

## THE INFLUENCE OF MIGRATION FACTOR ON THE ESTABLISHMENT OF MENSTRUAL FUNCTION IN GIRLS

Milushkina OYu<sup>1</sup>, Popov VI<sup>2</sup>, Skoblina NA<sup>1</sup>, Bokareva NA<sup>1</sup>, Astashkevich EV<sup>1</sup>, Zakharova AA<sup>1</sup>, Skoblina EV<sup>3</sup> ✉

<sup>1</sup> Pirogov Russian National Research Medical University, Moscow, Russia

<sup>2</sup> Burdenko Voronezh State Medical University, Voronezh, Russia

<sup>3</sup> Institute for Demographic Research of the Federal Research Sociological Center RAS, Moscow, Russia

The problems of migration are becoming increasingly important and have primary impact on women's and children's health. The aim of the study was to evaluate the influence of migration factor on the establishment of menstrual function in girls. The study enrolled 1,222 female undergraduate students of Moscow universities, born in 1995–2000, of diverse ethnicity. The data were collected in 2015–2020 by questionnaire method. The main group included 322 students classified as migrants and the comparison group included 900 students of local origin (Muscovites). Statistical processing of the data was carried out using Statistica 10.0 package (StatSoft; USA). Mean age at menarche constituted  $151.35 \pm 1.20$  months in migrants and  $150.88 \pm 1.06$  months in Muscovites ( $p > 0.05$ ). For all participants, menarcheal age fell within the range of 11–15 years (normal). Other parameters of menstrual function were also similar between the groups and comparable to corresponding data collected in other countries.

**Keywords:** menstrual function, Muscovites, migrants, reproductive healthcare

**Author contribution:** all authors made equal contributions to the study and manuscript preparation.

**Compliance with ethical standards:** The study was approved by Local Ethical Board at Pirogov Russian National Research Medical University (Protocol № 159 of November 21, 2016). All participants provided informed consent for the study.

✉ **Correspondence should be addressed:** Natalia A. Skoblina  
Ostrovityanova, 1, Moscow, 117997, Russia; skoblina\_dom@mail.ru

**Received:** 24.03.2022 **Accepted:** 14.04.2022 **Published online:** 24.04.2022

**DOI:** 10.24075/brsmu.2022.017

## ВЛИЯНИЕ ФАКТОРА МИГРАЦИИ НА СТАНОВЛЕНИЕ МЕНСТРУАЛЬНОЙ ФУНКЦИИ У ДЕВОЧЕК

О. Ю. Милушкина<sup>1</sup>, В. И. Попов<sup>2</sup>, Н. А. Скоблина<sup>1</sup>, Н. А. Бокарева<sup>1</sup>, Е. В. Асташкевич<sup>1</sup>, А. А. Захарова<sup>1</sup>, Е. В. Скоблина<sup>3</sup> ✉

<sup>1</sup> Российский национальный исследовательский медицинский университет имени Н. И. Пирогова Минздрава России, Москва, Россия

<sup>2</sup> Воронежский государственный медицинский университет имени Н. Н. Бурденко, Воронеж, Россия

<sup>3</sup> Институт демографических исследований Федерального научно-исследовательского социологического центра Российской академии наук, Москва, Россия

Проблемы миграции приобретают масштабное значение во всем мире оказывают влияние прежде всего на здоровье женщин и детей. Целью исследования было установить влияние фактора миграции на становление менструальной функции у девочек. С помощью анкетирования в период с 2015 по 2020 г. изучали становление менструальной функции и возраст менархе у 1222 студенток 1995–2000 года рождения различной этнической принадлежности, обучающихся на 1–2 курсах университетов г. Москвы. В основную группу вошли 322 студентки-мигрантки, в группу сравнения — 900 москвичек. Средний возраст менархе у мигранток составил  $151,35 \pm 1,20$  месяца, у москвичек —  $150,88 \pm 1,06$  месяца ( $p > 0,05$ ). У участниц обеих групп возраст наступления менархе составил 11–15 лет, что соответствует норме. В группе мигранток средний возраст менархе не отличался от возраста наступления менархе у москвичек и сопоставим с данными, полученными в разных частях света.

