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Department of Demography and Geodemography

REPRODUCTIVE HEALTH PATTERNS IN POST-SOVIET CENTRAL ASIAN COUNTRIES

Master Thesis

Aliya Takirova

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Thesis Supervisor: Prof. RNDr. Jitka Rychtaříková, CSc.

I declare that this thesis is my own work under the supervision of Prof. RNDr. Jitka Rychtaříková, CSc. Where other sources of information have been used, they have been acknowledged.

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Reproductive health patterns in post-Soviet Central Asian countries

Abstract

This study aims to evaluate reproductive health patterns among post-Soviet Central Asian republics since their independence. The reproductive health indicators of individual countries were researched and compared. Furthermore, cluster country groups among selected post-Soviet, post-Socialist and capitalist countries were identified based on certain reproductive health indicators for the beginning and the end of the research period. The subsequent research was focused on 1999 Kazakhstan Demographic and Health Survey data. This thesis explores statistically significant factors influencing pregnancy outcomes in the country. According to the results, never married, urban women, women of Ukrainian, Russian, and other ethnicities, women living in the East and North regions were more likely to terminate a first pregnancy by an induced abortion rather than giving a live birth. Additionally, the same categories were proven to be statistically significant using the Poisson regression analysis, except the regions were shown to be the West and the North.

Keywords: post-Soviet Central Asia, reproductive health, maternal mortality, pregnancy outcomes

CONTENTS

LIST OF ABBREVIATIONS

CIS	Commonwealth of Independent States
CEE	Central and Eastern Europe
DHS	Demographic and Health Survey
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICD-9	The 9th revision of International Statistical Classification of Diseases and Related Health Problems
ICD-10	The 10th revision of International Statistical Classification of Diseases and Related Health Problems
MDG	Millennium Development Goal
MMRate	Maternal mortality rate
MMRatio	Maternal mortality ratio
PM	The proportion of maternal deaths among deaths of women of reproductive age
TransMonEE	Transformative Monitoring for Enhanced Equity
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNSD	United Nations Statistics Division
WHO	The World Health Organization

LIST OF TABLES

LIST OF FIGURES

Chapter 1

Introduction

After the collapse of the Soviet Union the newly independent Central Asian republics had to take control of their own development. The challenges of changing from a centrally planned to a market-based economy were handled by each country in different ways, particularly in the sphere of health care. The term "Central Asia" includes a wide region, but the focus of this thesis is solely on five post-Soviet Central Asian countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. According to Anderson and Silver (1997), Central Asian countries are characterized as traditionally Muslim[1] new independent states which have some common historical and cultural links with each other. All of them have predominantly young populations with a considerable proportion of people living in rural areas (Rechel et al. 2011). At the same time, they differ in many respects, including languages and cultures (Veenema 2000). Comparative analysis will be based on data from 1991[2] up to 2010. Statistical methods and the Demographic and Health Survey data from Kazakhstan will be used in order to analyze what key factors have the most influence on female reproductive health.

Geographic proximity and the common Soviet past of the region, as well as the author's origin and interest in studying her native region, were the factors that influenced the final decision to study Central Asian republics.

1.1 Problem definition and relevance of the research

Reproductive health and its extreme negative consequence of maternal mortality is not only relevant to demographic study but is also reflected in the economic growth and questions of human rights of a given country.

Each studied country's political regime experienced its own patterns of historical development during the observed period. For instance, Tajikistan experienced a civil war between 1992 and 1997, while Turkmenistan is considered to be an internationally isolated state (Rechel et al. 2011), "where President Saparmurat Niyazov's increasingly oppressive policies had extended to

[1] Original spelling in the source – "Moslem" – changed to more commonly used "Muslim".
[2] Particular demographic indicators used in the research are taken from the year 1990 instead of 1991 due to the fact that some international statistical agencies only publish them every 5 years starting from 1990.

widespread closure of health and education facilities" (Rechel, Sikorskaya and McKee 2009a:2093). Such political climates adversely affect the current availability of accurate data on many reproductive health indicators.

One of the main achievements of the Soviet welfare system was investment in social services. Such investments included the improvement of citizens' welfare by providing universal basic education and health care. After the collapse of the Soviet Union, economic situations have changed throughout the region. In the first 5 years of the 1990s economic change resulted in a 30%–50% drop of income per capita and industrial production. Expenditures for social services declined and led to increased health risks in the populations of these countries, particularly for women and children; economic troubles led to a shortage in pharmaceuticals, medical equipment and supplies, which made them hard to obtain. Central Asian female life expectancy started to decline, maternal mortality rates remained high and high prevalence of the causes of maternal mortality (sepsis, preeclampsia, hemorrhage) indicated "difficulties of health professionals in dealing with the rapid transition from the structured Soviet system to a market economy" (Veenema 2000:301)[3].

On the other hand, because of restricted information on demographic and epidemiological dynamics in the Soviet era, it is not easy to make a comparative analysis on health related data between the Soviet and post-Soviet periods (Veenema 2000). A similar idea about Central Asia is expressed by Anderson and Silver, who point out that "real levels in mortality, both past and present, are obscured by data error" (Anderson and Silver 1997:120), and by Kingkade and Arriaga, who note that "the status of the epidemiological transition in the former Soviet countries is not well documented" (Kingkade and Arriaga 1997:156). Hence, the compilation of reproductive health patterns of post-Soviet Central Asian countries with available demographic data on health outcomes poses many methodological difficulties.

According to Veenema (2000), mortality data by age, sex, and causes of death, as well as information on the region's epidemiological transition stands, helps to set priorities for health care and to control major risk factors and disease outbreaks. It also helps to create comprehensive guidelines for effective interventions aimed at reducing the number of diseases. However, due to high probability of grave underreporting of disease prevalence and poor health outcomes, completeness of data, its validity and reliability in Central Asian republics is highly questionable. In turn, the absence of accurate data on these matters translates into the inability of the health system planners and health care providers to:

- Determine the population's specific health needs;
- Determine priorities among these needs;
- Prepare and plan adequate responses to current and potential health threats.

Understanding the causes of deaths in a population is important in order to:

- Reduce the number of premature women and children deaths;
- Improve overall health of women and children;

[3] Both the direct quotation and all information in the paragraph belong to Veenema 2000.

- Be able to prevent diseases and negative conditions which could lead to premature loss of working adults;
- Positively influence health status and quality of family life (Veenema 2000).

Such data is especially crucial in relation to the overall state of health and well-being of females, for it has extremely strong impact on all other aspects of a country's development. As the UNFPA Executive Director Thoraya Ahmed Obaid pointed out, "evidence from research and from the progress made so far prove that investing in women is not only the right thing to do, it is also smart economics," and "when women are healthy and survive, they provide enormous social and economic benefits for their families, communities and nations" (Dungus 2010). Therefore, accurate data gathering must be a priority for any country or region that wishes to improve its social and economic status.

1.2 Research aim and objectives

This thesis will investigate the differences and similarities in five post-Soviet Central Asian countries from 1990 to 2008 focusing on maternal mortality and reproductive health indicators, as well as the main factors that influence their trends and levels. In order to carry out this study, the following **research objectives** have been set:

- to identify the different trends and developments of the maternal mortality indicators on a global scale, as well as in the region of post-Soviet Central Asia;
- to describe the main risk factors which affect women's reproductive health in the Central Asian region;
- to compare changes in the reproductive health patterns between groups of countries of the post-Soviet Central Asian region, other post-Soviet and post-Socialist countries and some of the capitalist countries;
- to identify the differences in pregnancy outcomes of a surveyed women based on certain social and geographic factors;
- to investigate the differences in the decision making process during the first pregnancy based on certain social and geographic factors;
- to determine the main statistically significant factors which influence the average number of live births, induced abortions, miscarriages, and stillbirths.

1.3 Research questions and hypotheses

The following **research questions** have been set:

- What are the different trends and developments of the maternal mortality indicators on a global scale, as well as in the region of post-Soviet Central Asia?
- What are the main risk factors which affect women's reproductive health in the Central Asian region?

- How the changes in the reproductive health patterns are reflected in country grouping of the post-Soviet Central Asian region with other post-Soviet countries and some of the European ones?
- What are the differences in pregnancy outcomes of Kazakhstani women based on certain social and geographic factors?
- What are the differences in the decision making process during the first pregnancy of Kazakhstani women based on certain social and geographic factors?
- What are the main statistically significant factors that influence the average number of live births, induced abortions, miscarriages, and stillbirths of Kazakhstani women?

The research questions allowed to propose the following **hypotheses,** which were tested during the research:

1. Women's reproductive health in Central Asian countries, since their independence after the collapse of the Soviet Union, has improved and has showed a positive development over time.
2. Central Asian countries would be most similar by reproductive health and maternal mortality indicators to the other analyzed countries of the former Soviet Union.
3. Due to better economic conditions and development, Kazakhstan has a better reproductive health pattern compared to the rest of post-Soviet Central Asian republics.
4. Compared to other ethnicities, the proportion of Kazakh women who undergo induced abortion is smaller.

1.4 Structure of the research

This study is structured in a logical order determined by the functions of each chapter. The principle was to start the thesis from a global perspective, move on to a closer examination of the Central Asian region, and finish with a study focused on Kazakhstan.

First, the introduction explains the basic idea behind the study, which is to explore reproductive health patterns. The aim and objectives of the research is to investigate the differences and similarities within the studied region. The research questions are set out, the hypotheses are formulated, and the reasons for undertaking the study as well as its relevance are explained.

The introduction is followed by literature overview in chapter 2. In this chapter factors that influence female reproductive health and maternal mortality globally and in the Central Asian region are presented. Background information on those factors is summarized and a relevant historic overview is presented.

Chapter 3 deals with methodology and allows for better comprehension of the study. This chapter begins with a full explanation of the relevant terminology used in the thesis. Indicators are then defined and the analytical methods used in the analysis are explained. Data sources used for the analysis are identified and assessed in terms of their relevance, accuracy and the validity of data they feature.

The next chapter – chapter 4 – helps to provide an encompassing global perspective for the rest of the analysis. It features global levels and trends of maternal mortality.

Chapter 5 is focused on trends and levels in maternal mortality in post-Soviet Central Asia. Maternal mortality indicators are assessed in this chapter, as well as causes of maternal deaths and the main related risk factors.

Chapters 6 and 7 are central to this thesis. Data analyses are performed in these chapters, starting with the cluster analysis by the selected indicators, followed by the DHS data analysis employing Poisson and multinomial logistic regression methods. All pregnancy outcomes (such as live birth, induced abortion, miscarriage or stillbirth) are analyzed by ethnicity, education, marital status, place of residence and region factors; then first pregnancy outcomes are analyzed in the same way. Poisson regression analysis was applied to all pregnancy outcomes, and multinomial regression analysis applied to the first pregnancy outcomes. Finally, the conclusions of the study are summarized in the final section of this thesis.

Chapter 2

Literature overview

The working document of UNFPA (1997) "Family Planning and Reproductive Health in CCEE[4] and CIS" itemized some of the main reasons behind the high levels of maternal mortality ratio (MMRatio) in the first years of independence in the studied post-Soviet Central Asian region. Increasing health needs, economic hardship and the lack of health care resources in rural areas, together with the overall stagnation of medical qualification in urban areas were named as the factors influencing Kazakhstani MMRatio development trends in the first years of independence. Kyrgyzstan was chronically suffering from health sector under-financing, widespread shortage of drugs, vaccines and medical supplies. The highest regional level of MMRatio in 1990 belonged to Tajikistan. A five year civil war from 1992 to 1997 and a serious economic crisis resulted in mass emigration and consequently reduced the number of qualified doctors, all together contributing to $20 million worth of damage to the health care system. The country was receiving international aid to supply basic foods and medicines to the hospitals. In Turkmenistan in the first years of independence "health care staff appeared to be inadequately trained and human resources were inefficiently used" (UNFPA 1997:139). Only in Uzbekistan the government was clearly devoted to prioritizing the health of women and children from the very beginning. There, the program to improve the health of women of reproductive age included reducing the number of induced abortions, prevention of unwanted pregnancies, promotion of early diagnosis, as well as prevention of congenital malformations. Various kinds of maternal and child protection, as well as attitudes towards family and marriage, were regularly analyzed by public opinion surveys to develop up-to-date policies.

One of the main dangers to reproductive health is undergoing an induced abortion in Central Asia. Unfortunately, women often are not fully informed about the possible complications of such procedures and their effects on health. "Abortion is used not only for limiting the number of births, but for birth spacing as well. The quality of abortion services are very low, including poor anaesthesia." (The World Bank 1993:124). In Pre-Revolutionary Russia, induced abortion was strictly prohibited until being legalized in 1920 (Vishnevsky 2010). Then induced abortions were

[4] Countries of Central and Eastern Europe.

banned by the Soviet Decree of 1936[5], and could be applied only in exceptional cases, such as a threat to the health of the mother or danger to life, and/or the presence of a serious disease that could be inherited from parents. Consequences of illegal procedures included fining the woman and up to three years of imprisonment of the physician.

The Decree of 1955 canceled prohibition on the performance of induced abortions. The regulations clarified that an induced abortion could be performed freely during the first 12 weeks of gestation if no contraindication existed and birth would harm the mother. The Criminal Code and related legislation considered a person who performed an illegal induced abortion a subject to criminal penalties up to eight years' imprisonment in case of repeated offence or death or serious injury of the pregnant woman, but the pregnant woman who underwent an illegal induced abortion was not penalized.

Later on, in 1974, based on the pronatalist approach to childbearing, the government banned widespread use of oral contraceptives. In 1987 the government extended conditions under which legal induced abortions started to be available, such as the death of the husband during pregnancy, imprisonment of the pregnant woman or her husband, deprivation of maternity rights, multiparity (the number of children exceeds five), divorce during pregnancy, pregnancy following rape, child disability in the family and other reasons. All these factors led to the increase of the number of induced abortions in the Soviet Union as a whole and in the Central Asian region specifically, to the degree that sets the Soviet Union apart as a world anomaly. For instance, every fourth induced abortion globally in the 1980's was performed by the Soviet women (Agadjanian and Qian 1997).

According to the Discussion Paper prepared by the World Bank and UNFPA "Fertility Regulation in Kazakhstan: The Role of Providers and the Public Financial Cost" (Rani, Chao, Arystanova and Rakhimova 2006), availability of contraception and induced abortion have reduced the fertility level to some extent. Induced abortion as major method of fertility control has long been a phenomenon of Eastern European and Central Asian countries, where the rates were about 90 induced abortions per 1,000 women. Certain resources mention even higher rates. For instance a study done by the Policy Project and Macro International Inc. "Replacement of Abortion by Contraception in Three Central Asian Republics" (1998:1) concludes that "the abortion rate was 181 per 1,000 women of reproductive age, amounting to an average rate of 5 abortions per woman over adult lifetime". This is in sharp contrast to Western Europe, where data shows the lowest abortion rates in the world: 11 abortions per 1,000 women aged 15-44. Even though in 1990s instances of induced abortion in Central Asia declined together with fertility rates and desired family size, induced abortion levels in 2000s remained unacceptably high in Eastern Europe and Central Asia: total induced abortion rate per woman was over one, compared to less than half per woman in the developed countries. The main concerns about abortion are the reproductive health of women undergoing the procedure and the related maternal mortality (Sharmanov et al. 1998).

[5] Unless otherwise cited, all information on induced abortions legislation contained in this chapter is taken from Population Division of the United Nations Secretariat 2002.

High rates of induced abortion in Central Asia raise concerns about reproductive health of women undergoing the procedure and the related maternal death. Therefore, it is important to take into consideration one of the conclusions made in the Discussion Paper prepared by the World Bank and UNFPA "Fertility Regulation in Kazakhstan: The Role of Providers and the Public Financial Cost" (2006): the affordability of abortion services do not lead to abortion culture. High induced abortion rates are instead related to lack of family planning and perceived lack of alternatives.

Nevertheless, roughly 20% of worldwide maternal deaths are due to indirect causes, which complicate pregnancy, but are not themselves complications of pregnancy. A total of 80% of direct causes of maternal deaths are from complications during pregnancy and childbirth, including complications "caused by any interventions, omissions, incorrect treatment or events that result from these complications, including complications from (unsafe) abortion" (The World Health Organization 2005:63). In 11–17% of cases maternal deaths occur during childbirth itself, in 50–71% – in the postpartum period. The first week appears to be the most risky. Approximately 45% of all postpartum maternal deaths happen during the first 24 hours, and around two third during the first week (The World Health Organization 2005).

