RUDN Journal of Sociology. ISSN 2313-2272 (Print), ISSN 2408-8897 (Online) **2025 Vol. 25 No. 4 835–843**
Вестник РУДН. Серия: СОЦИОЛОГИЯ http://journals.rudn.ru/sociology

DOI: 10.22363/2313-2272-2025-25-4-835-843
EDN: KAMQXU

2020 census-based comparative estimations of infant and child mortality in Tajikistan*

S.V. Ryazantsev[1,2], N.S. Ryazantsev[3], A.Kh. Rakhmonov[3]

[1]Institute for Population and Social Research of the Mahidol University,
Phutthamonthon, 999, 4 Road Phutthamonthon, Salaya, 73170, Thailand

[2]RUDN University,
Miklukho-Maklaya St., 6, Moscow, 117198, Russia

[3]Institute for Demographic Research of FCTAS RAS,
Fotievoy St., 6–1, Moscow, 119333, Russia

(e-mail: svriazan@gmail.com; nikipaulistano@gmail.com; abubak.93@mail.ru)

Abstract. The article aims at estimating and analyzing with an indirect method the infant mortality and under-five years child mortality in urban and rural areas of one of the poorest countries in the post-Soviet space of Central Asia — the Republic of Tajikistan. Demographic data collected by the 2020 Population and Housing Census was used to estimate the child mortality by focusing on the data on children ever born and children still alive, and the number of married women at that time. By today, the estimated infant and child mortality in 2005–2019 has significantly declined. At the same time, in recent years, both infant and child mortality in urban areas has become much higher than in rural districts. Despite the gradually declining general child mortality rate in Tajikistan, the state authorities at all levels have to continue implementing different target national and local measures in urban and rural areas in order to significantly improve and even develop medical health care and service systems, providing access to them for the wider population, adopt new housing and other social policies to ensure for women, children and families in general better social, economic and medical environment and support.

Key words: Republic of Tajikistan; 2020 population census; infant mortality; child mortality; urban mortality; rural mortality; state; government authorities

For citation: Ryazantsev , S.V., Ryazantsev N.S., Rakhmonov A.Kh. 2020 census-based comparative estimations of infant and child mortality in Tajikistan. *RUDN Journal of Sociology.* 2025; 25 (4): 835–843. https://doi.org/10.22363/2313-2272-2025-25-4-835-843

The Republic of Tajikistan with more than 10.4 million people [22] and an average household with 6.1 people [10. P. 34] remains a very conservative state (even among Central Asian societies), since marriage, family and traditions

The article was submitted on 28.07.2025. The article was accepted on 14.10.2025.

are considered sacred values, while having children out of wedlock is highly stigmatized. These features have a direct impact on marriage behavior, making couples give birth to babies in complete families, have several children, and so on, which is still the rule, not the exception, across the country. For instance, in 2020, about 66.5% of the population were legally married [10. P. 23], and the total fertility rate (TFR) was slightly over 3.2 (28.3 people per 1 thousand population) with a forecast of stable decline to 2 by only 2073 [3].

At the same time, such trends persist despite such fundamental social-economic challenges as poverty (of a very high level), social inequality and unemployment [21; 22], which always affect national mortality level, especially in the most vulnerable social groups and age cohorts, i.e., infants and children. Therefore, the relevance of the study is determined by the exceptional importance of preserving the lives and health of the younger cohorts as a key indicator of social well-being of the Tajik society and its sustainable development. Infant and child mortality rates reflect not only the situation of the national healthcare system but also the general level of social-economic development, quality of life and efficiency of state social programs for supporting families and children.

In Tajikistan, despite the general positive trend of declining infant and child mortality in recent years, child mortality rates are still relatively high even for the Central Asian region. Significant disparities persist between urban and rural areas due to uneven distribution of medical and social resources, differences in living standards and access to quality healthcare and medical infrastructure, i.e., persistent systemic problems in ensuring equal conditions for child survival and development, particularly in socially vulnerable and far located regions. Moreover, the situation in Tajikistan turns out to be somewhat more complicated than seems due to the typical problems of emerging states in terms of social policies, healthcare, environment, infrastructure, and many more.