**Ключевые слова:** менструальная функция, москвички, мигрантки, охрана репродуктивного здоровья

**Вклад авторов:** все авторы внесли эквивалентный вклад в исследование и подготовку публикации.

**Соблюдение этических стандартов:** исследование одобрено этическим комитетом РНИМУ им. Н. И. Пирогова (протокол № 159 от 21 ноября 2016 г.), все участницы подписали добровольное информированное согласие.

✉ **Для корреспонденции:** Наталья Александровна Скоблина  
ул. Островитянова, д. 1, 117997, г. Москва, Россия; skoblina\_dom@mail.ru

**Статья получена:** 24.03.2022 **Статья принята к печати:** 14.04.2022 **Опубликована онлайн:** 24.04.2022

**DOI:** 10.24075/vrgmu.2022.017

The national project “Demography” implemented in the Russian Federation since 2019 regards female reproductive health as one of the top priorities.

According to WHO, female reproductive health implies the ability to conceive and bear a child in the absence of sexually transmitted diseases and with access to the means of family planning, ensured safety and security of pregnancy and childbirth, and health maintenance for both the mother and the child. Female reproductive health depends on socio-economic, environmental, hygiene, cultural, and lifestyle factors [1].

Migration processes reflect the economic situation, which is a staple point for the new economic theory of migration. Recent changes in the migration policy of the Russian Federation have been associated with the increase in external and internal migration flows recorded by the Federal State Statistics Service [2].

The global increase in the rates of migration has primary impact on women's and children's health. In this context, protecting the reproductive health of adolescent girls is absolutely essential [3–5].

The age at menarche is considered a sensitive indicator reflecting the impacts of adverse factors (economic, social, etc.) on girls' health [6]. For instance, relocation to another part of the country may affect physical development, physiological rhythms, and ultimately the establishment of menstrual function [7].

A recent study focused on female immigrants in Moscow Region demonstrates that “migration” and “adaptation” are largely interconnected: changing the place of residence requires adaptation to new conditions and integration into new environments [8].

For Moscow Region, protection of the reproductive health of female migrants is especially relevant: according to official statistics, every seventh child in this region is born to a non-permanent female resident, i.e. interregional or international migrant [9].

This study aimed to evaluate the influence of migration factor on the establishment of menstrual function in girls.

## METHODS

The study enrolled 1,222 female students of Moscow universities undergraduate year 1–2, born in 1995–2000, of diverse ethnicity. The data were collected in 2015–2020 by questionnaire method. The participants were aged  $19.4 \pm 0.3$  years. The main group consisted of 322 students classified as internal or external migrants; the number of observations was determined as guaranteeing 95% reliability of the results based on the established guidelines by K. A. Otdelnova [10]. In terms of ethnicity, the main group was diverse and encompassed immigrants from North Caucasus and Central Asia (external migrants), as well as Russian citizens — Chechens, Ingushs, Dagestanis, Ossetians, Adygs, and other (internal migrants). In accordance with the UN's International Migration Statistics Practical Guide for the Countries of Eastern Europe and Central Asia, all of them were classified as long-term migrants because their stay in Moscow lasted 1 year or longer [11]. The comparison group consisted of 900 students of local origin (Muscovites). The inclusion criteria were as follows: beginning of menstrual function during stay in Moscow; compliance with sex and age requirements; studying at a university in Moscow; health group I-II; conventional lifestyle with regard to nutrition, physical activity, etc.; correct completion of the questionnaire. The exclusion criteria were as follows: the lack of informed consent for the study; onset of menstrual function before moving to Moscow; non-compliance with sex and age requirements; staying in other regions; studying in other educational institutions; health group III; non-conventional lifestyles including addictions; incorrect completion of the questionnaire. The data were formalized as the "Database for the study of menstrual function in adolescent girls (born in 1995–2000)", registration certificate 2020622018 of October 23, 2020.

Statistical processing was carried out using Statistica 10.0 package (StatSoft; USA). Compliance of variables to the law of normal distribution was verified at the initial stage of the analysis. The descriptive statistics used means (M), standard deviations

( $\sigma$ ), and Student's *t*-test for between-the-group comparison; the differences were considered significant at  $p \leq 0.05$ .

