

## **Genetic and environmental effects on age at menarche, and its relationship with reproductive health in twins**

### **ABSTRACT**

**INTRODUCTION:** Menarche or first menstrual period is a landmark in reproductive life span and it is the most prominent change of puberty. The timing of menarche can be under the influence of genes as well as individual environmental factors interacting with genetic factors. **OBJECTIVE:** Our study objectives were (a) to investigate the heritability of age of menarche in twins, (b) to obtain the association between age of menarche and childhood factors, and reproductive events/behavior, (c) to examine whether or not having a male co-twin affects early/late menarche. **METHODOLOGY:** A group of female-female identical (n = 108, 54 pairs), non-identical twins (n = 68, 34 pairs) and 17 females from opposite-sex twin sets were identified from twin registries of Malaysia and Iran. Genetic analysis was performed via two methods of Falconers' formula and maximum likelihood. **RESULTS:** Heritability was found to be 66% using Falconers' formula and 15% using univariate twin analysis. Model analysis revealed that shared environmental factors have a major contribution in determining the age of menarche (82%) followed by non-shared environment (18%). **DISCUSSION:** Result of this study is consistent with that of the literature. Timing of menarche could be under the influence of shared and non-shared environmental effects. Hirsutism was found to have a higher frequency among subjects with late menarche. There was no significant difference in age of menarche between females of opposite-sex twins and females of same-sex twins. **CONCLUSION:** It is concluded that twin models provide a powerful means of examining the total genetic contribution to age of menarche. Longitudinal studies of twins may clarify the type of environmental effects that determine the age of menarche.

**Keyword:** Menarche; Reproductive health; Twin