Non-genetic risk factors for early and late age at menarche in Eastern Ukrainian females

Anna Yermachenko 1,2, Iryna Mogilevkina 3,4, Vitaliy G. Gurianov 5, Olena Getsko 3 and Volodymyr Dvornyk 1,6,*

1 School of Biological Sciences, the University of Hong Kong, Hong Kong SAR, P.R. China
yermach@connect.hku.hk
2 Department of Obstetrics and Gynecology, McMaster University, Hamilton, ON, Canada
3 Department of Obstetrics, Gynaecology and Perinatology, Donetsk National Medical University, Ukraine
imogilevkina@gmail.com
4 Department of Medical and Biological Physics, Bogomolets National Medical University, Kyiv, Ukraine
i_@ukr.net
5 Department of Science, Shupyk National Medical Academy of Postgraduate Education, Kiev, Ukraine
6 Department of Life Sciences, Alfaisal University, P.O. Box 50927, Riyadh, 11533, Kingdom of Saudi Arabia
(correspondence address)
* Corresponding author: vdvornyk@alfaisal.edu

With 1 figure, 3 tables and 1 appendix

Abstract: BACKGROUND: Age at menarche is a reproductive trait, which is largely influenced by environmental factors. Each population has a set of lifestyle factors that may shift age at menarche in different direction. Populations of Eastern Slavs, particularly Ukrainians, are underrepresented in studies of reproductive health. The objective of the present research was to determine important non-genetic risk factors, which may contribute to menarcheal onset in Eastern Ukrainians. METHODS: In total 620 females aged 17–25 years participated in the cross-sectional survey. The questionnaire included lifestyle factors previously reported in other populations as those, which might affect age at menarche. The risk factors for early and late age at menarche were determined using logistic regression models. The models were validated by receiver operating curves. RESULTS: Body composition in the prepubertal stage as presented by respondents seems to have the strongest association with age at menarche. Those who were shorter and thinner as compared to their peers at age six had significantly more chance to start menstruating later (OR = 1.66, 95% CI [1.01–2.73]) and reduced chance to have menarche before 12 years old (OR = 0.32, 95% CI [0.14–0.73]). Maternal smoking during pregnancy and low protein intake reported during childhood may decrease a probability of late age at menarche. CONCLUSIONS: Although overall body composition at age of six was a main trait, which was associated with menarcheal timing, more information on body measurements (e.g. waist-hip ratio) in prepubertal stage would help to establish a greater degree of accuracy on this matter.

Keywords: age at menarche; environmental factors; Eastern Ukrainians

Introduction

Age at menarche is a multifactorial trait, which may be associated with a risk of some disorders, such as breast cancer, type 2 diabetes, cardiovascular diseases and osteoporosis in later life (Giles et al. 2010; Glueck et al. 2013; Mueller et al. 2014). Age at menarche is determined by multiple genetic and environmental factors and their interactions (Yermachenko & Dvornyk 2014). These factors may vary in different populations. Although the menarche timing has been extensively studied in Whites of Western Europe and the United States (Gaudineau et al. 2010; Morris et al. 2011; Reagan et al. 2012), no studies of risk factors for age at menarche have been conducted in Eastern Slav women.

The goal of this study was to determine non-genetic factors, which may contribute to early and late menarche in Eastern Ukrainians.