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Short communication

## Age at menarche and its socioeconomic determinants among female students in an urban area in Bangladesh

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## ABSTRACT

This cross-sectional study aimed to determine the age at menarche and its socioeconomic determinants among urban female students ( $n = 680$ ) in Bangladesh. The mean age of the respondents was  $14 \pm 1.43$  years. Majority of the respondents were unmarried (98.4%). The mean age at menarche was  $11.6 \pm 3.6$  years, median 12 years. Almost one-third (35.7%) of the participants had menarche at the age of 12 years. There was no statistically significant difference between age at menarche before and after 12 years with the socio-economic characteristics, except education ( $p = <0.001$ ). In the multivariate model, only higher education was statistically significant predictor of age at menarche.

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## Introduction

Menarche marks the onset of puberty in female adolescents and is an important development milestone in the lives of young females [1]. Early onset of menarche is a well-established risk factor for breast cancer, ovarian cancer and several chronic diseases such as diabetes, metabolic syndrome and cardiovascular diseases [2–6]. Late menarche may, however, be positively associated with the risk of developing Alzheimer's disease [7]. Age at menarche also affect reproductive functions. Early menarche is a marker for the onset of childbearing years and may cause high fertility, sexually transmitted diseases including HIV/AIDS leading to increased mortality. Thus, age at menarche is an important indicator of reproductive health, population health and future chronic diseases.

Epidemiological evidence hinted at psychosocial and public health challenges stemming from the secular decline in age at menarche, which may have important adverse social and health consequences. A declining trend in the age at menarche has been observed in developed countries over decades commonly

attributed to childhood obesity, improved socioeconomic status and sedentary life [8,9]. A study by Hossain et al. in 2010 among 995 university students in Bangladesh reported that early menarche was associated with residence location at adolescence, religion and mother's education [10]. However, the available information on the relationship between socioeconomic context and age at menarche is not well understood. Information about the association between socioeconomic status and age at menarche is essential for developing population health policies and action plans. Substantial data in this field is available globally, but in comparison there are few reports from developing countries [11]. Therefore, we conducted this study to determine the age at menarche of young females and its socioeconomic determinants in Bangladesh.

## Methods

A cross sectional study carried out between June to November 2014 among the students of Modhu Sudin Tara Prasahanna (MSTP) girl's high school in Bongaon area, Jessore district in southwest Bangladesh. There are three high schools in the area which serves a total population of about 24,898. The MSPT school was purposively selected for this study as it represents the urban adolescent girls in the region. All students attending grades 5–10 with symptom of menarche were enrolled through convenient sampling with a response rate of 94.9% (680/716).

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Data were collected by two fourth year female medical students through face-to-face interviews using semi-structure questionnaire. The interviewers were trained by the investigators on interview skills, research ethics and about the objectives of the study. All interviews were conducted in an empty class room with adequate privacy in Bangla.

The questionnaire contained the following key variables: age of the respondents, age at menarche, marital status of respondents, religion, family size, family type, occupation of father and mother, family income, educational status of respondents, educational status of mother and father. The exact date of birth and class attended for each respondent was recorded from the school records, such as admission register, class records. To determine the age at menarche, participants were asked if they experienced any episodes of menstruation. Participants who responded positively were asked to recall the exact year and month of menarche. Various probes and local tools were used for recalling the year and month of menarche, such as grades attended when menstruating, different social and national events, local event calendars, and personal events which aid to remember the exact time.

Data were analyzed using SPSS statistical program version 17 (SPSS Corp. Texas, USA). Association between age at menarche and socio-economic status were explored using chi-square tests, Fisher's exact test and *t*-tests as appropriate. We estimated adjusted odds ratio and 95% confidence intervals with multivariate logistic regression models to evaluate the association between age at menarche and socio-economic determinants. Two-sided *p* value <0.05 were regarded as statistically significant.

The study was approved by the research review board of the Ad-Din Sakina Medical College, Jessore, Bangladesh. The school authority and respective class teachers were informed about the study and provided permission to contact the parents for approval. All parents were informed about the study through mail and were asked to sign the letter to interview their children. All participants provided written informed consent before participating in the interview.

## Results

The mean age of the respondents was  $14 \pm 1.4$  years ranging from 10 to 20 years (median = 14 years). The median family income of the respondent was 20,000 Bangladeshi Taka BDT (250 US \$) per month (1 US\$ = 80 BDT, 2014).

Among the respondents, 79.9% were Muslims, 20.1% Hindus, 61% from nuclear family, 33.4% from extended family and 5.6% from a joint family. A majority of the participants were unmarried (98.4%) and had father as family head (95%). The mean family size was  $6.7 \pm 1.32$ , median = 5 and ranging from 3–10. Almost two-third of the participants (65.5%) had 6–7 family members. The mean age at menarche of the respondents was  $11.6 \pm 1.1$  years, median = 12 years and ranging from 8–15 years. Fig. 1 shows that the highest number of girls had menarche at the age of 12, followed by 11 and 10 years. Almost half of the respondents (52.7%) were in the age 12–13 years followed by 10–11 years (40.2%), 3.8% in the range 8–9 years and 3.4% were in the range 14–15 years (Table 1).

Table 2 shows the association between age at menarche with socioeconomic characteristics. There was no statistically significant difference between age at menarche before and after 12 years with the socio-economic characteristics, except education of the respondents ( $p = <0.001$ ). In the multivariate model, only higher education was statically significant predictor of age at menarche. Compared to students at grade 5–7, those who had studied in grade 8–9 and grade 10 had 2.7 and 2.2 times higher odds of having menarche at the age of 12 years (Table 3).

## Discussion

This study reported the age at menarche among adolescent girls attending a high school in an urban district in Bangladesh was  $11.6 \pm 3.6$  years. Higher education was statistically significant predictor of age at menarche.

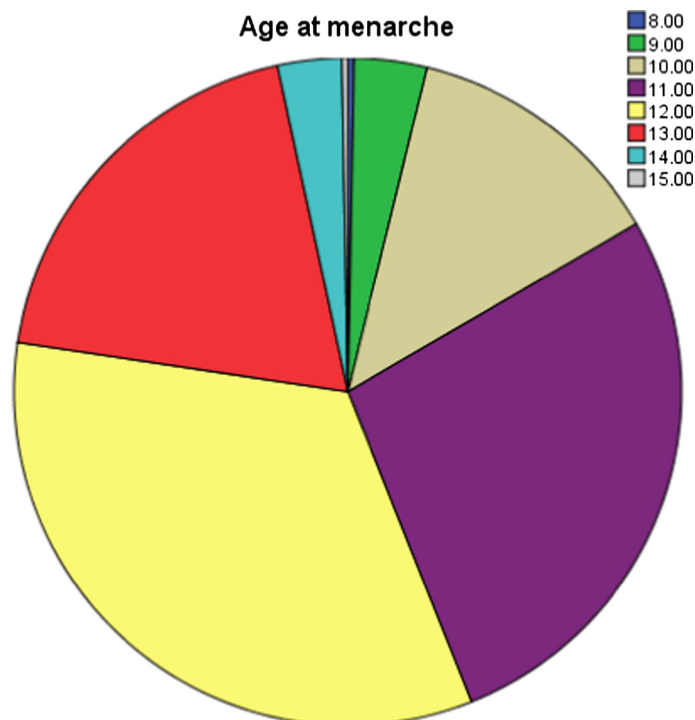


Fig. 1. Age at menarche.

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