## RESULTS

Mean age at menarche constituted  $151.35 \pm 1.20$  months (12.5 years) in migrants and  $150.88 \pm 1.06$  months (12.5 years) in Muscovites ( $p > 0.05$ ). The 68% expectance intervals were 11 years 5 months to 13 years 7 months in migrants and 11 years 5 months to 13 years 6 months in Muscovites.

Apart from these characteristics, we analyzed menarcheal age distributions for the two groups of the study (Fig. 1).

Menarche at the age of 11 was reported by 5.3% of migrants and 9.2% of Muscovites. Menarcheal age distributions for the groups differed ( $p \leq 0.05$ ). For Muscovites, the curve had smoother outline and showed a closer fit to the law of normal distribution; 35.8% of this group had menarche at the age of 13. For migrants, the curve had a major peak at 13 years (49.9% of the group) followed by a minor peak at 15 years (20.9% of the group). Equal major proportions of migrants and Muscovites had menarche at the age of 12–14 (73.8% in each group).

Other parameters of menstrual function for the studied cohort are illustrated in Figs. 2 and 3.

Overall, the studied parameters of menstrual function in migrants and Muscovites were similar. Shortened cycles (< 21 day, proiomenorrhea) and prolonged cycles (> 35 days, opsomenorrhea) were reported by 2.0% and 7.0% of participants, respectively.

## DISCUSSION

Menarcheal age and other parameters of menstrual function were similar between the groups and comparable to corresponding data for other countries.

A Portugal-based study enrolling 11,274 women showed a gradual decrease in menarcheal age in the course of the 20th century, by average 31.1 days every 5 years to the current figure of  $12.0 \pm 1.25$  years [12].

A similar trend towards accelerated onset of puberty was observed in Taiwanese girls, with the average age at menarche constituting  $11.35 \pm 1.06$  years [13].

A Poland-based survey enrolling 11,671 10–16-year-old girls in 1985–1986, 2005–2006, and 2015–2016 assessed the age at menarche with regard to socioeconomic