Tajikistan is still the poorest country in the macro-region in different social-economic indicators, namely the purchasing power parity (PPP) [18], with all the corresponding consequences in different spheres. This situation directly affects health care system, which is reflected in such indicators as mortality rates. Unfortunately, compared to other Central Asian states, the rates of infant and under-five years mortality in Tajikistan are the highest (except for Turkmenistan totally closed for assessment due to the political regime) [22]. Today Tajikistan declares child survival, development and some other aspects as the key public health priorities for the government and national agencies [11], following the ideas and goals of the UNICEF [17] and JICA [8. P. 1, 41].

In 2004, some statistical data of the UNICEF were almost three times higher than the national official data due to the differences in the definition of live births (the Tajik definition is not in line with international standards [9]). In the early 2000s, this was common for former Soviet states which were only trying to develop national statistical services and methods in line with at least general world standards in order

to get support from such international organizations and institutions [19. P. 12] as the UNICEF, UNFPA, IOM, UN Women, USAID, etc. Thus, the surveys of the time revealed acute respiratory infections in Tajikistan as one of the main factors increasing the number of deaths among babies (20% died of pneumonia), diarrhea caused by the poor quality of water killed 12% of children [9]. Malnutrition remained a serious public health problem, causing preventable deaths and hindering children's physical and cognitive development [17] (about 21% of Tajik children under five were chronically malnourished) [17]. In addition, many women and children suffered from micronutrient deficiencies, which is reflected in high rates of anemia and iodine deficiency [17].

There is also under-reporting of infant mortality cases, since some families do not register child's birth or death [9], which is typical for many post-Soviet countries. In Tajikistan, this is partly explained by the unwillingness to pay registration fees and the fact that many children are born by underage mothers or in polygamous families [7]. In 2013, the UNICEF mentioned these reasons as explaining why about 12% of newborns were not registered in Tajikistan [1], this, being deprived of the right to medical and social assistance [1].

In 1990, infant mortality was 83 per 1,000 live births and the under-five years mortality rate — 105; in 2017–29 and 34 respectively [17; see also: 14]. During the past twenty years, the Tajik government has tried to improve the situation, and the recent data is not that high compared to the early 2010s or the 1990s–2000s; however, this data is far from the Sustainable Development Goals (SDGs) of the Millennium Development Goals [17] even compared to the neighboring countries.

From the sociological perspective, infant and child mortality in Tajikistan reflects broader social inequalities in access to healthcare, living conditions, maternal support, which are determined by gaps in family income and belonging to certain social classes or ethnic groups. In other words, the persistent gap between urban and rural families demonstrates structural disparities: while urban residents have better access to medical institutions, rural populations face barriers related to distance, cost and shortage of medical personnel. Women and children in remote areas are often vulnerable in different terms (economic, geographical and information), which reduces their chances for survival and healthy development. Therefore, child mortality is not only a medical or demographic indicator but a key marker of social inequality and uneven social development in the country.

Our research is based on the official macro-data of the 2020 Tajik national census conducted by the Presidential Statistical Agency of the Republic of Tajikistan (TAJSTAT). This agency claims to be administratively autonomous, but its head is the country's chief statistician and directly reports to the president and government the results of population censuses and household surveys. TAJSTAT is also responsible for the national report "Women and Men of the Republic of Tajikistan" conducted with the support of the UN Women [14]. Datasets of micro-data, required for our estimates, were taken from the so-called

demographic and health survey (DHS) conducted by the DHS Program and funded by the US Agency for International Development (USAID). However, due to the on-going review of the US assistance programs, the project is currently on pause, and users cannot download available datasets (for 2023 and 2025) on the web site. For instance, the 2017 DHS report includes some secondary data but only in relative terms [8. P. 64], while the 2023 DHS midterm report lacks necessary for our research information, despite mentioning it [4. P. 3].