Among the major direct causes of maternal deaths are hemorrhage, infection, obstructed labor and eclampsia. Severe bleeding – "the quickest of maternal killers" – is the most common cause of maternal deaths in developing and developed countries. Women may need surgical intervention or a blood transfusion, requiring hospitalization with appropriate staff, equipment and supplies. Even a healthy woman can die within two hours due to postpartum bleeding, if unattended (The World Health Organization and UN Human Rights Council 2005:63).

Issues related to levels of maternal mortality are not only questions of economic development in the countries but, importantly, human rights (Hunt, Bueno de Mesquita 2007). In order to reduce maternal deaths Human Rights Council has adopted a landmark resolution on "Preventable maternal mortality and morbidity and human rights", which identifies a range of human rights promoting and protecting women's and girls' rights; namely, the "rights to life, to be equal in dignity, to education, to be free to seek, receive and impart information, to enjoy the benefits of scientific progress, to freedom from discrimination, and to enjoy the highest attainable standard of physical and mental health, including sexual and reproductive health" (UN Human Rights Council 2010).

Depending on the place of residence, there are many interconnected factors determining reproductive health state of women. For example, according to the State of World Population (UNFPA 2007) urban settings, compared to rural areas, can give women better educational facilities, access to media, information, technology, health and transportation facilities, diverse employment options, and urban services such as water and sanitation. All these capacities improve women's reproductive health status and result in smaller families with fewer children by preventing unwanted pregnancies, STIs (Sexually Transmissible Infections) and specifically HIV/AIDS. Cities also offer opportunities to project women's voices in social and political processes at any levels through women's organizations. Through the use of mass media, knowledge of gender equality,

women's rights, sexual and reproductive health services, leadership and self-confidence reaches many homes (UNFPA 2007).

Women often migrate to cities from rural areas to seek the opportunities they provide, security and entitlement to property, as well as support in new environments, where social dynamism and a wide range of economic possibilities make it simpler to obtain real estate. Globally, only 15% of land is in women's ownership. Some Asian and sub-Saharan African countries do not allow women to legally own property separately from their husbands, or they are prevented from using the property they own due to local customs. As a result, women cannot easily obtain loans and credits – a fact that limits their economic options. Legal property tenure empowers women in their relationships with partners and families and thus reduces gender based violence (UNFPA 2007).

Urban areas are the places where gender-based violence in its various forms is a feature that can affect any woman regardless of her educational and income status. For instance, anonymity of the city creates a favorable environment for physical and sexual abuse – factors leading to STIs, HIV/AIDS and unwanted pregnancies as well as psychological, physical, and financial damage, since violence often restricts women's ability to move in and around the city, freedom to choose a job and spend free time. Fortunately, urban women are far more likely, compared to rural women, to report violence due to better possibilities for denouncing violence in cities. The situation is more difficult for poor urban women, who are less likely to get good-quality services and thus face higher levels of reproductive health risks, are more likely to suffer from gender-based violence than other urban women, and remain vulnerable to harmful traditional practices. Compared to upper-income households, most of the young women living in low-income households tend to be married and have children. Poor women are at a greater risk of missing the chance to break out of the poverty cycle because they are more likely to not have an opportunity for appropriate education. The age at which they get married and pregnant and the resulting new household functions determine whether girls continue to go to school or not. School fees, uniforms, money for transport and other necessities are a loss of household help and income for the poor families (UNFPA 2007).

Commitment to deal with global poverty in its many dimensions, including reproductive health is expressed in the Millennium Development Goals (MDGs), which stem from the Millennium Declaration, adopted at the 2000 Millennium Summit by 191 countries. The MDGs are a set of numerical targets and assigned indicators monitoring progress from the levels of 1990 with a deadline of 2015. Goal number five (or MDG 5) of the Declaration is specifically to improve maternal health. Two targets have been set for assessing progress in improving maternal health: to reduce the MMRatio by three quarters between 1990 and 2015 and to achieve universal access to reproductive health by 2015 (United Nations 2011). Estimated trends of MMRatio as one of the indicators of development of the MDG 5 are presented in chapters 4 and 5.

Chapter 3

Methodology and data

3.1 Relevant terminology in the study

Reproductive health is defined by The World Bank as "a state of complete physical, mental and social well-being and not merely the absence of disease, in all matters relating to the reproductive health system" (The World Bank 2012). This definition is sufficiently broad and encompasses important characteristics of female reproductive health, which is why it has been selected for this thesis and shall be continued to be understood with this implied meaning. The most extreme indication of reproductive health state is **maternal death**, which is to be understood as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (The World Health Organization 2004a). It is essential to differentiate clearly which causes of death are considered to be maternal, since the data on maternal death and its accuracy depend heavily on how each case is being labeled.

Maternal deaths, in turn, may have direct and indirect causes. **Direct causes** are those that are most susceptible to reduction and prevention; they include consequences from obstetric complications of pregnancy, delivery or postpartum states, such as: deaths due to hemorrhage, pre-eclampsia, eclampsia, complications arising from the use of anesthesia, from undergoing caesarean section (WHO, UNICEF, UNFPA and The World Bank 2010:4), as well as omissions, interventions, incorrect treatment, or a chain of events stemming from all/any of them (Rosen et al. 2011). **Indirect causes** of maternal deaths, on the other hand, are the result of pre-existing or evolved during pregnancy diseases and conditions which complicate pregnancy, such as anemia**,** malaria (WHO, UNICEF, UNFPA and The World Bank 2010:4), cardiovascular disease, and HIV/AIDS (UN Human Rights Council 2010). Most of these can normally be monitored and addressed by proper timely diagnosis, attendance by qualified medical personnel, various treatments, equipment and medications.

In Central Asia, one of the most common risk factors negatively affecting female reproductive health is anemia. **Anemia** is a condition when hemoglobin value drops below 11 g/dl, or, in other words, "a reduction in the normal number of circulating red blood cells and in the quantity of hemoglobin in the blood" (Reveiz, Gyte and Cuervo 2007:2). Levels of hemoglobin normally

change somewhat during pregnancy – in early pregnancy its level in the blood is slightly reduced, and at the end of pregnancy – slightly enhanced. Anemia, however, is a specific condition and a widespread risk factor during pregnancy. It is usually graded as mild, moderate and severe, where: **mild anemia** corresponds to hemoglobin level 10.0–10.9 g/dl; **moderate anemia** corresponds to hemoglobin level 7.0–9.9 g/dl; while **severe anemia** corresponds to hemoglobin level less than 7.0 g/dl (Reveiz, Gyte and Cuervo 2007). Severe anemia may be principal cause of maternal death, as well as prenatal and perinatal infant loss (Sharmanov 1998).

The state of reproductive health is also highly dependent on the availability and quality of the skilled health personnel. In other words, a skilled birth attendant; the full name of the indicator is **birth attended by skilled health personnel** (measured in percentage). A **skilled birth attendant** is "an accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns" (The World Health Organization 2004b:1). This definition does not include either trained or untrained traditional birth attendants. Normally a skilled birth attendant is available at the health facility where delivery takes place, although in some cases delivery may also occur at home or in other places.

Several indicators have been selected from the Kazakhstan DHS (1999) for an analysis in order to have a more comprehensive understanding of the patterns in female reproductive health of Kazakhstan. The selected indicators included: **live births, induced abortions, miscarriages, stillbirths, and cases of never having been pregnant**. Note that both induced mini-abortion – the procedure carried out at earliest stages of pregnancy, and regular induced abortion – the procedure used at later terms of pregnancy – have been counted together as "induced abortion" in this analysis. Differentiations of selected indicators were studied using the parameters of: **birth cohort group, ethnicity, level of education, marital status, place of residence, and region.**

Some details regarding the meaning of used parameters must be explained. For instance, it has been decided not to base the analysis on data from all women born from 1949 till 1984. Instead, three representative **birth cohort groups** each encompassing 4 consecutive years have been selected: the older cohorts of women born in 1949–1952; the middle group – women born in 1965–1968; and the younger group of women born in 1977–1980[6]. Such approach allows observing the reproductive patterns of women from three birth cohort groups, also avoiding small numbers of reports. However, for the more in-depth Poisson regression and multinomial logistic regression analyses it has been decided to include all nine birth cohort groups (1949–1952; 1953–1956; 1957–1960; 1961–1964; 1965–1968; 1969–1972; 1973–1976; 1977–1980; 1981–1984).

Since Kazakhstan is a multicultural country where the biggest ethnic groups are **Kazakhs, Russians** and **Ukrainians**, it was decided to use them and the fourth heterogeneous residual group

[6] The actual youngest birth cohorts of 1981–1984 are not very informative, since nearly no pregnancy cases that are being studied have been experienced by the youngest women, which is why the preceding 4-year birth cohorts has been selected instead.

for analysis – "**other**" – which contains women of all other ethnicities, including Germans, Koreans, and Tatars.

The Kazakhstani basic educational system has three levels – primary education (1–4 classes, ages 7–11), incomplete secondary (5–9 classes, ages 12–15) and complete secondary (10–11 classes, ages 16–17) – in this analysis taken together as "**primary/secondary**" education – which are compulsory for all children. The next level is **secondary-special** education, which is optional education in a specific selected professional field: pupils can choose it after finishing incomplete secondary level. And the last level is **higher** education in a university.

Marital status affects what type of sexual relations the woman is exposed to, as well as what her personal goals and family plans may be. The "**ever married**" category in the analysis is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The categories "**living together**" (to be understood as cohabitation of divorced, widowed or never married), and "**never married**" (not cohabiting) are also types of marital status used in the study.

Fig. 1 Regional differences in Kazakhstan according to DHS

Source: Joint Stock Company "Kaztransservice" (adjusted).

The 1999 Kazakhstan Demographic and Health Survey included interviews with 4,800 women[7] of ages 15–49[8] from six regions of Kazakhstan (Fig. 1): **Almaty city, South region** (Almatinskaya, Zhambylskaya, Kyzylordinskaya, and South-Kazakhstanskaya oblast), **West region** (Aktyubinskaya, Atyrauskaya, Mangistauskaya, and West-Kazakhstanskaya oblast), **North region**

[7] 1,440 men were also interviewed in the survey, but they are not the focus of the current analysis.
[8] See on page 23 nine birth cohort groups.

(Akmolinskaya, Kostnaiskaya, Pavlodarskaya, and North-Kazakhstanskaya oblast), **Central region** (Karagandinskaya oblast) and **East region** (East-Kazakhstanskaya oblast).

Each region was sub-divided into urban and rural areas of analysis. In the survey, the place in which the respondent was interviewed was assumed to be their de facto place of residence. "**Urban**" areas refer to cities with population over 50,000 and other urban areas, such as towns. All countryside areas are referred to as "**rural**".

3.2 Analytical methods

3.2.1 Reproductive health related indicators

Several health indicators have been used in the research.

Maternal mortality ratio is calculated by the following formula:

$$MMRatio = \frac{D^{mat}}{B} * 100{,}000$$

where D^{mat} is the number of maternal deaths; B is the number of live births.

Adult lifetime risk of maternal mortality, which must be understood as the probability that a 15-year-old women will die eventually from a maternal cause, is calculated by the following formula:

$$Adult\ lifetime\ risk\ of\ maternal\ mortality = \frac{T_{15}-T_{50}}{l_{15}} \times MMRate$$

where $(T_{15} - T_{50})/\ l_{15}$ equals the average number of years lived between ages 15 and 50 – up to a maximum of 35 years – among survivors to age 15, and *MMRate (maternal mortality rate)* is the number of maternal deaths per 1,000 women of reproductive age.

Also, an alternative measure of maternal mortality which was used in cluster analysis is **proportion of maternal deaths among deaths of women aged 15-49 years (%):**

$$PM = \frac{D^{mat}}{D_{15-49}} * 100$$

where D^{mat} is the number of maternal deaths, and D_{15-49} is the total deaths among women aged 15‑49 years.

3.2.2 Cluster analysis

Cluster analysis was applied to above described selected indicators of specifically chosen twenty eight countries – Central Asian, some of the post-Soviet and European ones – in order to allocate them into similar groups and compare the discovered trends. Post-Soviet countries (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Russian Federation, and Ukraine) were chosen because of the common political regime and experience shared in the past with the countries of Central Asia. European countries (Albania, Bulgaria, Croatia, Czech Republic, Finland, France, Hungary, Netherlands, Norway, Slovakia, Slovenia, TFYR Macedonia, Republic of Moldova, and Romania) were chosen to include several countries with some of the best reproductive health patterns in the world, as well as several countries that, while they have not been a part of the Soviet

Union, have been nevertheless influenced by the Soviet regime. The selected indicators were those that most clearly enable to infer the state of female reproductive health: MMRatio, induced abortions per 1,000 live births, percentage of births attended by skilled health personnel, the proportion of maternal deaths among deaths of women of reproductive age (PM), and adult lifetime risk of maternal death (see definitions and formulas above).

In order to delimit the country group with similar reproductive health patterns **hierarchical cluster analysis** was used. **Z-score** was used before clustering in order to transform variables. It can be expressed by the following formula:

$$z_i = \frac{x_i - \bar{x}}{\sigma}$$

where x_i is the value of the variable, $\bar{x}$ is the mean value, and σ is the standard deviation.

Ward's method was used for country grouping and the Euclidean distance between two countries was computed. **Ward's method** tends to join clusters with roughly the same number of observations. **Euclidean distance** between two points X (x_1, x_2, … x_n) and Y (y_1, y_2, … y_n) is defined as follows:

$$d = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}$$

The calculations have been made with the SPSS software.

3.2.3 Poisson regression

In order to examine factors related to pregnancy outcomes, Poisson regression analysis was applied to the data only from Kazakhstan. A Poisson regression model, also known as a log-linear model, has at its basis the generalized linear model, which is used to distribute count data in multiway contingency tables. "The typical Poisson regression model expresses the natural logarithm of the event or outcome of interest as a linear function of a set of predictors" (Oxford University Press 2012:143); the conditional mean and the conditional variance are equal to one another. The calculations have been made with the aid of the SPSS program.

The random variable *Y* has a Poisson distribution, if:

$$P(Y = y) = \frac{\lambda^y e^{-\lambda}}{y!}, y = 0, 1, 2, \ldots$$

where λ is the parameter of the Poisson distribution.

The Poisson regression model is set as follows:

$$Log\ (Y) = a + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

The **dependent variable** *Y* represents the number of live births or induced abortions or miscarriages or stillbirths; the **independent variables** are categorical and represent region (Almaty city, North region, South region, West region, East region, and **Central region)**, place of residence (urban, **rural**), marital status (never married, **ever married**, living together), level of education (no

education, **primary/secondary**, secondary-special, and higher) or ethnicity (**Kazakh**, Russian, Ukrainian, and other) of a woman; reference category is in bold font. Birth cohort groups (nine categories, see page 23) of the respondents were taken as **controlling variables.** "Never pregnant" women were excluded from the Poisson regression analysis.

3.2.4 Multinomial logistic regression

First pregnancy outcomes were analyzed using **multinomial logistic regression**:

$$log \frac{Pr\ (Y = j)}{Pr\ (Y = j^{'})} = a + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

where Y denotes the categorical outcome, j is the selected category, $j^{'}$ is the reference category, X denotes the explanatory (independent) variables taken as categorical, a is absolute term, β denotes the regression coefficients.

The **dependent variable** represents the first induced abortion compared to the first live birth, first miscarriage compared to the first live birth, first stillbirth compared to the first live birth, never pregnant women compared to the women who had the first live birth; the **independent variables were the same as the ones used in Poisson regression,** are categorical and represent region (Almaty city, North region, South region, West region, East region, and **Central region**), place of residence (urban, **rural**), marital status (never married, **ever married**, living together), level of education (no education, **primary**/**secondary**, secondary-special, and higher), and ethnicity (**Kazakh**, Russian, Ukrainian, and other) of a woman; reference category is in bold font. Birth cohort groups (nine categories, see page 23) of the respondents were taken as **controlling variables.**

3.3 Data sources

3.3.1 Databases

Data from several statistical agencies have been used for the purpose of research. Their methodological particularities are briefly described below.