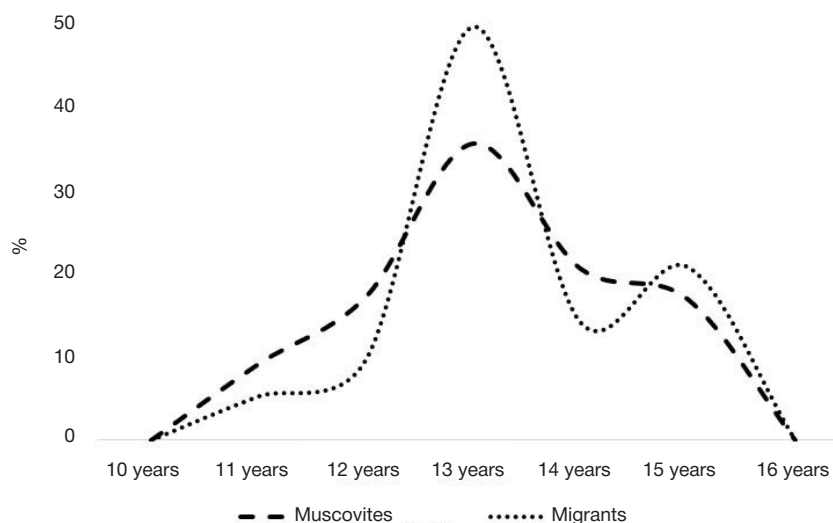


Fig. 1. Menarcheal age distributions for the two groups of the study

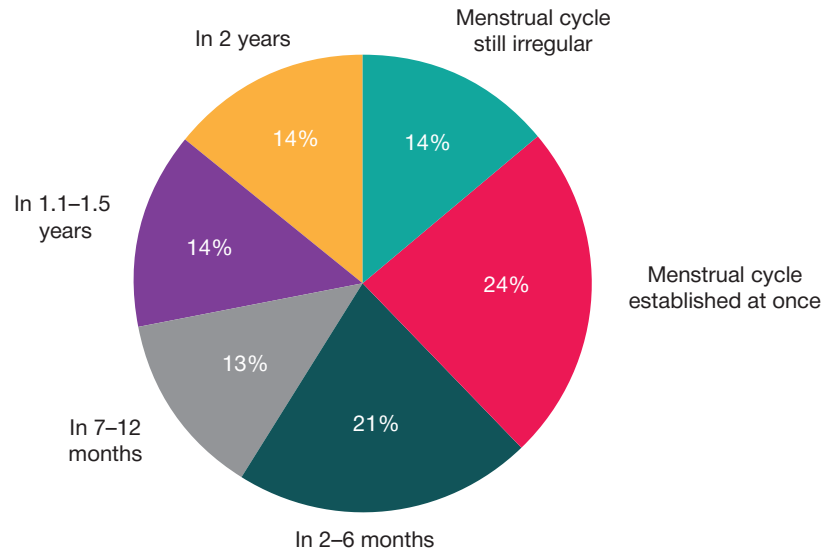


Fig. 2. Pie chart of the time spans from menarche to regular menstrual cycle

background (education level of parents, child number and overall socioeconomic status of the family) to reveal significant acceleration in all groups [14].

Consistently with these findings, the average age at menarche in 24,380 Mexican-born female participants was reduced from 13.3 years among girls born before the 1940s to 12.56 years among girls born in the 1980s and later on. Moreover, in all age cohorts, urban women had menarche significantly earlier than their rural peers. It should be noted that urban non-indigenous women and rural indigenous women were the youngest and the oldest at menarche, respectively [15].

Our findings can also be viewed in the context of other surveys enrolling female migrants.

One study, which encompassed 814 girls adopted internationally, compared menarcheal age between Chinese adoptees in North America and age-matched girls in China. The median menarcheal age in the adoptees constituted 12.37 years (95% CI 11.84–13.00 years), while the estimated prevalence of menarche at an age below 10 years was about 3%. In the non-adopted native residents of China, these parameters were similar [16].

However, a Denmark-based study demonstrated a significant 10–20-fold increase in the risks of precocious puberty for internationally adopted girls. Although the risks of precocious puberty depended on the country of origin, in

children who immigrated with their family these risks were elevated only slightly. Remarkably, older age of adopters significantly increased the risks of precocious puberty in adoptees regardless of their country of origin. The authors believe that psychosocial stressors in infancy and childhood may accelerate the onset of puberty: adoptees typically have a history of traumatic life events which may predispose them to precocious puberty [17].

In our study, none of the participants in both groups reported precocious puberty; on the contrary, a distinct subgroup of migrants (20.9%) reported a somewhat delayed menarche at the age of 15.

Migration, accompanied by a change in climatic and geographic conditions, has been shown to significantly interfere with menstrual function in 3% of girls, in terms of menstrual cycle length and regularity [18].

Other factors that negatively affect female reproductive health in adolescents include poor quality of medical care, unfavorable socio-economic conditions, low family income, and poor healthcare system at the state level [19–21].

According to a number of foreign studies, the negative impact of migration on women's health is reflected by the structure of pregnancy outcomes [22–24], including higher risks of pregnancy and childbirth complications and a 1.3-fold increase in neonatal morbidity among migrants compared with other social groups [3].