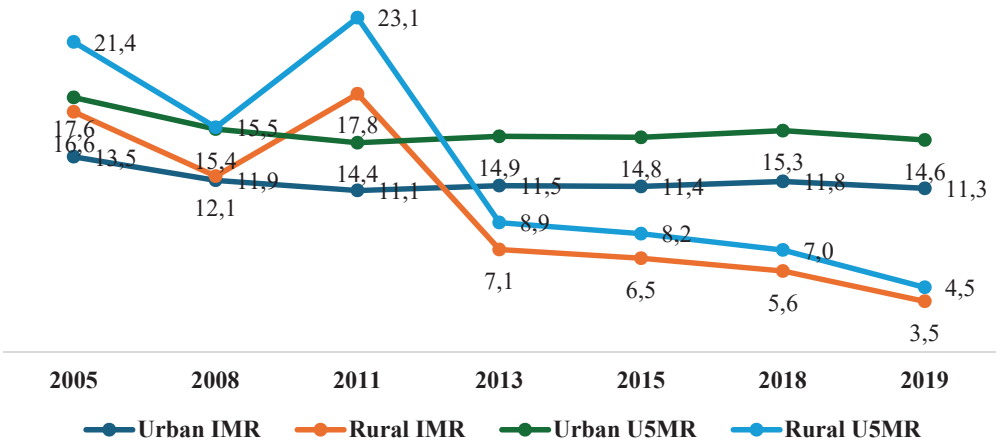
The latest national Population and Housing Census was conducted in October 2020 [13]. According to the TAJSTAT, the survey was conducted by interviews without providing personal documents [12], i.e., foreign citizens could have also been 'counted'. The final census report was published only in 2022–2023, including the special volume on fertility and mortality rates. The census questions about children ever born (CEB) and children still alive (CSA) (which exclude stillbirths) were asked to all women aged 15+, and female respondents were divided into age groups with a difference of 5 years (including 70+ group), regardless of their marital status [12]. Sex of children was also specified during the census, but the data has not been published yet [12]. Therefore, the separate data for legally married women (not to be confused with ever married women) at the age of 15(17)–49 was taken into consideration (since 2010, in Tajikistan the minimum age for marriage is 18 years, but in exceptional cases the court may permit marriage at 17) in addition to the data for both urban and rural areas. Moreover, the already published data allows to conduct further calculations for a deeper regional analysis (the capital city of Dushanbe, Gorno-Badakhshan Autonomous Region, Sughd Region, Khatlon Region, and regions of the so-called republican subordination).

In this study, to estimate infant and under-five years mortality rates, we applied indirect techniques based on the use of the census data on the number of children ever born (CEB), children still alive (CSA), and the total number of women in each age cohort: child mortality is estimated indirectly as a share of children who died among those ever born, based on the answers of respondents rather than the official data on births and deaths. Such an approach assumes that the child's risk of dying depends mainly on age rather than other maternal or delivery factors. In other words, we made calculations based on the extended UN version of the Trussell's variation of the Brass Method of indirect estimation with logit transformation including standard mortality tables and correction factors [15; 16], which the method converts into standard mortality indicators such as infant mortality rate (IMR) and under-five years mortality rate (U5MR). Estimates based on the data on women aged 15–19 were not taken into account due to the small number of births and deaths in the group.

Thus, the research methodology consisted of six main steps: to find a share of dead children and infants among CEB and CSA; to calculate average numbers of CEB for each five-year cohort; to select a model life table family for Tajikistan; to estimate the average age of birth by age and for each group of mothers, and

probability of child's death before a certain age (nq0) based on the data on deceased children (share of deaths among births); to identify approximately in what years (time reference — t(x)) children were born by women in each group to understand the period to look at mortality; to convert data on mortality of children before a certain age (nq0) into a standard indicator — mortality under five years (5q0). The family life table known as the UN General Life Model [15; 16] was chosen, since it seems be the most appropriate due to being designed specifically for countries with incomplete, inaccurate or irregular population data, which is often the case in Central Asia, including Tajikistan. In turn, among the reasons for not choosing for example the East Model life table for Tajikistan one can note large regional discrepancies and a relatively narrow historical database.