TransMonEE

The data collected is usually taken directly from national statistical offices by using a standard template as well as from international organizations, or is calculated by UNICEF Regional Office for Central and Eastern Europe and Commonwealth of Independent States countries. For instance, the web-sites of National Statistical Offices provide data for the Baltic countries in recent years. However, the data in TransMonEE may differ from those that can be found in UNICEF publications and databases, due to the different sources of data for some indicators (TransMonEE 2012).

European Health Database

The collected data comes from various sources: partly from countries' annual data collection and partly from WHO technical units, where statistical information is collected within their own field, and also from different international organizations and agencies (The World Health Organization WHO 2012a, 2012b).

Millennium Development Goals (MDGs)

Primary data source related to proportion of births attended by skilled health personnel are provided by household surveys, including MICS (Multiple Indicator Cluster Survey) and DHS (Demographic and Health Survey) (UNSD 2012).

WHO, UNICEF, UNFPA and The World Bank

There are two ways of methodological approaches for the countries with lack of maternal death data. First is a model-based approach for countries with no reliable national data, and second is when existing data of deaths are adjusted for underreporting and misclassification (WHO, UNICEF, UNFPA and The World Bank 2010).

3.3.2 Demographic and Health Survey (DHS) data

Demographic and Health Survey data has been used for the specific analysis of factors that affect female reproductive health in Kazakhstan. Kazakhstan DHS is a nation-wide household survey aimed at collecting comprehensive data related to demographic and health indicators. Such data allows the government to make sure its programs and policies related to the areas of health and are adequate and effective. It also contributes to the growing international database on health-related and demographic variables. In Kazakhstan, such a survey was conducted twice: in 1995 and 1999. The 1999 survey was funded by USAID and implemented by the Academy of Preventative Medicine of Kazakhstan (APMK) with technical assistance from U.S. based Marco International Inc. MEASURE *DHS*+ project.

The questionnaires used in the survey were based on MEASURE *DHS*+ program model survey instruments, adapted to the needs of Kazakhstan upon consultation with local reproductive health, child health and nutrition specialists. The questionnaires given to women covered a multitude of major topics; however, the data used for the thesis research covered only background characteristics (such as ethnicity, marital status, region, place of residence), educational level, pregnancy history and outcome of pregnancies. They were translated into Russian and Kazakh languages and used in a pre-test in April 1999, based on which the questionnaires were further modified. During a one-week session, eight interviewers were trained at the Academy of Preventative Medicine of Kazakhstan to pre-test the questionnaires during one-week long interviews in urban and rural settings. In June and July 1999, sixty four people, most of them physicians, were recruited as interviewers, health investigators, supervisors and editors for the actual survey and trained both in classroom and in field settings for over three weeks. They were then divided into teams of seven people and collected data from July 12 to September 25, 1999. Collected survey data were then sent back to the Academy of Preventative Medicine of Kazakhstan, where office editing staff checked that all of the

questionnaires from all eligible respondents have been returned from the field. Collected data was then recorded, edited and processed with the use of the Integrated System Survey Analysis software package from July 12 to October 15, 1999 (Text is adopted from the publication of Kazakhstan: DHS, 1999 – Final Report, pages 6–10).

Data for analysis of the Poisson regression and the multinomial logistic regression was taken from Kazakhstan DHS 1999.

3.3.3 Details of data selected for cluster analysis

Data for cluster analysis was chosen from several data sources, such as WHO, European Health Database, and TransMonEE database, The World Bank, data from collaborative work of WHO, UNICEF, UNFPA and The World Bank.

MMRatio was taken from collaborative work of WHO, UNICEF, UNFPA and The World Bank. Induced abortions per 1,000 live births and skilled attendance at births were taken from European Health Database. Skilled births attendance was taken from both TransMonEE and European Health Database. PM and Adult lifetime risk of maternal mortality belong to the year 2010 (these indicators are publishing every 5 years, starting from 1990, and are thus not available for year 2008) and were taken from WHO.

Since some of the data was not available for the cluster analysis for the beginning and the end of the studied period, introduced below labeled as data sources 1990s and 2000s shows closest available year for the particular country. So, the substituted data is presented in the following order: country name, indicator name, actual year, and source.

Data sources 1990:

- Estonia, skilled birth attendance, 1993, TransMonEE database;
- Finland, skilled birth attendance, 1993, European Health Database;
- France, skilled birth attendance, 1993, European Health Database;
- Netherlands, skilled birth attendance, 1998, European Health Database;
- Norway, skilled birth attendance, 1990, MDGs;
- Tajikistan, skilled birth attendance, 1991, TransMonEE database;
- Turkmenistan, skilled birth attendance, 2002, TransMonEE database;
- Uzbekistan, skilled birth attendance, 1996, European Health Database.

Data sources 2008:

- Estonia, skilled birth attendance, 2006, European Health Database;
- France, abortions per 1,000 live births, 2003, European Health Database;
- Latvia, skilled birth attendance, 2006, European Health Database;
- Lithuania, skilled birth attendance, 2006, European Health Database;
- Netherlands, skilled birth attendance, 2005, MDGs;
- Russian Federation, abortions per 1,000, 2006, European Health Database;
- Turkmenistan, skilled birth attendance, 2006, TransMonEE database;
- Uzbekistan, skilled birth attendance, 2006, European Health Database.

3.4 Data validity

Various data sources provide different figures on maternal deaths trends in Central Asian republics. In its report, the UNFPA states that, for instance, "Kazakhstan has never had a comprehensive assessment of maternal health and consequently the sources of information for estimating maternal health indicators are limited" (Newport 2009:56). This statement suggests that one needs to be skeptical every time one sees any relevant data, even for the countries that may be considered most advanced in any given region. The actual maternal mortality ratio is likely much higher than official figures indicate. For example, according to the estimates by the international development agencies (WHO, UNICEF, UNFPA), the actual maternal mortality ratio in Kazakhstan in 2000 was 210 death per 100,000 live births – more than three times higher than the official ratio for the same year (Tab. 1). Also, the Committee for Health Services Quality Control investigation concluded numerous cases of distortions, irregularities and non-reporting in providing information on maternal deaths in several oblasts of Kazakhstan (Rechel and Kulzhanov 2007).

Tab. 1 Example of underreporting of maternal mortality ratio (MMRatio; maternal deaths per 100,000 live births) in Kazakhstan examined by WHO, UNICEF, and UNFPA, 1990 and 2000–2005

	1990	2000	2001	2002	2003	2004	2005
Official statistics as reported by WHO	55	62	49	52	42	37	41
WHO / UNICEF / UNFPA estimates	80	210	-	-	-	-	-

Source: Rechel and Kulzhanov 2007:16

In Kyrgyzstan, the official level of MMRatio for the 2005 year was 78 maternal deaths per 100,000 live births (WHO, UNICEF, UNFPA and The World Bank 2010:30), and adjusted MMRatio by WHO 2005 was 150 deaths per 100,000 live births, which is almost double the official figure. The underreporting was mainly "due to deaths being concealed" (Newport 2009:66).

"A lack of confidence in official data" (Newport 2009:93) was expressed with regard to Tajikistan, where the reported MMRatio was 75 per 100,000 live births in 2005 (WHO, UNICEF, UNFPA and The World Bank 2010:31), compared to the adjusted MMRatio by WHO 2005 equal to 170 per 100,000 – more than twice the official level (Newport 2009).

Turkmenistan has been presumed to have "concerns over the accuracy of data collection and analysis" (Newport 2009:109). MMRatio by WHO European HFA Database for the 2005 year was equal to 15 deaths per 100,000 live births and adjusted MMRatio by WHO 2005 was 130 deaths per 100,000 live births – nine times higher. But the new review conducted by the WHO, UNICEF, UNFPA and The World Bank (2010) estimated 82 deaths per 100,000 for the same year. Such high discrepancies in results indicate the difficulty of gathering reliable data.

"Inadequate data collection and possible underreporting" (Newport 2009:118), together with linkages to criminal offences that result in underreporting (Rechel, Sikorskaya and McKee 2009b) pose issues in Uzbekistan. Adjusted MMRatio by WHO 2005 for Uzbekistan was 47 per 100,000

live births (Newport 2009), compared to 30 deaths per 100,000 live births for the same year in the review by WHO, UNICEF, UNFPA and The World Bank (2010).

Sometimes very specific sub-sets of data become very difficult to obtain. For instance, it is often hard to obtain accurate data on maternal deaths related to induced abortions. Experts in reproductive health Elisabeth Ahman and Iqbal Shah (2009) consider the measurement of induced abortion as a difficult indicator of women's health because data are not reliable enough. Especially in countries where abortion is legally restricted/limited and practically not available, or legally allowed but hardly available, the classification and statistics are difficult to measure. They also noted that usually unreported clandestine abortions are reported as spontaneous abortions. The reasons are controversial issues of legal, ethical, and moral considerations that hinder reporting of induced abortions. Some of the reasons for underreporting of maternal deaths in Kazakhstan have been highlighted in Entre Nous – The European Magazine for Sexual and Reproductive Health: "In the past, the official investigation conducted on maternal deaths did not give useful results. The traditional system did not allow an understanding of all the nuances of the case and it concluded with the imposition of punishment. Fear of censure led to the concealment of the true causes of the incident and to falsification of documentation, for self-protection of medical staff. The true cause of death remained hidden." (The World Health Organization and UNFPA 2011:16).

It is, however, necessary to note that underreporting of maternal mortality is not only the problem of one or several countries of post-Soviet Central Asia, but an occurrence that has been reported, to one degree or another, in all countries. Some developed countries have been facing challenges in routine registration of maternal deaths in place as well. Misclassification of ICD-10 coding might result in incorrect or understated numbers of maternal deaths, which means that accounting for the true number of maternal deaths and causes of deaths takes additional special investigations of adjustment factors for misclassification of maternal deaths (WHO, UNICEF, UNFPA and The World Bank 2010), the results of some of which are summarized in Table 2.

Tab. 2 Adjustment factor to account for misclassification of maternal deaths in civil registration, literature review of published reports

Country	Period/year	Additional maternal deaths identified (%)	Adjustment factor
Australia	2000–2002	110	2.1
	2003–2005	90	1.9
Austria	1980–1998	60	1.6
Brazil, capital cities	2002	40	1.4
Canada	1988–1992	60	1.5
	1997–2000	50	1.6
China, Taiwan	1984–1988	60	1.6
El Salvador	June 2005 - May 2006	220	3.2

Country	Period/year	Additional maternal deaths identified (%)	Adjustment factor
Finland	1987–1994	–10	0.9
	1999–2000	100	2
France	1999	10	1.1
	Dec 1988 - Mar 1989	130	2.3
	2001–2003	20	1.2
	2004–2006	20	1.2
Japan	2005	35	1.3
Netherlands	1983–1992	40	1.4
	1993–2005	50	1.5
United Kingdom	1985–1987	40	1.4
	1988–1990	40	1.4
	1991–1993	50	1.5
	1994–1996	60	1.6
	1997–1999	80	1.8
	2000–2002	70	1.7
	2003–2005	70	1.7
USA	1995–1997	50	1.5
USA, Maryland	1993–2000	60	1.6
USA, North Carolina	1999–2000	10	1.1
Median			1.5

Source: WHO, UNICEF, UNFPA and The World Bank 2010:34.

Different definitions of maternal mortality, systems of reporting causes of death to a civil registry, questionnaires, autopsy reports, medical records, death certificates and other vital event certificates, method of record linkage, and assessments from experts identifying maternal deaths are all factors that influence the data gathered. For instance, the most common cases of maternal deaths that are reported in the above mentioned investigations are as follows:

- Early pregnancy deaths;
- Later postpartum deaths (more difficult to report than previous type);
- Maternal deaths at extreme ages (youngest and oldest mothers);
- Deaths caused by cerebrovascular disease and cardiovascular disease in miscoding by ICD–9 or ICD–10.

There are several factors that could make measuring levels of maternal mortality difficult. First, when routine recording of deaths is not completed within the civil registration systems, the death of

a woman of reproductive age might not be recorded at all (WHO, UNICEF, UNFPA and The World Bank 2010:6). Second, deaths of pregnant women are not always reported because pregnancy might not be obvious or may be unknown and therefore such deaths can be unreported as maternal deaths, although the women were pregnant. Third, most developing countries do not have medical certification of a cause of death, making it challenging to accurately attribute maternal deaths (WHO, UNICEF, UNFPA and The World Bank 2010). In addition to difficulties while measuring the levels, there exist additional risks of underreporting and misclassification caused by, for instance, incompetent understanding of ICD rules; incompleteness of death certificates (ignoring pregnancy status of women); intentions to avoid litigation; desire to hide facts, especially related to deaths due to abortion.

Chapter 4

Global trends in maternal mortality

Maternal mortality ratio (MMRatio) is the health indicator that reflects the level of development of a country. Different MMRatio levels reflect the disparity between developing and developed countries and regions (Cham, Sundby and Vangen 2005). Therefore, Millennium Development Goals (MDGs) include it in the framework. One of the targets of MDG 5 is to reduce overall MMRatio by 75% in the period from 1990 to 2015, or by 5.5% annually. According to the report "Trends in maternal mortality: 1990-2008" (WHO, UNICEF, UNFPA and The World Bank 2010) the actual overall trend shows a decline equal only to 34% from 1990 to 2008, which corresponds to an average annual decline of 2.3%. Globally, MMRatio declined from 400 maternal deaths per 100,000 live births in 1990 to 260 maternal deaths per 100,000 live births in 2008, while number of maternal deaths decreased from 546,000 in 1990 to 358,000 in 2008 (Tab. 6). Yet, even though the number of maternal deaths is declining, still much of 358,000 deaths are readily preventable (UNFPA 2007).

Current lack of reliable and accurate data has turned assessment of a real extent of maternal mortality trends, especially in developing countries where MMRatio is high, into a great challenge. In a collaborative effort to address this challenge, WHO, UNICEF, UNFPA and The World Bank elaborated and updated five-yearly estimates of MMRatio using statistical modeling for countries where no reliable data on MMRatio exist. In total, 172 countries and territories were analyzed; 140 of 172 countries reported decline in MMRatio from 1990 till 2008, 90 of which showed a decline of 40% or more; 2 countries did not experience remarkable change in MMRatio and in 23 countries an actual increase in MMRatio was estimated.

4.1 Levels of maternal mortality

Table 3 shows the estimates of MMRatio, the number of maternal deaths, the adult lifetime risk of maternal death (the probability that a 15-years-old female will die eventually from a maternal cause), and the range of uncertainty on MMRatio estimates by UN MDG regional groups (WHO, UNICEF, UNFPA and The World Bank 2010). The estimates of MMRatio can be considered as the most likely levels, while the range of uncertainty shows intervals containing the true MMRatio with

95% probability. The range of uncertainty in the world for the year 2008 was 200 to 370 maternal deaths per 100,000.

Tab. 3 Estimates of maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births), number of maternal deaths, and adult lifetime risk of maternal deaths by United Nations MDG regions, 2008

MDG regions	Estimated MMRatio[a]	Number of maternal deaths[a]	Adult lifetime risk of maternal deaths[a]: 1 in:	Range of uncertainty on MMRatio estimates	
				Lower estimate	Upper estimate
World	260	358,000	140	200	370
Developed regions[b]	14	1,700	4,300	13	16
CIS[c]	40	1,500	1,500	34	48
Developing regions	290	355,000	120	220	420
Africa	590	207,000	36	420	860
Northern Africa[d]	92	3,400	390	60	140
Sub-Saharan Africa	640	204,000	31	460	950
Asia	190	139,000	220	130	270
Eastern Asia	41	7,800	1,400	26	66
South Asia	280	109,000	120	190	420
South-Eastern Asia	160	18,000	260	110	250
Western Asia	68	3,300	460	45	110
Latin America, Caribbean	85	9,200	490	72	110
Oceania	230	550	110	100	520

Notes: MDG regions (United Nations 2011).
Adult lifetime risk of maternal deaths: 1 in: means the probability that 1 in N number of a 15-year-old female will die eventually from a maternal cause.
[a] The MMRatio and lifetime risk have been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1,000, rounded to nearest 100. The numbers of maternal deaths have been rounded as follows: <1,000, rounded to nearest 10; 1,000–9,999, rounded to nearest 100; and >10,000, rounded to nearest 1,000.
[b] Includes Albania, Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, the United Kingdom, and the United States of America.
[c] The CIS countries are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, the Republic of Moldova, the Russian Federation, and Uzbekistan.
[d] Excludes Sudan, which is included in sub-Saharan Africa.