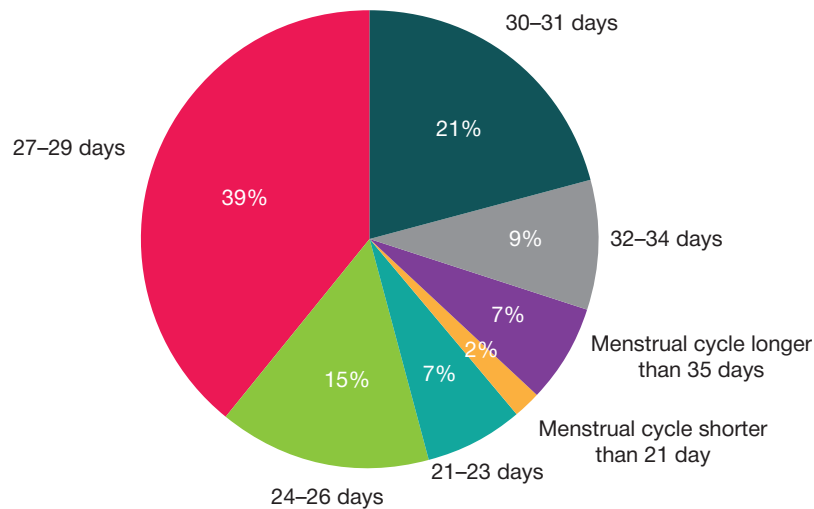


Fig. 3. Pie chart of the menstrual cycle lengths

## CONCLUSIONS

In migrants and Muscovites, menarcheal age was similar, within the absolute range of 11–15 years (normal). Other parameters

of menstrual function were also similar between the groups and comparable to corresponding data for other countries. The research can be expanded to long-term migrants from non-CIS countries.

## References

- World Health Organization. Sexual and reproductive health. Доступно по ссылке (дата обращения 14.02.2022): <https://www.who.int/reproductivehealth/en/>.
- Ioncev VA, Ryazancev SV, Ionceva SV. Novye tendencii i formy ehмиграции из Росси. *Ehkonomika regiona*. 2016; 12 (2): 499–509. Russian.
- Artyukhov IP, Li-Gi-Ru SYu, Gorbach NA, i dr. Zdorov'e beremennykh migrantok: analiz i vozmozhnosti upravleniya. *Zdravooxranenie Rossijskoj Federacii*. 2016; 60 (1): 27–30. Russian.
- Fontanelli Sulekova L, Spaziante M, Vita S, et al. The pregnancy outcomes among newly arrived asylum-seekers in Italy: Implications of public health. *J Immigr Minor Health*. 2021; 23 (2): 232–9.
- Alarcão V, Stefanovska-Petkovska M, Virgolino A, et al. Fertility, migration and acculturation (FEMINA): A research protocol for studying intersectional sexual and reproductive health inequalities. *Reprod Health*. 2019; 16 (1): 140.
- Sergeyko IV, Lyutsko VV. Ocenka vliyaniya social'no-ehkonomicheskoy situacii na sostoyanie reproduktivnogo zdorov'ya naseleniya. *Sovremennye problemy nauki i obrazovaniya*. 2014; 1: 164. Russian.
- Bokareva NA, Milushkina OYu, i dr. Vliyaniye migracii na fizicheskoe razvitiye detej. *Zdorov'e naseleniya i sreda obitaniya*. 2017; 8 (293): 40–43. Russian.
- Izmerov NF, Izmerova NI, Bukhtiyarov IV, i dr. Osobennosti adaptacionnykh reakcij u zhenshin-migrantok i riski narusheniya zdorov'ya pri razlichnoj dlitel'nosti prebyvaniya na territorii moskovskogo regiona. *Analiz riska zdorov'yu*. 2017; 2: 119–127. Russian.
- Ryazancev SV, Karimov MM. Vliyaniye trudovoy migracii na reproduktivnoe zdorov'e (na primere tadzhikskix migrantov v Rossii). *Vestnik Tadzhikskogo gosudarstvennogo universiteta prava, biznesa i politiki*. 2013; 2 (54): 40–51. Russian.
- Otdelnova K. A. Opredeleniye neobходимого chisla nablyudenij v social'no-gigienicheskix issledovaniyax. *Sb. trudov 2-go MMI*. 1980; 150 (6): 18–22. Russian.
- Statistika mezhdunarodnoj migracii. *Prakticheskoe rukovodstvo dlya stran Vostochnoj Evropy i Central'noj Azii*. Zheneva: Organizaciya ob'edinennykh nacij, 2011. Доступно по ссылке (дата обращения 13.04.2022): [https://unece.org/fileadmin/DAM/stats/publications/RUS\\_International\\_Migration\\_Statistics\\_Practical\\_Guide.pdf](https://unece.org/fileadmin/DAM/stats/publications/RUS_International_Migration_Statistics_Practical_Guide.pdf). Russian.
- Queiroga AC, Silva RS, Santos AC, et al. Secular trend in age at menarche in women in Portugal born between 1920 and 1992: Results from three population-based studies. *Am J Human Biol*. 2020; 32 (5).
- Chow JC, Chou TY, Tung T, et al. Recent pubertal timing trends in northern Taiwanese children: Comparison with skeletal maturity. *J Chin Med Assoc*. 2020; 83 (9): 870–5.
- Saczuk J, Wasiluk A, Pytasz P. Secular trend and social gradients in the menarcheal age of girls from eastern Poland between 1986 and 2016. *Anthropol Rev*. 2020; 83 (3): 279–91.
- Marván ML, Castillo-López RL, del-Callejo-Canal DD, et al. Secular trends in age at menarche in 20th century Mexico: Differences by ethnicity, area of residency, and socioeconomic status. *Am J Human Biol*. 2020; 32 (6).
- Hayes P, Tan TX. Timing of menarche in girls adopted from China: a cohort study. *Child Care Health Dev*. 2016; 42 (6): 859–62. DOI: 10.1111/cch.12393.
- Teilmann G, Pedersen CB, Skakkebaek NE, et al. Increased risk of precocious puberty in internationally adopted children in Denmark. *Pediatrics*. 2006 Aug; 118 (2): e391–9. DOI: 10.1542/peds.2005-2939.
- Isakova ZhK, Musuraliev MS. Vliyaniye processa migracii na menstrual'nyy funkciyu devushek iz vysokogornyx regionov. *Web of Scholar*. 2018; 2 (4) (22): 26–29.
- Abramova VM, Chebotareva AA, Krivosheva II, i dr. Sravnitel'nyy analiz vliyaniya reproduktivnogo zdorov'ya zhenshhiny na posleduyushhee stanovlenie menstrual'noj i reproduktivnoj funkcii u docherej. *Original'nye issledovaniya*. 2014; 2: 46–50. Russian.
- Uvarova EV, Tarusin DI, Kuchma VR, i dr. Profilaktika narushenij reproduktivnogo zdorov'ya detej i podrostkov. *Voprosy shkol'noj i universitetskoj mediciny i zdorov'ya*. 2018; 2: 45–62. Russian.
- Castellucci H, Viviani C, Boccardo G, et al. Gender inequality and sexual height dimorphism in Chile. *J Biosoc Sci*. 2021; 53 (1): 38–54.
- Arcos E, Vollrath A, Sánchez X, et al. Motherhood in immigrant women in Chile: A qualitative study. *Midwifery*. 2018; 66: 182–6.
- Banounin BH, Adekunle AO, Oladokun A, et al. Impact of internal migration on fertility in Cotonou, Benin republic. *Etud Popul Afr*. 2018; 32 (2): 4305–18.
- Rokicki S, Montana L, Fink G. Impact of migration on fertility and abortion: Evidence from the household and welfare study of accra. *Demography*. 2014; 51 (6): 2229–54.