Figure 1 presents the history of changes (dynamic) of infant mortality rate (IMR) and under-five years mortality rate (U5MR) from 2005 to 2019 in the Republic of Tajikistan among married women, based on the 2020 national census. Taking the reported year of the initial census as beyond calculated t from 39, the years of reference are as follows: 2019, 2017, 2015, 2013, 2010, 2007, and 2005 respectively.



Changes in infant and child mortality rates in urban and rural areas of Tajikistan (2005–2019)

The data on urban and rural settlements is presented as Tajikistan remains an agrarian-rural country with the lowest level of urbanization in the world [21]. According to the TAJSTAT [13. P. 33], 68% of almost 1.6 million households (about 6.54 million people) are rural, which determines significant differences in demographic indicators in cities and suburban areas. The general decline in IMR and U5MR in Tajikistan from 2005 to 2019 differed for urban and rural areas. It is surprising that despite the general improvement of the situation in the country, it is urban areas that lag behind periphery in terms of child

survival, and this situation is especially unusual for developing countries with low level of urbanization.

According to Figure 1, in the period under study infant and child mortality rates in Tajikistan significantly decreased, which is confirmed by both official data and our calculations. From 2005 to 2019, the IMR decreased from 15 per 1,000 (13.5 in urban and 16.6 in rural areas) to 7,4 per 1,000 (11.3 and 3.5 respectively). The same trend is observed for U5MR: in 2005–19.5 per 1,000 (17.6 in urban and 21.4 in rural areas), in 2019–9.6 (14.6 and 4.5 respectively), which means almost 51% reduction in child mortality. In other words, in 2005, infant and child mortality in rural areas was significantly higher than in cities (13.5 and 17.6 vs 16.6 and 21.4), while in the 2010s and then in 2019, rural districts show much better numbers (3.5 and 4.5 vs 11.3 and 14.6 for IMR and U5MR in rural and urban areas respectively).

On the one hand, medical institutions, including perinatal centers and specialized clinics for babies and children, are concentrated in large and densely populated cities — Dushanbe, Khujand and some regional centers, which ensures timely assistance to pregnant women and newborns, timely diagnostics of pregnancy complications, qualified obstetric and neonatal care, while access to such services in rural areas remains limited — hospitals and medical facilities are often located at great distances, cannot reach patients due to poor roads and transport links [19. P. 22], suffer from a shortage of doctors and have outdated equipment and tools [19. P. 20]. As a result, many women in rural areas are forced to give birth at home, which increases risks for both mother and child. High level of poverty does not allow rural families to get even common access to quality food, clean water, and essential medications [19. P. 16–17, 21]. This explains the situation in 2000s, when infant and child mortality rates were lower in urban areas with better medical services. However, the same factors determined the opposite situation in the 2010s, which explains lower mortality rates for infants and children in rural areas compared to urban districts.

On the other hand, rural residents often move to urban areas for work or to join their husbands who once went to the city to earn money, but they are officially registered in their place of origin. If their children die in cities, such deaths are registered as urban, although de facto these families are rather rural. In addition, poor urban areas (with poor sanitation and overcrowded households) experience a higher risk of infection, and in remote areas children are often born at home, which is why their deaths are not registered. All this artificially lowers rural statistics. Moreover, city hospitals are more often visited by seriously ill children from villages with insufficient or no specialized care, and their deaths are also registered as urban. In general, death registration in cities is much more organized than in rural areas, where some cases remain statistically ‘invisible’. As researchers we should also keep in mind possible misinterpretations of census questions about the number of children by illiterate rural residents [10. P. 30], which could have also significantly affected the data on child mortality.