Source: WHO, UNICEF, UNFPA and The World Bank 2010:18.

That the MMRatio is an actual indicator of the levels of development is reflected in the data. On average, almost 1,000 maternal deaths occurred every day in the year 2008 worldwide (358,000 in total). While developing countries and regions are estimated to have an average MMRatio level of 290 maternal deaths per 100,000 live births, the same indicator reaches only 14 for the developed countries. The countries of the CIS can be taken as a distinct intermediate group with the estimation of 40 in the same year 2008.

The largest numbers of maternal deaths (Tab. 4) for that period were recorded in India, Nigeria, the Democratic Republic of the Congo, Afghanistan, Ethiopia, Pakistan, Tanzania (United Republic of), Bangladesh, Indonesia, and Sudan. It is clear that the patterns of most prevalent highest estimates on maternal deaths correspond to the countries that are among the least developed and, often, have large populations.

Tab. 4 Top 10 countries with highest estimated number of maternal deaths, 2008

Country	Number of maternal deaths
India	63,000
Nigeria	50,000
Congo (Democratic Republic of the)	19,000
Afghanistan	18,000
Ethiopia	14,000
Pakistan	14,000
Tanzania (United Republic of)	14,000
Bangladesh	12,000
Indonesia	10,000
Sudan	9,700

Notes: The numbers of maternal deaths have been rounded as follows: <100, no rounding; 100–999 rounded to nearest 10; 1,000–9,999, rounded to nearest 100; and >10,000, rounded to nearest 1,000.

Source: Selected from WHO, UNICEF, UNFPA and The World Bank 2010.

Among the countries with the highest estimated MMRatio excluding those of sub-Saharan Africa were: Afghanistan, the Lao People's Democratic Republic, Nepal, Timor-Leste, Bangladesh, Haiti, and Cambodia. The relative level changes the order substantially, as India disappeared from the highest ranking and very small countries moved upwards (Tab. 5).

Tab. 5 Countries with highest estimated maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births) outside of sub-Saharan Africa, 2008

Country	Estimated MMRatio
Afghanistan	1,400
Lao People's Democratic Republic	580
Nepal	380
Timor-Leste	370
Bangladesh	340
Haiti	300
Cambodia	290

Notes: The MMRatio has been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1,000, rounded to nearest 100.

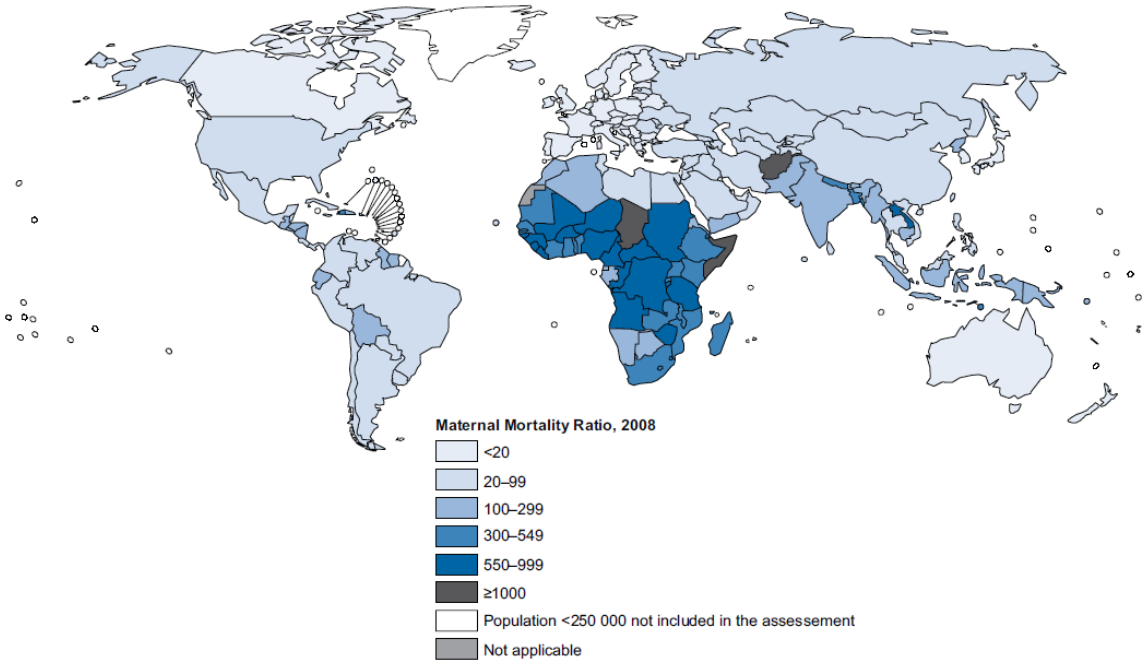
Source: Selected from WHO, UNICEF, UNFPA and The World Bank 2010.

Afghanistan is the country with the highest estimated adult lifetime risk of maternal death of 1 in 11 as measured in 2008. Other high maternal deaths countries show much lower values of adult

lifetime risk of maternal death: for sub-Saharan Africa, it is 1 in 31, for Oceania 1 in 110, for Southern Asia - 1 in 120, for CIS – 1,500, developed regions - 1 in 4,300 (Tab. 3, Fig. 2).

In fact, 99% (355,000) of all maternal deaths occurred in the developing countries. Sub-Saharan Africa (204,000) and Southern Asia (109,000) accounted for 87% of global maternal deaths. Relative levels for the high MMRatio countries (Fig. 2) are such that Sub-Saharan Africa had the highest MMRatio at 640 maternal deaths per 100,000 live births in 2008, while the next regions in descending order of MMRatio are: South Asia (280), Oceania (230), South-Eastern Asia (160), North Africa (92), Latin America and the Caribbean (85), Western Asia (68), and Eastern Asia (41).

Fig. 2 Countries according to their maternal mortality ratio (MMRatio, deaths per 100,000 live births), 2008



Notes: The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Source: WHO, UNICEF, UNFPA and The World Bank 2010:27.

According to the available estimates by WHO, UNICEF, UNFPA and The World Bank (2010), 45 countries had MMRatio equal to or surpassing 300 maternal deaths per 100,000 live births; Afghanistan, Chad, Guinea-Bissau, and Somalia had extremely high MMRatio ≥1,000 maternal deaths per 100,000 live births. Even though the region of sub-Saharan Africa is the worst affected one overall, its countries have lower levels of MMRatio, even if not by much, than Afghanistan. The highest MMRatio levels are estimated for the following countries: Chad (1,200), Somalia (1,200), Guinea-Bissau (1,000), Liberia (990), Burundi (970), Sierra Leone (970), the Central African Republic (850), Nigeria (840), Mali (830), and Niger (820). On the other hand, some countries of sub-Saharan Africa have relatively low levels of MMRatio: Mauritius and Cape Verde have 36 and 94 maternal deaths per 100,000 live births, respectively. Namibia and Botswana have

moderate levels of MMRatio: 180 and 190 maternal deaths per 100,000 live births. This illustrates that MMRatio can vary significantly between and within regions, as is reflected on the map from Figure 2.

4.2 Trends of maternal mortality

Globally, MMRatio has slowed down since the beginning of the observed period, with developing regions marking a 34% decline, while the developed regions a 13% decline (Tab. 6). It is necessary to emphasize that it takes less effort to reduce high levels of MMRatio than to further reduce already relatively low levels (WHO, UNICEF, UNFPA and The World Bank 2010), which is why the rates of decline are as recorded. MMRatio estimated for United Nations MDG regions for years 1990 to 2008 allow analysis of trends between 1990 and 2008 (Tab. 6). They show percentage changed in MMRatio between 1990 and 2008 and annual percentage change in MMRatio between 1990 and 2008.

Tab. 6 Comparison of 1990 and 2008 maternal mortality by United Nations MDG regions

MDG regions	1990[a]		2008[a]		1990-2008 MMRatio change %	1990-2008 MMRatio annual change %
	MMRatio	Maternal deaths	MMRatio	Maternal deaths		
World	400	546,000	260	358,000	-34	-2.3
Developed regions[b]	16	2,000	14	1,700	-13	-0.8
CIS[c]	68	3,200	40	1,500	-41	-3.0
Developing regions	450	540,000	290	355,000	-34	-2.3
Africa	780	208,000	590	207,000	-25	-1.6
Northern Africa[d]	230	8,600	92	3,400	-59	-5.0
Sub-Saharan Africa	870	199,000	640	204,000	-26	-1.7
Asia	390	315,000	190	139,000	-52	-4.0
Eastern Asia	110	29,000	41	7,800	-63	-5.5
South Asia	590	234,000	280	109,000	-53	-4.2
South-Eastern Asia	380	46,000	160	18,000	-57	-4.7
Western Asia	140	6,100	68	3,300	-52	-4.0
Latin America, Caribbean	140	17,000	85	9,200	-41	-2.9
Oceania	290	540	230	550	-22	-1.4

Notes: MDG regions (United Nations 2011).
[a] The 1990 estimates have been revised using the same methodology used for 2008, which make them comparable. The MMRatio have been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1,000, rounded to nearest 100. The numbers of maternal deaths have been rounded as follows: <1,000, rounded to nearest 10; 1,000–9,999, rounded to nearest 100; and >10,000, rounded to nearest 1,000.
[b] Includes Albania, Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania,

Luxembourg, Malta, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, the United Kingdom, and the United States of America.
[c] The CIS countries are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, the Republic of Moldova, the Russian Federation, Ukraine, and Uzbekistan.
[d] Excludes Sudan, which is included in sub-Saharan Africa.

Source: WHO, UNICEF, UNFPA and The World Bank 2010:20.

It is clear from the Table 6 that Eastern Asia made the largest reduction of MMRatio among all studied regions from 1990 till 2008 – by 63%, while South-Eastern Asia experienced reduction by 57%, South Asia – by 53%, Asia – by 52%, Western Asia – by 52%, Latin America and the Caribbean, as well as the CIS countries – by 41%, sub-Saharan Africa – by 26%, and Oceania – by 22%. Among the countries of sub-Saharan Africa the largest reduction of MMRatio belongs to: Equatorial Guinea – 73%, Eritrea – 69%, Cape Verde – 58%, Ethiopia – 53%, and Rwanda – 51% (WHO, UNICEF, UNFPA and The World Bank 2010).

However, in some countries the MMRatio has been a rising indicator instead (Tab. 7). The highest and the worst percentage increase of MMRatio from 1990 till 2008 belongs to Southern African countries: Botswana, Zimbabwe, South Africa, Swaziland, and Lesotho. Although it is clear from Table 7 that from 2005 to 2008 the MMRatio decreased in each country, which gives hope that maternal deaths are on the track to be reduced there, for now these countries are making no progress (WHO, UNICEF, UNFPA and The World Bank 2010).

Tab. 7 Countries with highest percentage increase of maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births) from 1990 till 2008

Country	Estimated MMRatio[a] per 100,000 live births					1990-2008 MMRatio change[b] %	1990-2008 MMRatio annual change[b] %
	1990	1995	2000	2005	2008		
Botswana	83	130	310	280	190	133	4.7
Zimbabwe	390	450	670	830	790	102	3.9
South Africa	230	260	380	440	410	80	3.3
Swaziland	260	220	340	440	420	62	2.7
Lesotho	370	340	470	570	530	44	2

Notes: [a] The MMRatio have been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1,000, rounded to nearest 100.
[b] Negative values indicate a decreasing MMRatio from 1990 to 2008, while positive values indicate an increasing MMRatio.

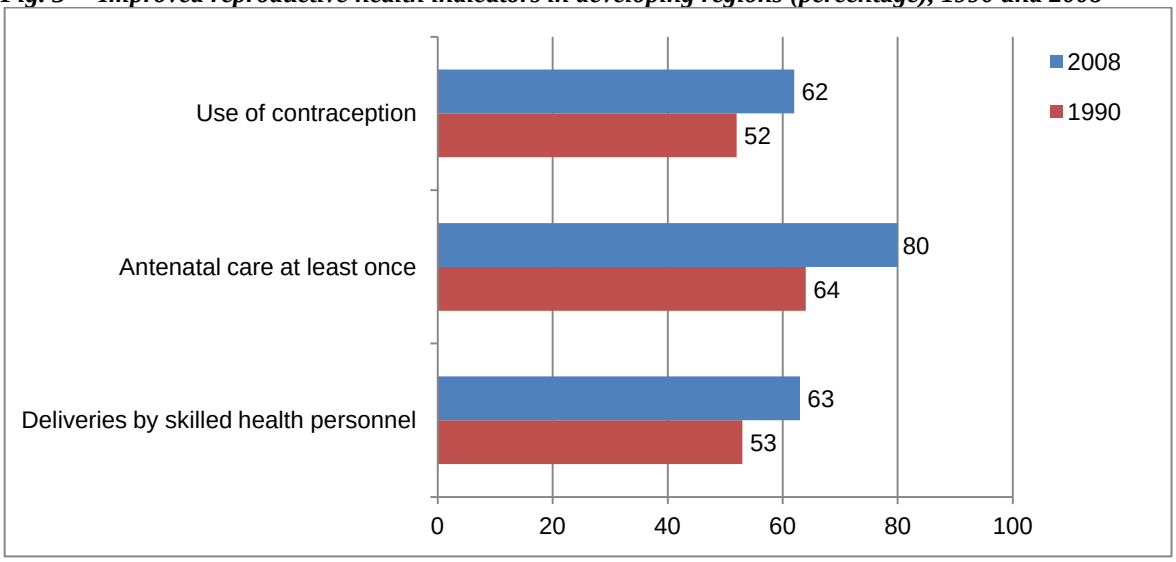
Source: Selected from WHO, UNICEF, UNFPA and The World Bank 2010.

These countries are also identified collectively as the sub-region with the highest HIV prevalence in the world, suggesting that the MMRatio in these countries can be dramatically reduced if the problem of HIV prevalence can be effectively tackled. Rosen et al. stress that "the adverse effect of HIV on women's health in sub-Saharan Africa appears to be an important reason for poor progress" (2011:3) in reaching MDG 5.

The reasons for the overall decline of the MMRatio can be linked to overall improvements in health care systems and increased female education. The Figure below (Fig. 3) shows the trends for

developing regions only, where the proportion of women (aged 15-49) using any method of contraception has increased from 52% in 1990 to 62% in 2008, the proportion of women attended at least once during pregnancy by skilled health-care personnel rose from 64% to 80%, and the proportion of deliveries attended by skilled health personnel increased from 53% to 63%. These three reasons were considered as the most important ones for decreasing MMRatio (WHO, UNICEF, UNFPA and The World Bank 2010).

Fig. 3 Improved reproductive health indicators in developing regions (percentage), 1990 and 2008



Source: WHO, UNICEF, UNFPA and The World Bank 2010:21 (adjusted).

It is noteworthy that the previously mentioned largest decline of MMRatio in Eastern Asia corresponds very closely to the highest contraceptive prevalence rate – 86%, while in sub-Saharan Africa – the region with the lowest MMRatio decline – has a contraceptive prevalence rate of only 22% (WHO, UNICEF, UNFPA and The World Bank 2010).

Various countries around the world, where MMRatio was ≥100 maternal deaths per 100,000 live births in 1990, are experiencing different levels of progress in improving maternal health. Out of the total 87 countries 10 are considered to be "on track[9]", 47 have been "making progress", 22 countries have made "insufficient progress" and 8 have made "no progress". Among countries of sub-Saharan Africa, Equatorial Guinea and Eritrea are "on track", and among countries of South Asia, Bhutan, Iran, Maldives are "on track". The only UN MDG region which is "on track" to achieve MDG 5 is Eastern Asia with a 5.5% annual decline; the regions with the least progress to achieve MDG 5 are Oceania and sub-Saharan Africa with 1.4% and 1.7%, respectively. Fourteen countries which achieved 5.5% annual decline or more are: Bhutan – 8.6%, Bolivia – 5.8%, China – 6.0%, Egypt – 5.5%, Equatorial Guinea – 7.3%, Eritrea – 6.6%, Estonia – 7.9%, Iran – 8.9%, Latvia – 5.7%, Maldives – 14.6%, Poland – 6.2%, Romania – 10.3%, Turkey – 6.0%, and Viet Nam – 6.0% (WHO, UNICEF, UNFPA and The World Bank 2010).