## Литература

- World Health Organization. Sexual and reproductive health. Доступно по ссылке (дата обращения 14.02.2022): <https://www.who.int/reproductivehealth/en/>.
- Ионцев В. А., Рязанцев С. В., Ионцева С. В. Новые тенденции и формы эмиграции из России. *Экономика региона*. 2016; 12 (2): 499–509.
- Артюхов И. П., Ли-Ги-Ру С. Ю., Горбач Н. А., и др. Здоровье беременных мигранток: анализ и возможности управления. *Здравоохранение Российской Федерации*. 2016; 60 (1): 27–30.
- Fontanelli Sulekova L, Spaziante M, Vita S, et al. The pregnancy outcomes among newly arrived asylum-seekers in Italy: Implications of public health. *J Immigr Minor Health*. 2021; 23 (2): 232–9.
- Alarcão V, Stefanovska-Petkovska M, Virgolino A, et al. Fertility, migration and acculturation (FEMINA): A research protocol for studying intersectional sexual and reproductive health inequalities. *Reprod Health*. 2019; 16 (1): 140.
- Сергейко И. В., Люцко В. В. Оценка влияния социально-экономической ситуации на состояние репродуктивного здоровья населения. *Современные проблемы науки и образования*. 2014; 1: 164.
- Бокарева Н. А., Милушкина О. Ю., и др. Влияние миграции на физическое развитие детей. *Здоровье населения и среда обитания*. 2017; 8 (293): 40–43.
- Измеров Н. Ф., Измерова Н. И., Бухтияров И. В., и др. Особенности адаптационных реакций у женщин-мигранток и риски нарушения здоровья при различной длительности пребывания на территории московского региона. *Анализ риска здоровью*. 2017; 2: 119–127.
- Рязанцев С. В., Каримов М. М. Влияние трудовой миграции на репродуктивное здоровье (на примере таджикских