The above findings suggest that the census-based indirect estimates are likely to underestimate the level of infant and under-five years mortality due to the nature of self-reported data on CEB and CSA indicators, which tend to omit early neonatal deaths and unregistered cases. Consequently, official statistics, although possibly affected by reporting biases in medical institutions, appear to provide figures that are closer to the real situation. In the 2000s, the same paradox was observed in the Republic of Uzbekistan, the most populated country in Central Asia [2], due to migration and different accounting systems, but after adjusting the initial methodology the statistical data manage to stabilize [2]. In other words, Tajikistan in not a unique case, at least in its macro region. However, the country will definitely not reach SDG 3.2 goals related to ending preventable deaths of newborns and children under five by 2030 (or even in the mid-term perspective) but would get closer to these goals if increases its efforts to reduce mortality. The country's main problems in this perspective are structural — poverty, shortage of doctors and weak infrastructure — and hinder the long-term development. Certainly, there are some positive changes in infant and child mortality rates in Tajikistan, determined mainly by reforms and improvements in the national health care and service systems, technological progress in different spheres, comprehensive financial and non-monetary support from international organizations, donors and institutions, and other factors. For instance, vaccination of children, including in remote areas, has significantly reduced mortality from vaccine-preventable diseases such as measles, polio and diphtheria; training health workers and nurses in neonatology and obstetrics techniques has also played an important role.

References

1. ASIA-Plus: In Tajikistan, 12% of newborns are not registered. 2013 // URL: https://old.asiaplustj.info/ru/news/tajikistan/society/20131212/v-tadzhikistane-12-novorozhdennykh-detei-ne-registriruyutsya. (In Russ.).
2. ASIA-Plus: Demographic path of Uzbekistan. 2006 // URL: https://old.asiaplustj.info/ru/news/tajikistan/20060302/demograficheskii-put-uzbekistana. (In Russ.).
3. Database Earth: Total Fertility Rate of Tajikistan. 2025 // URL: https://database.earth/population/tajikistan/fertility-rate.
4. DHS: Tajikistan Demographic and Health Survey 2023: Key Indicators Report. 2024 // URL: https://dhsprogram.com/pubs/pdf/PR155/PR155eng.pdf.
5. DHS: Tajikistan Demographic and Health Survey 2025 // URL: https://dhsprogram.com/methodology/survey-search.cfm?sendsearch=1&strl=225&crt=1&listgrp=0.
6. DHS: Tajikistan Demographic and Health Survey 2017. 2018 // URL: https://dhsprogram.com/pubs/pdf/FR341/FR341.pdf.
7. Dikaev T. Tajikistan's unrecorded lives. 2005 // URL: https://iwpr.net/410z2rg6.
8. JICA: Tajikistan Primary Health Care Data Collection Study — Final Report. 2021 // URL: https://openjicareport.jica.go.jp/pdf/1000046720.pdf.
9. Reliefweb: Tajikistan: Country tops Central Asia infant mortality rate. 2004 // URL: https://reliefweb.int/report/tajikistan/tajikistan-country-tops-central-asia-infant-mortality-rate.
10. Rizoev N.M. Dissemination of the Republic of Tajikistan 2020 Population and Housing Census Data. 2020 // URL: https://unece.org/sites/default/files/2023-09/WS10RizoevENG.pdf.
11. Strategy for the Protection of Public Health in the Republic of Tajikistan until 2030. 2021 // URL: https://ncc.tj/wp-content/uploads/2024/02/Стратегия-охраны-здоровья-на-период-до-2030-года.pdf. (In Russ.).