[9] Countries with MMRatio ≥100 in 1990 are categorized as "on track" if there has been 5.5% decline or more annually, "making progress" if MMRatio has declined between 2% and 5.5%, making "insufficient progress" if MMRatio has declined less than 2% annually, and having "no progress" if there has been an annual increase in MMRatio.

Chapter 5

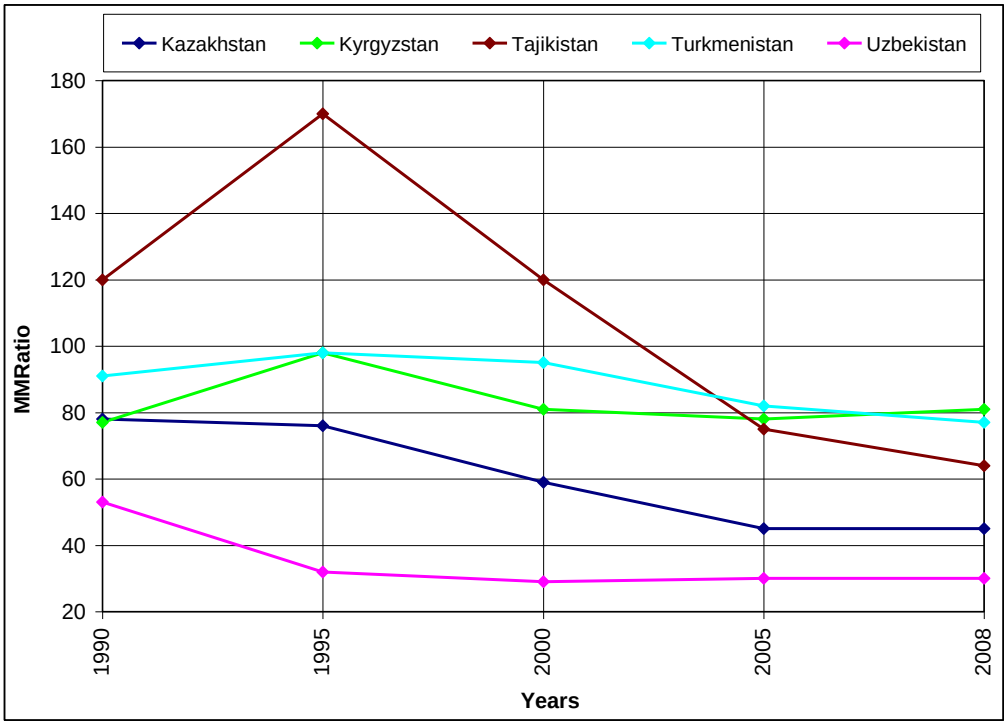
Maternal mortality in Central Asia

While examining the estimated maternal mortality ratios in selected Central Asian countries, it is obvious that each country shows its own type of a trend, although some common patterns are also present.

5.1 Trends and levels of maternal mortality indicators

After the first years of independence, levels of MMRatio show a steady decrease from the year 1995 to 2008 in every country of the region, reflecting improvement in overall reproductive health of women (Fig. 4).

Fig. 4 Trends in maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births) in selected post-Soviet Central Asian countries; 1990–2008



Source: WHO, UNICEF, UNFPA and The World Bank 2010.

Percent changes in MMRatio between 1991 and 2008 are similar among some of the Central Asian countries: Kazakhstan (–42%), Tajikistan (–44%), and Uzbekistan (–44%) exhibit the highest percent change with around 3% annual progress (Tab. 8). Kyrgyzstan and Turkmenistan fall significantly behind. For comparison: in 1990 Kazakhstan and Kyrgyzstan were almost at the same level of MMRatio (78 and 77 maternal deaths per 100,000 live births, respectively). In the consecutive 18 years different ways of the countries' development resulted in MMRatio in Kazakhstan being reduced by 42%, while during the same observed period Kyrgyzstan added 5% to its MMRatio, thus becoming the only country not to progress since 1990. Uzbekistan and Tajikistan achieved the best results: –44% in 18 years with annual change of 3.2% – 3.3%. Turkmenistan's MMRatio declined approximately 3 times slower than in Kazakhstan, Tajikistan and Uzbekistan – by 16%.

Tab. 8 Comparison of 1990, 1995, 2000, 2005, and 2008 estimates of maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births) in selected post-Soviet Central Asian countries

Country	Estimated MMRatio[a]					% change in MMRatio between 1990 and 2008	Annual % change in MMRatio between 1990 and 2008[b]	Progress towards improving maternal health[c]
	1990	1995	2000	2005	2008			
Kazakhstan	78	76	59	45	45	-42	-3	making progresses
Kyrgyzstan	77	98	81	78	81	5	0.3	no progress
Tajikistan	120	170	120	75	64	-44	-3.3	making progresses
Turkmenistan	91	98	95	82	77	-16	-0.9	insufficient progress
Uzbekistan	53	32	29	30	30	-44	-3.2	making progresses

Notes: [a] The MMRatio have been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1000, rounded to nearest 100.

[b] Negative values indicate a decreasing MMRatio from 1990 to 2008, while positive values indicate an increasing MMRatio.

[c] Countries are categorized as "on track" if there has been 5.5% decline or more annually, "making progress" if MMRatio has declined between 2% and 5.5%, making "insufficient progress" if MMRatio has declined less than 2% annually, and having "no progress" if there has been an annual increase in MMRatio.

Source: WHO, UNICEF, UNFPA and The World Bank 2010.

Comparing countries of post-Soviet Central Asia, countries with lower levels of MMRatio includes Kazakhstan and Uzbekistan, where the probability that a 15–year–old women will die eventually from a maternal cause were equal to1 out of 950 and 1 out of 1,400, respectively, by the adult lifetime risk of maternal death indicator. The countries with higher levels of MMRatio are Kyrgyzstan, Tajikistan, and Turkmenistan, where indicators of adult lifetime risk of maternal deaths are, respectively, 1 out of 450, 430, and 500: levels almost three times worse than in Uzbekistan and two times worse than in Kazakhstan. Levels of adult lifetime risk of maternal deaths in these

countries correspond to the MMRatio values. One may note that absolute numbers of maternal deaths are higher in Kazakhstan and Uzbekistan, but it is to be remembered that these countries are significantly more populated than the others of the region (Tab. 9).

The highest indicator of the proportion of maternal deaths among females of reproductive age (PM) belongs to Tajikistan (4.9%) – the country with the lowest adult lifetime risk of maternal death and with the highest proportion of maternal death due to HIV, but not the highest MMRatio (Tab. 9). However, even though Uzbekistan has the lowest level of MMRatio, the lowest level of PM belongs to Kazakhstan. Notably, proportions of maternal deaths due to HIV are from 0 to 0.6% – very similar and very low in the entire region.

Tab. 9 Estimates of maternal mortality ratio (MMRatio, maternal deaths per 100,000 live births), number of maternal deaths and adult lifetime risk of maternal deaths in Central Asia, 2008

Country	Estimated MMRatio[a]	Range of uncertainty on MMRatio estimates		Number of maternal deaths[a]	Adult lifetime risk of maternal death[a]: 1 in[c]:	Proportion of maternal deaths due to HIV (%)	PM[b] (%)
		Lower estimate	Upper estimate				
Kazakhstan	45	34	60	140	950	0.4	1.2
Kyrgyzstan	81	51	130	100	450	0.4	3.1
Tajikistan	64	28	150	120	430	0.6	4.9
Turkmenistan	77	34	170	90	500	0	2.3
Uzbekistan	30	25	36	170	1,400	0.4	1.5

Notes: [a] The MMRatio and lifetime risk have been rounded according to the following scheme: <100, no rounding; 100–999, rounded to nearest 10; and >1000, rounded to nearest 100. The numbers of maternal deaths have been rounded as follows: <100, no rounding; 100–999 rounded to nearest 10.

[b] The proportion of maternal deaths among females of reproductive age (PM).

[c] Adult lifetime risk of maternal deaths: 1 in: means the probability that 1 in N number of a 15-year-old female will die eventually from a maternal cause.

Source: WHO, UNICEF, UNFPA and The World Bank 2010.

5.2 Causes of maternal deaths

In the Central Asian region, trends in what constitute the leading causes of maternal mortality differ from country to country. Data for Turkmenistan is not available.

Kazakhstan provides the most comprehensive statistics on causes of maternal mortality (Tab. 10). Unfortunately, the data is only available from 1999 to 2008, but it is sufficient to observe the trends of causes of deaths.

Tab. 10 Causes of maternal deaths in Kazakhstan (percentage), 1999–2008

Cause of death	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Induced abortion	24.8	26.9	23.1	22.9	22.1	19.0	14.9	12.3	13.7	10.6
Morbidity, pregnancy complications	1.4	4.5	2.8	2.5	2.9	3.0	2.6	2.9	3.9	4.4
Ectopic pregnancy	2.8	3.0	0.0	0.8	1.0	0.0	2.6	0.7	1.3	0.9
Hemorrhage	23.4	20.9	28.7	33.9	26.9	28.0	26.3	33.3	22.2	23.9
Gestosis	17.0	13.4	20.4	11.0	17.3	17.0	19.3	10.1	18.3	23.0
Sepsis	10.6	6.0	8.3	5.9	8.7	7.0	7.0	8.0	7.8	3.5
Other causes	19.9	25.4	16.7	22.9	21.2	26.0	27.2	32.6	32.7	33.6

Source: Analiticheskaya zapisaka po teme: "Analiz rozhdaemosti v Respublike Kazahstan" 2009:12

The most common causes of maternal deaths in Kazakhstan are hemorrhage, gestosis, and complications from an induced abortion. Percentages of some of the causes of death seem to fluctuate (gestosis, hemorrhage); percentage of some of the causes are decreasing (sepsis, ectopic pregnancy, induced abortion); while maternal deaths from other causes appear to be on the increase.

Data available for Tajikistan (Tab. 11) is, unfortunately, was available only from 1990 to 2005 in absolute numbers. It was decided, however, to try to provide some more information, which is the 1990–2005 period percentages.

Tab. 11 Causes of maternal deaths in Tajikistan, 1990–2005

Cause of death	1990	1996	2000	2001	2002	2003	2004	2005	1990-2005 %
Extra-uterine pregnancy	1	1	4			2			0.02
Induced medical abortion	1	2	1						0.01
Abortion out of medical facility	2		3		1			1	0.02
Hemorrhages	18	7	13	8	20	9	12	6	0.23
Pregnancy toxicosis	7	9	12	10	9	7	3	3	0.15
Anesthesia complications								3	0.01
Sepsis in delivery	6	2	2	4	2	1	2	1	0.05
Obstetric clotting			13	12	4	2	4	1	0.09
Other obstetric mortality causes			7	8	4	12	13	9	0.13
Indirect obstetric mortality causes			2	1	3	1	2	1	0.02
Other complications	51	39	1		14	2	1	4	0.28

Source: Muhammadieva et al. 2006:33.

Even less data is available for Kyrgyzstan and Uzbekistan. Turkmenistan does not release official data on causes of maternal deaths.

Tab. 12 Causes of maternal deaths in Kyrgyzstan, 1991

Cause of death	Number	Percentage
Hemorrhage	22	19
Hypertensive disease of pregnancy	22	19
Sepsis	19	16
Abortion	16	14
Other causes	39	32
Total	118	100

Source: The World Bank 1993:122.

Tab. 13 Causes of maternal deaths in Uzbekistan, 1997–2007

Cause of death	Percentage
Hemorrhage	27
Indirect	18
Hypertension	14
Embolism	10
Abortion	10
Sepsis	7
Other direct	13

Source: UNICEF 2012:3.

5.3 Risk factors

5.3.1 Anemia

Table 14 shows the results of the Institute of Nutrition of the Kazakhstan National Academy of Sciences testing Kazakhstani women for anemia. Close to half (49%) of women were found to be anemic. Moderate to severe anemia was found in about 11% of cases. In Western regions of Kazakhstan the rates were highest with 19% of women suffering from moderate to severe anemia. Prevalence of anemia was higher among ethnic Kazakhs than among ethnic Russians and higher among women from rural areas than among women from urban areas. The latter is likely to be so due to more restricted access to information on importance of proper nutrition and to generally poorer diet in rural areas. Women with higher than primary or secondary education were less likely to be anemic. It is likely that with higher levels of education women gain access to both information on health and nutrition and higher-paying jobs that allow them to diversify their diet. Age did not seem to have large effect on prevalence of anemia, except for the age group of 15–19 years that had slightly lower percentage of severe and moderate anemia (Sharmanov 1998).

Tab. 14 Percentage of women classified as having iron-deficiency anemia in Kazakhstan according to background characteristics, Kazakhstan DHS, 1995

	Percentage of women with anemia (by severity):		
	Severe	Moderate	Mild
15-19	0.4	6.4	38.8
20-24	0.6	11.4	39.0
25-29	0.9	10.5	35.8
30-34	2.1	11.8	39.4
35-39	1.5	12.2	37.4
40-44	0.8	10.1	34.0
45-49	2.0	13.8	33.0
Place of residence			
Urban	0.7	9.0	36.5
Rural	1.7	12.6	37.8
Region			
Almaty city	1.1	9.4	27.7
South	0.8	10.6	38.9
West	2.5	16.4	40.0
Central	0.7	8.0	35.1
North-east	1.1	9.5	36.8
Education			
Primary/secondary	1.3	11.6	37.8
Special education	1.0	10.7	37.9
Higher	1.1	8.2	33.5
Ethnicity			
Kazakh	1.9	14.3	40.7
Russian	0.7	7.2	33.8
Other	0.3	8.2	34.7
Total	1.1	10.6	37.1

Source: Sharmanov 1998.

Table 15 shows that 60% of women tested in Uzbekistan were anemic to some extent (45% with mild anemia, 14% with moderate anemia and 1% with severe). There was no significant connection between anemia prevalence and age, ethnicity, residence or education, but regional differences did exist. While in Ferghana Valley and Aral Sea region, which is "characterized by severe agrochemical pollution and other environmental and socio-economic problems" (Sharmanov 1998), the prevalence of moderate and severe anemia was high (23% and 25%, respectively), Tashkent city

had the lowest prevalence of moderate anemia within the country (7%) and no cases of severe anemia. It seems that specific environmental factors had the strongest influence on incidence of anemia in Uzbekistan. Anemia is still a rather severe problem for female reproductive health in Uzbekistan where, according to the director of the Republic Perinatal Centre Adelina Lyubchich, "it has been proven that 40% of maternal and child mortality is linked to anemia" (Saadi 2010).

Tab. 15 Percentage of women classified as having iron-deficiency anemia in Uzbekistan according to background characteristics, Uzbekistan DHS, 1996

	Percentage of women with anemia (by severity):		
	Severe	Moderate	Mild
15-19	0.6	10.4	45.3
20-24	0.9	16.6	45.0
25-29	0.6	16.4	45.5
30-34	1.2	16.3	45.8
35-39	1.6	14.6	47.0
40-44	0.8	11.5	45.4
45-49	1.1	13.3	41.5
Place of residence			
Urban	0.9	12.8	45.5
Rural	0.9	15.1	45.2
Region			
Aral Sea region	2.1	21.3	48.1
Central	0.3	10.0	33.7
East	0.4	8.5	44.7
Ferghana Valley	1.8	23.1	53.4
Tashkent City	0.0	6.7	50.2
Education			
Primary/secondary	1.0	13.8	45.8
Special education	0.8	16.6	44.7
Higher	0.5	10.8	43.7
Ethnicity			
Uzbek	0.9	14.6	45.9
Other	0.8	12.1	42.3
Total	0.9	14.2	45.3

Source: Sharmanov 1998.

Some degree of anemia was reported for 38% of women in Kyrgyzstan (Tab. 16). Moderate anemia was reported for 9% of women, severe anemia for 2%. The Southern region had a higher prevalence of moderate and severe anemia (12%). Anemia rates among rural women were higher than among urban women. Kyrgyz and Uzbek women also had higher rates of anemia than women of Russian and other ethnicities.

