Studies, University of Malaya, 2010.

Omar K, Hasim S, Muhammad NA, Jaffar A, Hashim SM, Siraj HH. Adolescent pregnancy outcomes and risk factors in Malaysia. *Int J Gynecol Obstet* 2010; 111: 220-3.

Orr ST, Miller CA, James SA, Babones S. Unintended pregnancy and preterm birth. *Paediatr Perinat Epidemiol* 2000; 14: 309-13.

Owens EW, Behun RJ, Mannings JC, Reid RC. The impact of internet pornography to adolescent: a review of the research. *Sex Addict Compulsiv* 2012; 19: 99-122.

Qian X, Tang S, Garner P. Unintended pregnancy and induced abortion among unmarried women in China: a systematic review. *BMC Health Serv Res* 2004; 4: 1-1.

Raatikainen K, Heiskanen N, Heinonen S. Marriage still protects pregnancy. *BJOG* 2005; 112: 1411-6.

Reininger BM, Perez A, Aguirre Flores MI, Chen Z, Rahbar MH. Perceptions of social support, empowerment and youth risk behaviors. *J Prim Prev* 2012; 33: 33-46.

Shah PS, Zao J, Ali S. Maternal marital status and birth outcomes: a systematic review and meta-analyses. *Matern Child Health J* 2011; 15: 1097-109.

Sulaiman S, Othman S, Razali N, Hassan J. Obstetric and perinatal outcome on teenage pregnancies. *S Afr J Obstet Gynaecol* 2013; 19: 77-80.

Tong WT, Low WY, Wong YL, Choong SP, Jegasothy R. A qualitative exploration of contraceptive practice and decision making of malaysian women who had induced abortion: a case study. *Asia-Pac J Public Health* 2014, 26, 536-45.

Tu X, Lou C, Gao E, Li N, Zabin LS. The relationship between sexual behavior and nonsexual risk behaviors among unmarried youth in three Asian cities. *J Adolesc Health* 2012; 50 (3 suppl): S75-82.

Wang RH, Wang HH, Hsu MT. Factors associated with adolescent pregnancy— a sample of Taiwanese female adolescents. *Public Health Nurs* 2003; 20: 33-41.

Wong LP. Qualitative inquiry into premarital sexual behaviours and contraceptive use among multiethnic young women; implications for education an future research. *Plos One* 2012a; 7 (12): e51745.

Wong LP. An exploration of knowledge, attitudes and behaviours of young multiethnic Muslim-majority society in Malaysia in relation to reproductive and premarital sexual practices. *BMC Public Health* 2012b; 12 (1): 865.

Woo H, Twinn S. Health needs of Hong Kong Chinese pregnant adolescents. *J Adv Nurs* 2004; 45: 595-602.

Zimet GD, Powell SS, Farley GK, Werkman S, Berkoff KA. Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *J Pers Assess* 1990; 55: 610-7.

Zulkifli SN, Low WY. Sexual practices in Malaysia: determinants of sexual intercourse among unmarried youths. *J Adoles Health* 2000; 27: 276-80.