- мигрантов в России). Вестник Таджикского государственного университета права, бизнеса и политики. 2013; 2 (54): 40–51.
10. Отдельнова К. А. Определение необходимого числа наблюдений в социально-гигиенических исследованиях. Сб. трудов 2-го ММИ. 1980; 150 (6): 18–22.
  11. Статистика международной миграции. Практическое руководство для стран Восточной Европы и Центральной Азии. Женева: Организация объединенных наций, 2011. Доступно по ссылке (дата обращения 13.04.2022): [https://unece.org/fileadmin/DAM/stats/publications/RUS\\_International\\_Migration\\_Statistics\\_Practical\\_Guide.pdf](https://unece.org/fileadmin/DAM/stats/publications/RUS_International_Migration_Statistics_Practical_Guide.pdf).
  12. Queiroga AC, Silva RS, Santos AC, et al. Secular trend in age at menarche in women in portugal born between 1920 and 1992: Results from three population-based studies. *Am J Human Biol.* 2020; 32 (5).
  13. Chow JC, Chou TY, Tung T, et al. Recent pubertal timing trends in northern taiwanese children: Comparison with skeletal maturity. *J Chin Med Assoc.* 2020; 83 (9): 870–5.
  14. Sączuk J, Wasiluk A, Pytasz P. Secular trend and social gradients in the menarcheal age of girls from eastern Poland between 1986 and 2016. *Anthropol Rev.* 2020; 83 (3): 279–91.
  15. Marván ML, Castillo-López RL, del-Callejo-Canal DD, et al. Secular trends in age at menarche in 20th century Mexico: Differences by ethnicity, area of residency, and socioeconomic status. *Am J Human Biol.* 2020; 32 (6).
  16. Hayes P, Tan TX. Timing of menarche in girls adopted from China: a cohort study. *Child Care Health Dev.* 2016; 42 (6): 859–62. DOI: 10.1111/cch.12393.
  17. Teilmann G, Pedersen CB, Skakkebaek NE, et al. Increased risk of precocious puberty in internationally adopted children in Denmark. *Pediatrics.* 2006 Aug; 118 (2): e391–9. DOI: 10.1542/peds.2005-2939.
  18. Исакова Ж. К., Мусуралиев М. С. Влияние процесса миграции на менструальную функцию девушек из высокогорных регионов. *Web of Scholar.* 2018; 2 (4) (22): 26–29.
  19. Абрамова В. М., Чеботарева А. А., Кривошапова И. И., и др. Сравнительный анализ влияния репродуктивного здоровья женщины на последующее становление менструальной и репродуктивной функции у дочерей. Оригинальные исследования. 2014; 2: 46–50.
  20. Уварова Е. В., Тарусин Д. И., Кучма В. Р., и др. Профилактика нарушений репродуктивного здоровья детей и подростков. Вопросы школьной и университетской медицины и здоровья. 2018; 2: 45–62.
  21. Castellucci H, Viviani C, Boccardo G, et al. Gender inequality and sexual height dimorphism in Chile. *J Biosoc Sci.* 2021; 53 (1): 38–54.
  22. Arcos E, Vollrath A, Sánchez X, et al. Motherhood in immigrant women in Chile: A qualitative study. *Midwifery.* 2018; 66: 182–6.
  23. Banougnin BH, Adekunle AO, Oladokun A, et al. Impact of internal migration on fertility in cotonou, Benin republic. *Etud Popul Afr.* 2018; 32 (2): 4305–18.
  24. Rokicki S, Montana L, Fink G. Impact of migration on fertility and abortion: Evidence from the household and welfare study of accra. *Demography.* 2014; 51 (6): 2229–54.