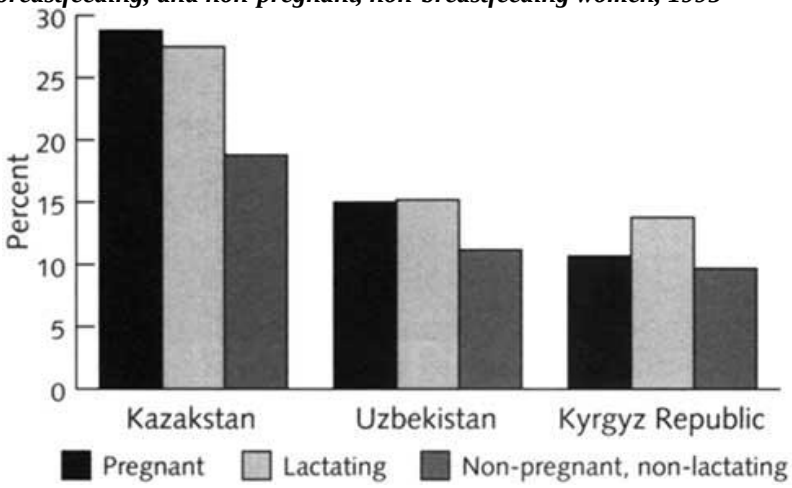
Tab. 16 Percentage of women classified as having iron-deficiency anemia in Kyrgyzstan according to background characteristics, Kyrgyzstan DHS, 1997

	Percentage of women with anemia (by severity):		
	Severe	Moderate	Mild
15-19	0.7	5.9	25.2
20-24	0.8	8.9	24.3
25-29	1.3	7.4	28.4
30-34	2.7	11.2	30.3
35-39	1.0	10.3	30.3
40-44	2.8	10.2	26.1
45-49	1.5	10.5	31.1
Place of residence			
Urban	0.8	6.5	24.8
Rural	1.8	10.2	29.1
Region			
Bishkek City	0.6	5.0	23.5
North	1.4	8.5	26.6
East	0.5	7.0	22.6
South	1.9	10.5	30.0
Education			
Primary/secondary	1.0	13.8	45.8
Special education	0.8	16.6	44.7
Higher	0.5	10.8	43.7
Ethnicity			
Kyrgyz	1.9	9.6	27.6
Russian	0.3	3.9	20.7
Uzbek	1.1	10.8	34.2
Other	0.7	7.1	23.3
Total	1.5	9.0	27.7

Source: Sharmanov 1998.

Figure 5[10] compares the rates of moderate and severe anemia in pregnant, breastfeeding and non-pregnant, non-breastfeeding women in Kazakhstan, Uzbekistan and Kyrgyzstan. The prevalence of moderate and severe anemia among pregnant women was almost 2–3 times higher than among non-pregnant women (regardless of their breastfeeding status). It is likely that, whilst women may have been normally consuming just enough iron for themselves, they did not adjust their diets enough to account for the extra iron needs during pregnancy. There also is sufficient evidence to suggest that "having an anemic mother increases the risk of moderate and severe anemia among children" (Sharmanov 1998). It is logical that a child born to an anemic mother, since it has been receiving all nutrition from her until birth and, often, for the period of breastfeeding, will be anemic, too. Older children of anemic mothers may also be anemic because dietary habits of the parents normally determine young children's diets.

Fig. 5 Prevalence of moderate and severe anemia among pregnant, breastfeeding, and non-pregnant, non-breastfeeding women, 1995



Source: Sharmanov 1998.

The percentage of anemic women in the Central Asian region is rather high and the countries recognize the need to address this issue on the national level. Fortifying foods with trace iron has been found to be the most economical and effective approach to combating anemia in regions with high incidence. In Uzbekistan, for example, prevalence of anemia decreased by 30% when the government implemented the program for enriching flour and salts with iron in 2005–2009 (Saadi 2010).

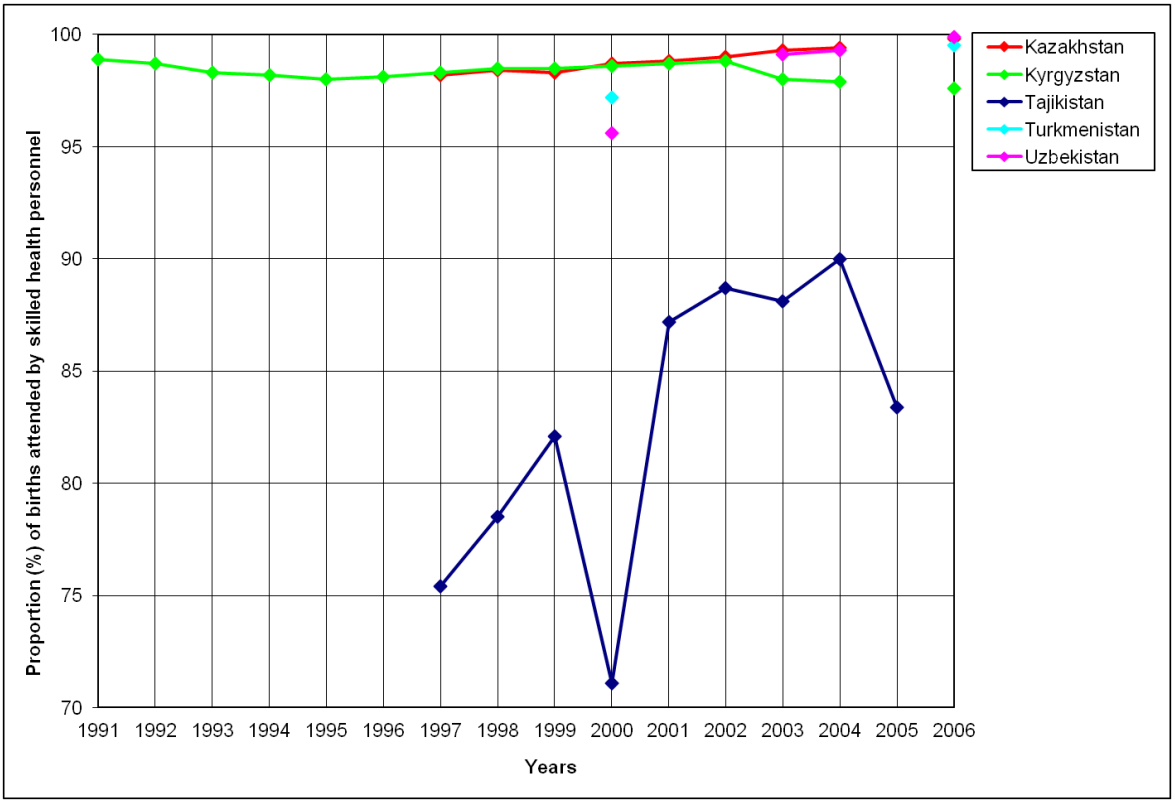
5.3.2 Attendance by skilled personnel

Included in the targets of the Millennium Development Goals, attendance by skilled health personnel responds effectively to maternal needs. Substantial disparities in delivery care within countries exist and this can be considered as a risk factor determining sometimes whether woman will die or not during delivery.

[10] Kazakstan = Kazakhstan and Kyrgyz Republic = Kyrgyzstan.

Comparing trends of birth attended by skilled health personnel indicator in the Central Asian region gives an idea of overall development of the countries and, therefore, helps to correlate them with the trends of MMRatio, described above.

Fig. 6 Trends in births attended by skilled health personnel in countries of post–Soviet Central Asia (percentage), 1991-2006



Source: The World Health Organization 2012.

As it can be seen from the Figure 6, the most advanced levels of births attended by skilled health personnel were in Kazakhstan, Kyrgyzstan, Uzbekistan, and Turkmenistan. The proportion of births attended by skilled health personnel was less for Tajikistan – this may partially be due to the fact that about 90% of Tajikistan is covered by mountains and it may be difficult for skilled health personnel to reach some of the more remote villages in the mountains in time.

Some regional data on proportion of deliveries attended by skilled health personnel from Tajikistan were and assistant during delivery by place of residence in Kazakhstan found and are presented below (Tab. 17 and Tab. 18).

Tab. 17 Proportion of deliveries with the participation of qualified medical personnel in Tajikistan (percentage)

Region names	2000	2001	2002	2003	2004	2005	2006
Republic of Tajikistan	78,5	72,1	72,6	76,0	81,0	86,3	89,4
GBAO	49,4	59,3	51,7	55,1	55,4	60,5	71,9
Khalton Region	66,4	50,2	54,2	60,8	70,3	77,7	84,0
Sod Region	94,1	94,5	96,1	96,6	96,6	97,1	97,3
Dushanbe	91,3	94,9	93,3	95,1	97,1	97,7	98,5
RRS	76,7	70,4	67,3	68,5	72,3	81,7	84,3

Notes: GBAO is Gorno-Badakhshan Autonomous Province, RRS is Regions of Republican Subordination.

Source: Muhammadieva et al. 2006:33.

Tab. 18 Assistant during delivery by place of residence in Kazakhstan (percentage), 2006

Region	Medical doctor	Nurse/ Midwife	Auxiliary midwife	Traditional birth attendants	Total
Urban	88,7	10,8	0.3	0,1	99,9
Rural	72,5	26,0	1,4	0.0	99,9

Source: Economic Cooperation Organization 2010:17.

Chapter 6

Reproductive health patterns and country grouping in different regions

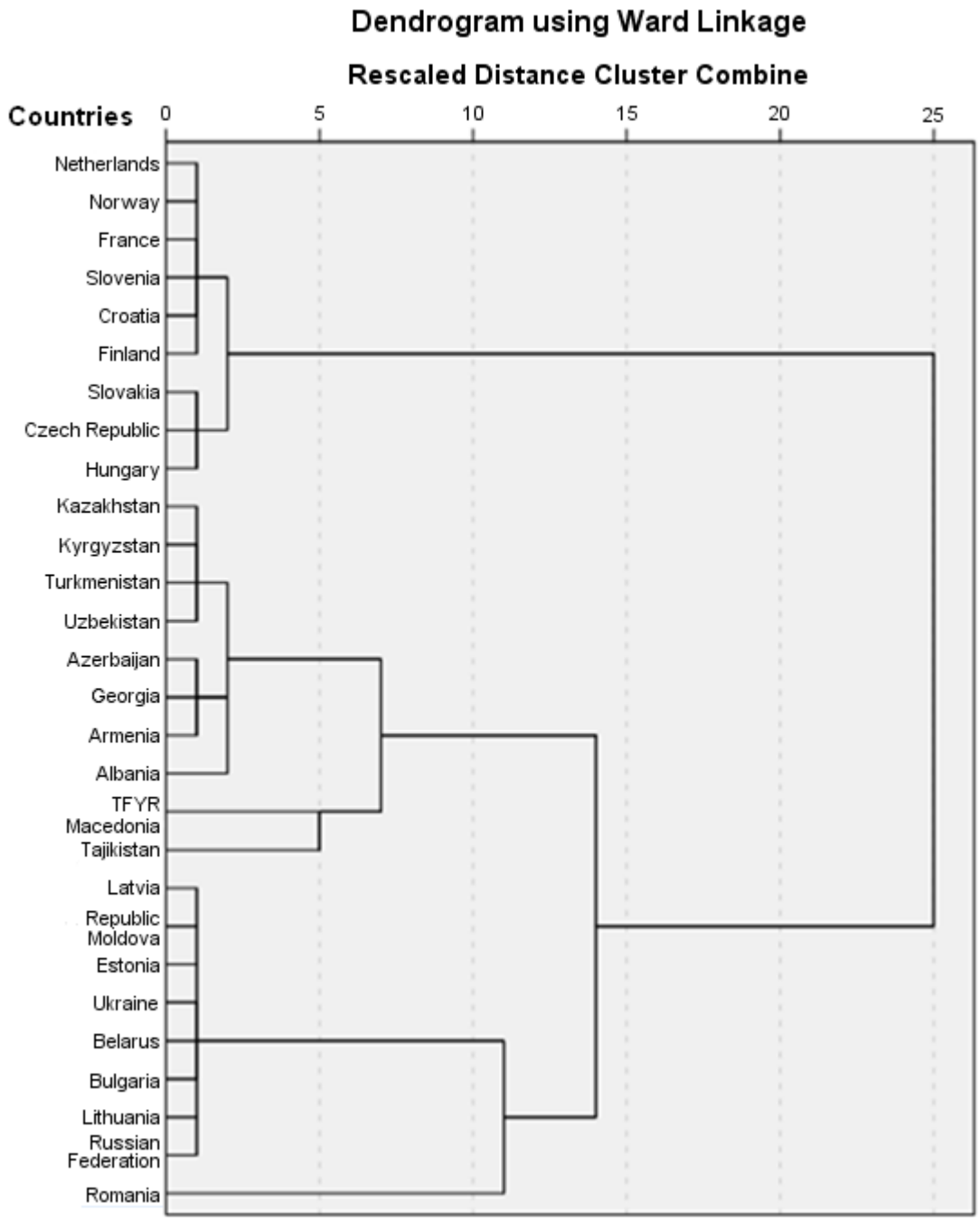
Cluster analysis was applied to 28 selected countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Russian Federation, Ukraine, Albania, Bulgaria, Croatia, Czech Republic, Finland, France, Hungary, Netherlands, Norway, Slovakia, Slovenia, TFYR Macedonia, Republic of Moldova, and Romania) and was shown in a Dendrogram, in order to discover the country groupings by similar chosen reproductive health indicators transformed into z-scores (MMRatio, induced abortions per 1,000 live births, percentage of births attended by skilled health personnel, the proportion of maternal deaths among deaths of women of reproductive age (PM), and adult lifetime risk of maternal death; see Fig. 7). According to Dendrogram, six country groups can be distinguished.

6.1 Country grouping according to reproductive health in 1990

In 1990 the countries of the Central Asian region had not yet gained independence and their health care facilities were administered centrally. They were also subjected to common Soviet ideologies and values. This common shared background has resulted in rather homogeneous conditions. This fact is reflected in the Dendrogram (Fig. 7), where Kazakhstan, Turkmenistan, Uzbekistan and Kyrgyzstan have been grouped into one cluster, together with other Soviet Caucasus countries (Armenia, Azerbaijan, and Georgia) and Albania.

It may seem surprising that Albania also ended up in the same cluster, but the country's background explains the grouping: it is a relatively poor European country, at the time officially known as the People's Socialist Republic of Albania. Albania joined the Communist block after the Second World War and underwent 45 years of extremely self-isolated policy and autocratic communist rule. After the fall of communism in 1990 the country finally started to build a democratic society and create a market economy, similarly to the other countries of this cluster.

Fig. 7 Country grouping based on reproductive health indicators in 1990



Source: Author's calculations in SPSS.

It is noteworthy that Kazakhstan, Turkmenistan, Uzbekistan and Kyrgyzstan also belong to the same ethno-cultural group of Turkic countries. Tajikistan, on the other hand, ended up in its own cluster. Incidentally, unlike the other four, Tajikistan is a country that is closest in ethno-cultural sense to Iran and Afghanistan. All of the remaining former Soviet and post-socialist republics (Belarus, Bulgaria, Estonia, Latvia, Lithuania, Republic of Moldova, Ukraine, and Russian Federation) on the Dendrogram have been grouped into a separate cluster. This separation of

Central Asian cluster indicates that even within the large, perceivably homogenous entity of the Soviet Union, some differences among geographic regions have remained and that Central Asian countries were most similar, from the female reproductive health point of view, to the others in the Caucasus region, but not to the rest of the former Soviet Union countries.