12. TAJSTAT: Census 2020: Methodology. 2023 // URL: https://www.stat.tj/wp-content/uploads/2024/12/metodologicheskie-poyasneniya.pdf. (In Russ.).
13. TAJSTAT. Census 2020 // URL: https://www.stat.tj/ru/perepis-naseleniya-i-zhilishhnogo-fonda-2020. (In Russ.).
14. TAJSTAT: Women and men of the Republic of Tajikistan. 2017 // URL: https://www.stat.tj/wp-content/uploads/2024/02/tajikistan_statistical_publication-1.pdf. (In Russ.).
15. UN: Manual X. Indirect Techniques for Demographic Estimation. Chapter III. 1983 // URL: https://unstats.un.org/unsd/demographic/standmeth/handbooks/Manual_X-en.pdf.
16. UN: Step by Step Guide to the Estimation of Child Mortality. 1990 // URL: https://www.un.org/en/development/desa/population/publications/pdf/mortality/stepguide_childmort.pdf.
17. UNICEF: Health and Child Survival. 2017 // URL: https://www.unicef.org/tajikistan/health-and-child-survival.
18. Ventura L. Poorest countries in the world. 2024 // URL: https://gfmag.com/data/economic-data/poorest-country-in-the-world.
19. WHO: Assessment of the health sector of the Republic of Tajikistan. 2010. URL: https://iris.who.int/bitstream/handle/10665/347931/WHO-EURO-2010-3960-43719-61504-rus.pdf.
20. World Bank: Population – Tajikistan. 2025 // URL: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=TJ.
21. World Bank: Poverty & Equity Brief — Tajikistan. 2023 // URL: https://databankfiles.worldbank.org/public/ddpext_download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/current/Global_POVEQ_TJK.pdf.
22. World Bank: Human Capital Data — Tajikistan. 2025 // URL: https://humancapital.worldbank.org/en/economy/TJK.

DOI: 10.22363/2313-2272-2025-25-4-835-843
EDN: KAMQXU

Сравнительные оценки младенческой и детской смертности в Таджикистане на основе переписи населения 2020 года*

С.В. Рязанцев[1,2], Н.С. Рязанцев[3], А.Х. Рахмонов[3]

[1]Институт народонаселения и социальных исследований Университета Махидол,
Пхуттхамонтхон Роад 4, 999, Phutthamonthon, Салайя, 73170, Таиланд

[2]Российский университет дружбы народов (РУДН),
ул. Миклухо-Маклая, 6, Москва, 117198, Россия

[3]Институт демографических исследований ФНИСЦ РАН,
ул. Фотиевой, 6–1, Москва, 119333, Россия

(e-mail: svriazan@gmail.com; nikipaulistano@gmail.com; abubak.93@mail.ru)

Аннотация. Цель проведенного авторами исследования — оценка и анализ младенческой и детской (в возрасте до пяти лет) смертности в городской и сельской местности на основе косвенного метода демографических расчетов для одной из беднейших стран постсоветского пространства в Центральной Азии – Республики Таджикистан. Демографические

Статья поступила в редакцию 28.07.2025. Статья принята к публикации 14.10.2025.

данные, представленные в официальной переписи населения и жилищного фонда Таджикистана, проведенной в 2020 году, были использованы авторами для оценки детской смертности на основе числа детей, родившихся живыми, числа детей, оставшихся в живых, и числа женщин, состоявших в браке на момент рождения/смерти ребенку. Согласно имеющимся данным, расчетная младенческая и детская смертность в Таджикистане значительно снизилась за период с 2005 по 2019 годы. Однако в последние годы как младенческая, так и детская смертность в городских районах Таджикистана оказалась намного выше, чем в сельских районах страны. Несмотря на постепенное снижение общего уровня детской смертности в Таджикистане, государственные органы всех уровней должны продолжать реализовать комплексные меры национального, регионального и локального уровня в городских и сельских районах, чтобы значительно повысить уровень, а где-то даже создать соответствующие институты системы здравоохранения, обеспечить доступ к ним для всего населения страны, а также разрабатывать и реализовывать такие меры социальной политики, которые позволят женщинам, детям и семьям повысить качество и уровень своей жизни с точки зрения ее социальных, экономических и медицинских показателей.

Ключевые слова: Республика Таджикистан; перепись населения 2020 года; младенческая смертность; детская смертность; городская смертность; сельская смертность; государственные органы

Для цитирования: *Рязанцев, С.В., Рязанцев Н.С., Рахмонов А.Х.* Сравнительные оценки младенческой и детской смертности в Таджикистане на основе переписи населения 2020 года // Вестник Российского университета дружбы народов. Серия: Социология. 2025. Т. 25. № 4. С. 835–843. https://doi.org/10.22363/2313-2272-2025-25-4-835-843