Tab. 19 Selected statistical indicators in use for clustered countries 1990

	Ward Method	Induced abortions per 1,000 live births	MMRatio per 100,000 live births	Skilled health personnel	PM	Adult lifetimes risk of maternal deaths: 1 in
Albania	Mean	388.0	65.0	97.4	4.3	481
Armenia	Minimum	134.5	48.0	93.0	2.9	250
Azerbaijan	Maximum	701.7	91.0	99.7	5.7	770
Georgia	Std. Deviation	184.9	15.4	2.1	1.2	198
Kazakhstan						
Kyrgyzstan						
Uzbekistan						
Turkmenistan						
Belarus	Mean	1,372.4	48.1	99.7	1.9	1,211
Bulgaria	Minimum	879.2	24.0	99.1	1.0	650
Estonia	Maximum	1,971.1	74.0	100.0	2.8	2,400
Latvia	Std. Deviation	382.7	16.2	0.4	0.6	555
Lithuania						
Republic of Moldova						
Ukraine						
Russian Federation						
Slovakia	Mean	487.7	12.3	99.8	0.6	5,222
Slovenia	Minimum	92.9	7.0	99.0	0.4	2,600
Czech Republic	Maximum	820.5	23.0	100.0	0.8	8,700
Hungary	Std. Deviation	281.0	4.9	0.4	0.2	1,943
Croatia						
Finland						
France						
Netherlands						
Norway						
Romania	Mean	3,152.6	170.0	99.8	6.9	300
	Minimum	3,152.6	170.0	99.8	6.9	300
	Maximum	3,152.6	170.0	99.8	6.9	300
	Std. Deviation	.	.	.	.	.
TFYR Macedonia	Mean	618.5	16.0	88.9	1.1	2700
	Minimum	618.5	16.0	88.9	1.1	2700
	Maximum	618.5	16.0	88.9	1.1	2700
	Std. Deviation	.	.	.	.	.
Tajikistan	Mean	95.5	120.0	90.0	7.7	180
	Minimum	95.5	120.0	90.0	7.7	180
	Maximum	95.5	120.0	90.0	7.7	180
	Std. Deviation	.	.	.	.	.
Total	Mean	797.8	47.2	98.3	2.5	2,276
	Minimum	92.9	7.0	88.9	0.4	180
	Maximum	3,152.6	170.0	100.0	7.7	8,700
	Std. Deviation	689.0	37.8	2.9	2.1	2,389

Notes: See definitions of demographic indicators in the methodological part, pages 23, 25.

Source: Author's calculations in SPSS.

The state of reproductive health in the cluster with most of Central Asian countries, Caucasus region and Albania, as suggested by the selected indicators, lagged behind the rest of the analyzed

Soviet and post-Socialist countries' cluster: the mean value of MMRatio was 65 maternal deaths per 100,000 live births against 48 maternal deaths per 100,000 live births of other Soviet countries; mean percentage of births attended by skilled personnel was lower by 2.3% points in cluster with most of Central Asian countries, compared to other Soviet countries; PM (proportion of maternal deaths out of the total deaths) mean was higher (4.3%) than that of other post-Soviet countries (1.9%) and mean value of adult lifetime risk of maternal death was positively 2.5 higher in other Soviet countries rather than in cluster with most of Central Asian countries. On the contrary, the mean value of induced abortion per 1,000 live births in other Soviet countries' cluster was 3.5 times higher than in cluster with Central Asian countries (Tab. 19). This may be due to both cultural factors, such as more traditional family values held in the countries of Central Asian, Caucasus region and Albania versus a higher degree of acceptance/readiness for the induced abortion and less willingness to raise more children. In case of Albania, its significant poverty may have also resulted in less availability of both professionals and facilities necessary to carry out the procedure.

All developed countries – Western, Scandinavian, Central and Southeastern European ones – were grouped together into one cluster, which by all indicators showed much better female reproductive health patterns than the other clusters. For instance, the mean value of MMRatio for the cluster of developed countries was 4 times lower than that for cluster of the four Central Asian countries, Caucasus region and Albania, and 5.4 times lower than that of the Soviet and post-socialist countries cluster; mean value of attendance by skilled personnel was higher by 2.4% points than for the cluster of the Central Asian countries, Caucasus region and Albania, but only 0.1% points higher than for the Soviet and post-socialist countries cluster; the value of PM was 7.2 times lower than for the Central Asian countries, Caucasus region and Albania cluster and 3.2 times lower than for the Soviet and post-socialist cluster; value of adult lifetime risk of maternal death was 10.9 times lower than for the Central Asian countries, Caucasus region and Albania cluster and 4.3 times lower than for the Soviet and post-socialist countries cluster.

Tajikistani reproductive health indicators, however, were worse than those of the Soviet and post-socialist countries cluster and those of the Central Asian countries, Caucasus region and Albania cluster. The only cluster with worse indicators than in Tajikistan is Romania alone. Romania, however, was suffering from immense economic deprivation and unrest at that time because Nicolae Ceausescu focused the entire economy on repaying the country's huge foreign debt (Encyclopedia Britannica 2012), while Tajikistan's healthcare was taken care of by the comprehensive Soviet welfare system. In 1990 Tajikistani mean value of MMRatio was 1.2 times higher than in Romania, 2.5 times higher than in the Soviet and post-socialist countries cluster and 10 times higher than in the developed countries cluster. This may partially be due to the fact that about 90% of Tajikistan is covered by mountains and it may be difficult for skilled health personnel to reach for some of the more remote villages in the mountains in time, resulting in more maternal deaths than elsewhere. Similarly, PM in Tajikistan was 1.8 times higher than in the cluster of Central Asian countries, Caucasus region and Albania, 4 times higher than in the Soviet and post-socialist countries cluster and 12.8 times higher than in the developed countries cluster. Life risk of

maternal death was 2,7 times higher than in the Central Asian countries, Caucasus region and Albania cluster, 6.7 times higher than in the Soviet and post-socialist countries cluster and a whole 29 times higher than in the developed countries cluster. Mean value of induced abortion per 1,000 live births was the lowest out of all clusters; this suggests that, possibly, Tajik women prefer to have larger families and more children, which, in turn, exposes women to increased risks associated with childbearing.

The complementary statistics of variation are also included in the table, but not commented in the thesis.

6.2 Country grouping according to reproductive health in 2008

In eighteen years following the collapse of the Soviet Union the state of female reproductive health has changed in the selected countries and the clustering indicates a different pattern than in the year 1990 (Fig. 8).

Interestingly, in 2008 analysis Tajikistan yet again ended up being its own cluster. Kyrgyzstan and Turkmenistan have formed a new separate cluster together. Uzbekistan and Kazakhstan remained grouped with Albania and the Caucasus post-Soviet republics but now the cluster also includes Croatia, Ukraine and Moldova. Next cluster remains predominantly Western and Central European, with addition of Macedonia and Belarus.

It is noteworthy that the current cluster division no longer reflects former Soviet Union's presence and seems to be more closely associated with the levels of the given countries' economic development (Tab. 20).

Compared to 1990, Tajikistan has improved on all but one of its indicators: its mean value of MMRatio decreased by 47%; PM mean decreased by 33%; mean value of an adult lifetime risk of maternal death (or probability that a 15-year-old women will die eventually from a maternal cause) improved from 1 in 180 to 1 in 430; induced abortions per 1,000 live births decreased by 47%; the only negative trend was that attendance by skilled health personnel dropped by full 5% points. This is a peculiar development, since one would expect most other indicators to be worse if attendance by skilled personnel drops. Immediately after its independence, Tajikistan experienced a civil war, which affected access to medical education and training, as well as prompted a huge wave of emigration of specialists, such as skilled health personnel.

Kyrgyzstan and Turkmenistan have moved into a new cluster over the past decades. This cluster had twice the abortion-live births ratio than Tajikistan and a slightly higher number of maternal deaths per 100,000 live births (79 in Kyrgyzstan with Turkmenistan against 64 in Tajikistan), but the values of the remaining indicators were at a more advanced level (Tab. 20).

The cluster that had the best values of indicators – the cluster of the developed countries – has improved them even more: compared to year 1990, mean value of MMRatio got lower by 20%; mean value of percentage of attendance by skilled personnel remained unchanged; mean value of

PM got 33% lower; mean value of adult lifetime risk of maternal death improved by 41%; and the induced abortions per 1,000 live births dropped by 47%.

Positive changes could also be observed in the cluster with two Central Asian, all Caucasus countries, Croatia, Moldova and Ukraine: mean value of MMRatio was lower by 50%; mean value of attendance by skilled personnel got 2.2 percentage points higher; mean value of PM got 64% lower; mean value of adult lifetime risk of maternal death got positively 3.6 times lower; and the mean value of induced abortions per 1,000 live births has dropped by 34%, comparing to 1990.

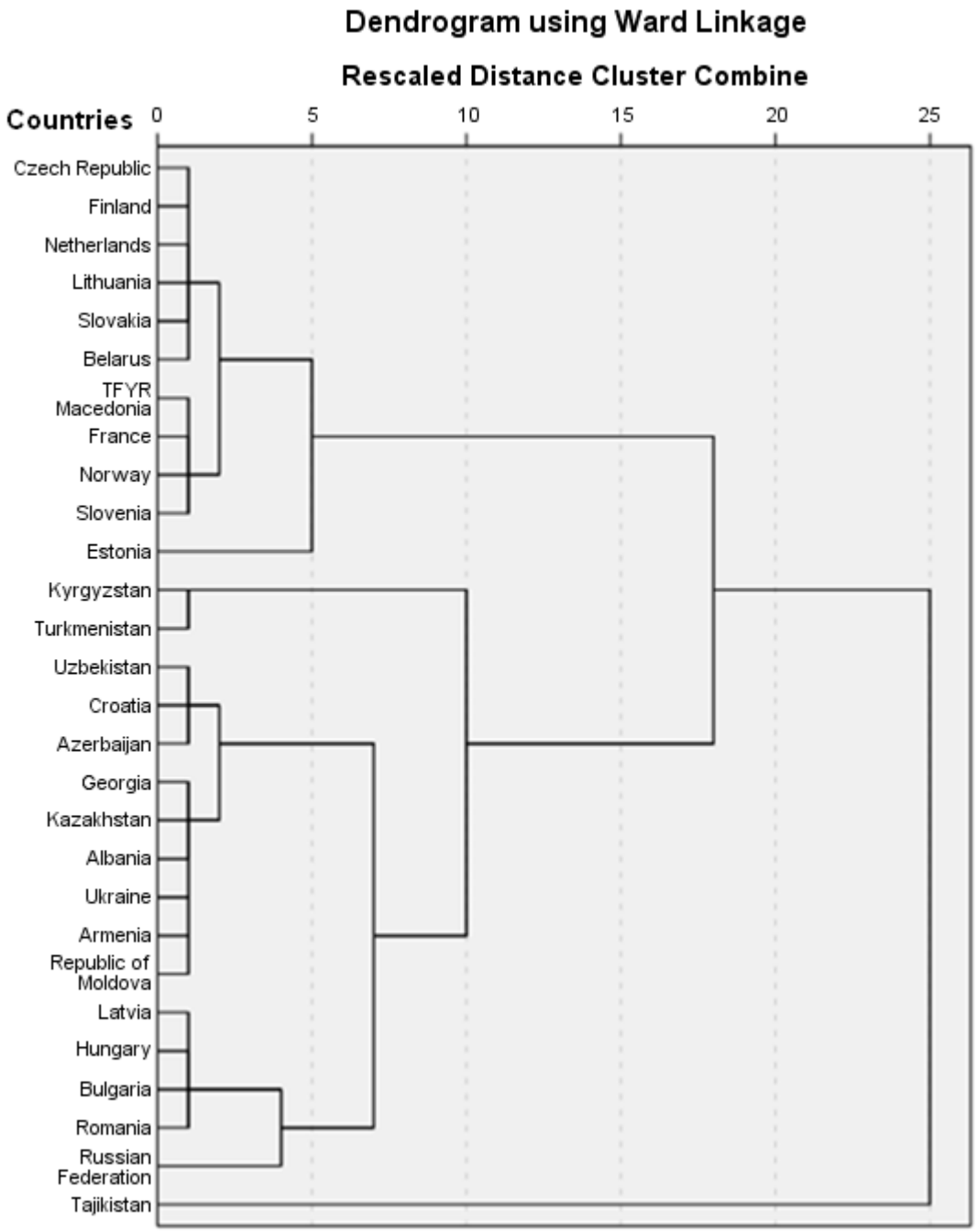
Tab. 20 Selected statistical method in use for clustered countries by selected demographic indicators, 2008

	Ward Method	Induced abortions per 1,000 live births	MMRatio per 1,000 live births	Skilled health personnel	PM	Adult lifetimes risk of maternal deaths: 1 in
Belarus	Mean	256.3	10.1	99.8	0.4	9,900
Czech Republic	Minimum	154.2	6.0	99.0	0.1	5,900
Finland	Maximum	391.2	18.0	100.0	0.8	16,300
France	Std. Deviation	67.9	3.9	0.3	0.2	3,393
Lithuania						
Netherlands						
Norway						
Slovakia						
Slovenia						
TFYR Macedonia						
Albania	Mean	256.4	32.6	99.6	1.4	1,759
Armenia	Minimum	61.9	14.0	98.0	0.7	770
Azerbaijan	Maximum	407.5	48.0	99.9	2.1	4,100
Croatia	Std. Deviation	125.3	10.2	0.6	0.5	1,016
Georgia						
Kazakhstan						
Republic of Moldova						
Ukraine						
Uzbekistan						
Bulgaria	Mean	575.6	22.4	99.5	0.8	3,160
Hungary	Minimum	435.3	13.0	98.7	0.4	2,000
Latvia	Maximum	950.9	39.0	100.0	1.1	5,900
Romania	Std. Deviation	217.2	10.9	0.5	0.3	1,623
Russian Federation						
Kyrgyzstan	Mean	107.1	79.0	99.1	2.7	535
Turkmenistan	Minimum	103.7	77.0	98.5	2.0	480
	Maximum	110.4	81.0	99.7	3.3	590
	Std. Deviation	4.7	2.8	0.8	0.9	78
Estonia	Mean	525.3	12.0	99.8	0.1	25,100
	Minimum	525.3	12.0	99.8	0.1	25,100
	Maximum	525.3	12.0	99.8	0.1	25,100
	Std. Deviation	.	.	.	.	.
Tajikistan	Mean	50.5	64.0	85.0	5.1	430
	Minimum	50.5	64.0	85.0	5.1	430
	Maximum	50.5	64.0	85.0	5.1	430
	Std. Deviation	.	.	.	.	.
Total	Mean	305.0	26.4	99.1	1.1	5615
	Minimum	50.5	6.0	85.0	0.1	430
	Maximum	950.9	81.0	100.0	5.1	25,100
	Std. Deviation	188.4	20.8	2.8	1.1	5,863

Notes: See definitions of demographic indicators in the methodological part, pages 23, 25.

Source: Author's calculations in SPSS.

Fig. 8 Country grouping based on reproductive health indicators in 2008



Source: Author's calculations in SPSS.

Chapter 7

Pregnancy analysis in Kazakhstan

Tables 21, 22 and 23 include absolute data from the Demographic and Health Survey that have been used for further descriptive analysis.

Tab. 21 Distribution of women according to birth cohorts and pregnancy outcomes

Birth cohorts	Live birth	Induced abortion	Miscarriage	Stillbirth	Never pregnant	Total
1949	44	53	3	2	0	102
1950	288	244	47	5	0	584
1951	258	277	53	6	6	600
1952	329	214	41	6	4	594
1953	326	210	40	3	6	585
1954	323	276	39	4	4	646
1955	342	259	38	3	5	647
1956	379	229	42	3	11	664
1957	351	209	36	7	4	607
1958	455	334	50	0	3	842
1959	420	244	54	5	10	733
1960	427	263	48	0	5	743
1961	349	253	44	8	3	657
1962	386	184	42	3	9	624
1963	318	229	43	4	9	603
1964	364	202	34	2	8	610
1965	220	113	25	2	9	369
1966	309	163	48	1	12	533
1967	301	179	24	6	13	523
1968	273	127	42	3	7	452
1969	308	137	30	5	15	495
1970	224	146	35	5	15	425

Birth cohorts	Live birth	Induced abortion	Miscarriage	Stillbirth	Never pregnant	Total
1971	206	108	21	0	16	351
1972	230	99	32	3	18	382
1973	135	77	22	3	26	263
1974	147	65	12	1	31	256
1975	111	35	16	2	40	204
1976	104	25	14	2	43	188
1977	64	27	4	3	71	169
1978	54	15	8	1	92	170
1979	38	6	7	3	125	179
1980	13	9	7	1	125	155
1981	8	4	7	2	147	168
1982	2	2	1	0	153	158
1983	0	2	0	0	163	165
1984	0	0	0	0	98	98

Source: Kazakhstan DHS 1999.

Tab. 22 Distribution of women according to social and geographical factors

Place of residence	***Number of women***
Urban	2,927
Rural	1,873
Total	**4,800**
Level of education	
No education	15
Primary/Secondary	1,814
Secondary-special	1,903
Higher	1,068
Total	**4,800**
Ethnicity	
Kazakh	2,545
Russian	1,595
Ukrainian	174
Other	482
Total	**4,800**

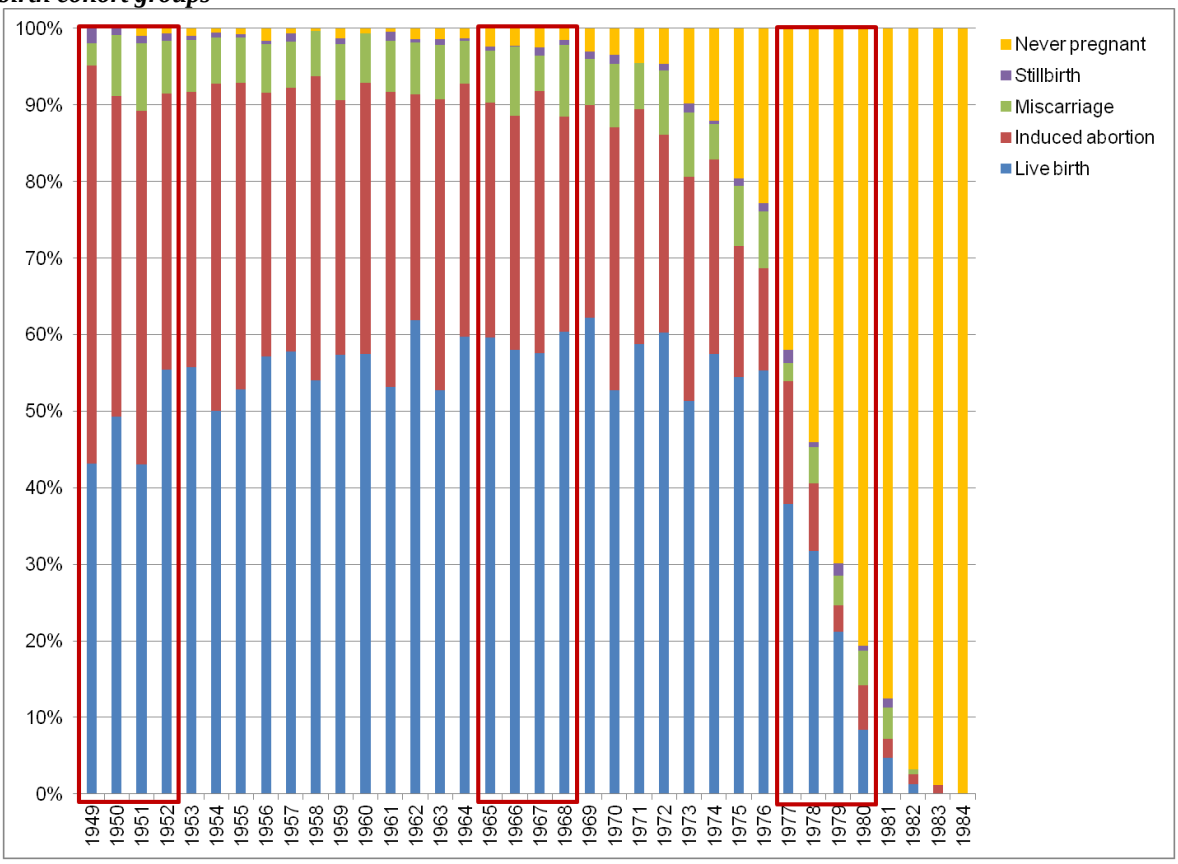
Marital status	***Number of women***
Never married	1,243
Ever married	2,251
Not living together	100
Total	**4,800**
Region	
Almaty city	636
South region	922
West region	753
Central region	875
North region	655
East region	959
Total	**4,800**

Source: Kazakhstan DHS 1999.

7.1 All pregnancy outcomes from the survey

Figure 9 illustrates the 4,800 women who participated in the survey. When looked at from left to right, the figure represents the transition from cohorts of those older women, who had completed their fertility plans and experienced various pregnancy outcomes, through those who were still in the process of completing theirs, to those who had just began their fertility plans. As mentioned in the methodology chapter, the study focuses in detail on the three birth cohort groups (1949–1952, 1965–1968, 1977–1980) highlighted in rectangles. They will be examined according to ethnicity, level of education, marital status, place of residence and regions.

Fig. 9 Proportion of all pregnancy outcomes by women of 1949–1984 birth cohorts and three selected birth cohort groups



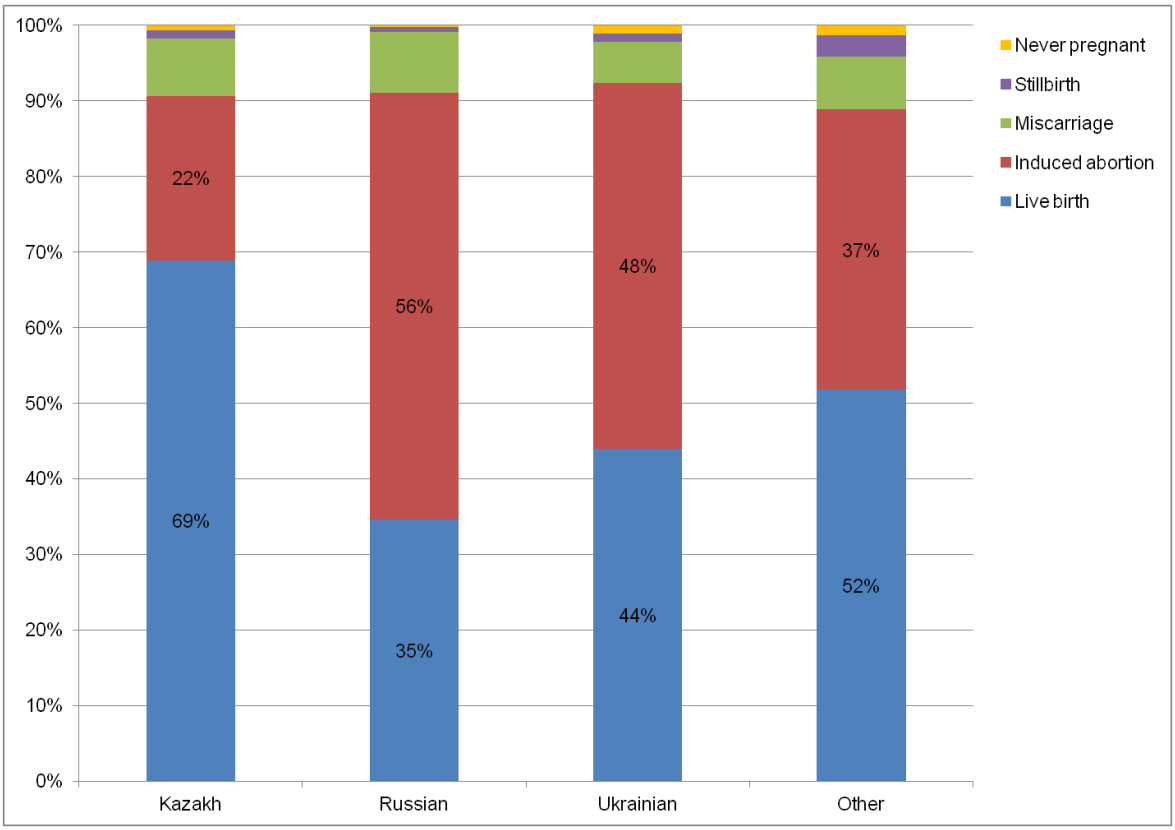
Source: Kazakhstan DHS 1999.

7.1.1 Ethnicity

It is visible that there were some ethnicity-related differences regarding pregnancy outcomes among women surveyed in 1999 (Fig. 10). For instance, the percentage of live births by Kazakh women of the 1949–1952 birth cohorts nearly twice as high than that of Russian women, 1.6 times higher than that of Ukrainian women and 1.3 times higher than that of all other ethnicities. Induced abortion was rather common among Russian, Ukrainian and other ethnicities compared to Kazakh women –

the percentages were, respectively, 2.6, 2.2 and 1.7 times higher. However, the percentage of miscarriages remained similar for these birth cohorts – approximately 7% – across all ethnic groups.

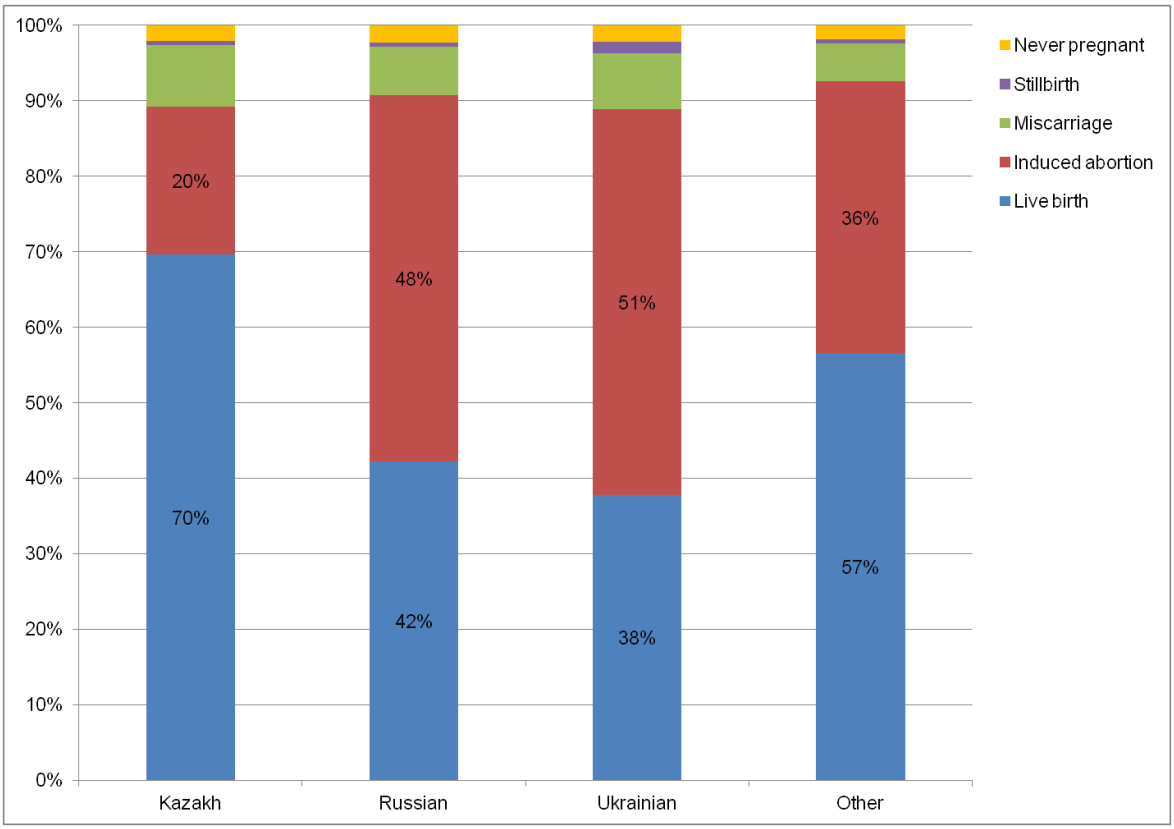
Fig. 10 Proportion of all pregnancy outcomes by ethnicity of the 1949–1952 birth cohort group



Source: Kazakhstan DHS 1999.

Russian women of the older cohorts have reported more (by 8 percentage points) induced abortions and fewer (by 7 percentage points) live births than Russian women of the 1965–1968 birth cohorts (Fig. 11), while for Ukrainian women the development was the opposite: older cohorts reported fewer (by 3 percentage points) induced abortions and 6 percentage points more live births than the middle cohorts. Of the women born in 1965–1968, 2% reported never having experienced pregnancy across all ethnic groups. There was not much of a difference in percentages of pregnancy outcomes between Kazakh women of middle cohorts and older cohorts. Kazakh women, however, were more likely (70%) to give live birth compared to Russian (42%), Ukrainian (38%) and other ethnicities (57%). Kazakh women were also less likely to undergo an induced abortion (20%) compared to Russian (48%), Ukrainian (51%) and other ethnicities (36%). It seems that induced abortion may have been perceived more negatively by the Kazakhs than by the others.

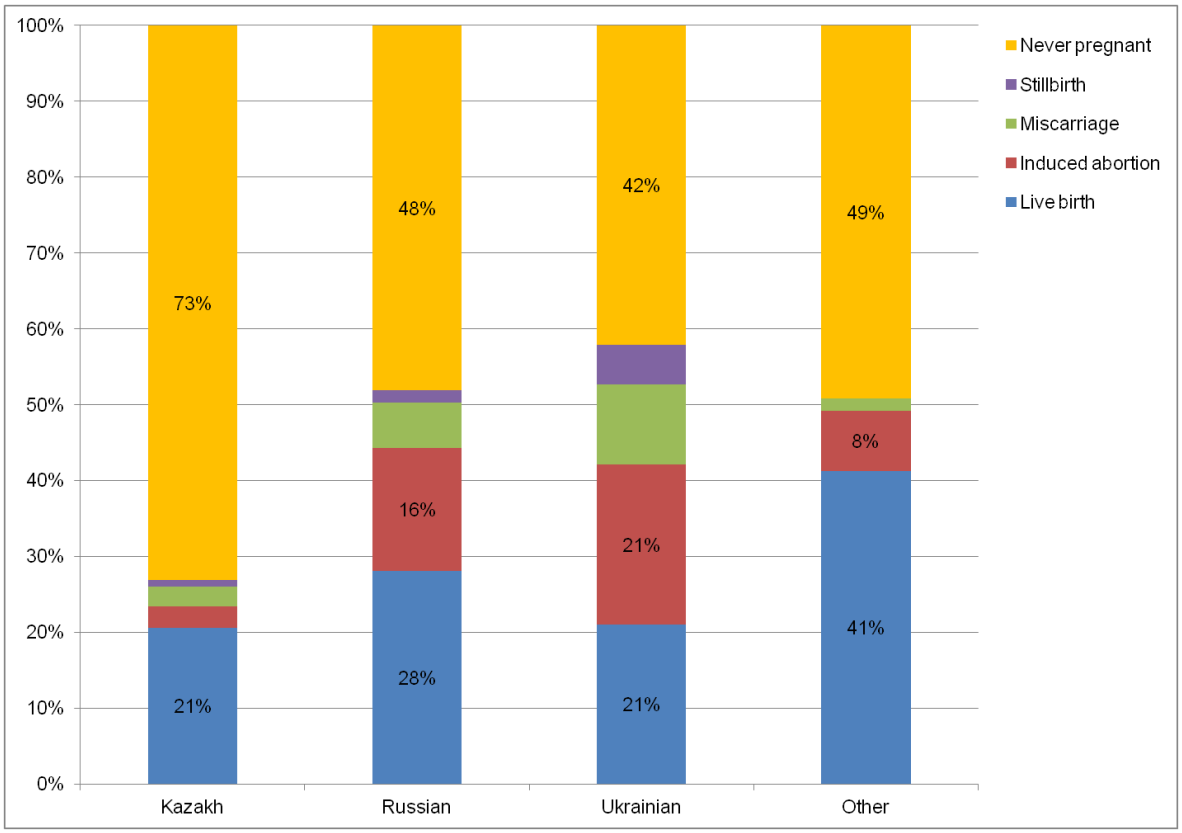
Fig. 11 Proportion of all pregnancy outcomes by ethnicity of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

For women born in 1977–1980, it is remarkable that the majority of Kazakh women (73%) have never been pregnant, while young women of all other ethnicities had reported more than 50% higher incidence of pregnancy outcomes (Fig. 12). It seems that Kazakh women started having children slightly later than other ethnic groups, but then had more children in total than any other ethnicities. Even though all women from different ethnicities have entered reproductive age, and a small proportion of these young women already got married, the proportion of pregnancy outcomes was low across all the ethnicities. This is understandable as commonly people of these ages are finishing secondary (or secondary-special) education and university; students mostly depend financially on their parents, so they often prefer to first secure a career and then start their own family once they are financially independent. Ukrainian women of those cohorts had slightly higher percentages of miscarriages, stillbirths and induced abortions than all other ethnicities.

Fig. 12 Proportion of all pregnancy outcomes by ethnicity of the 1977–1980 birth cohort group

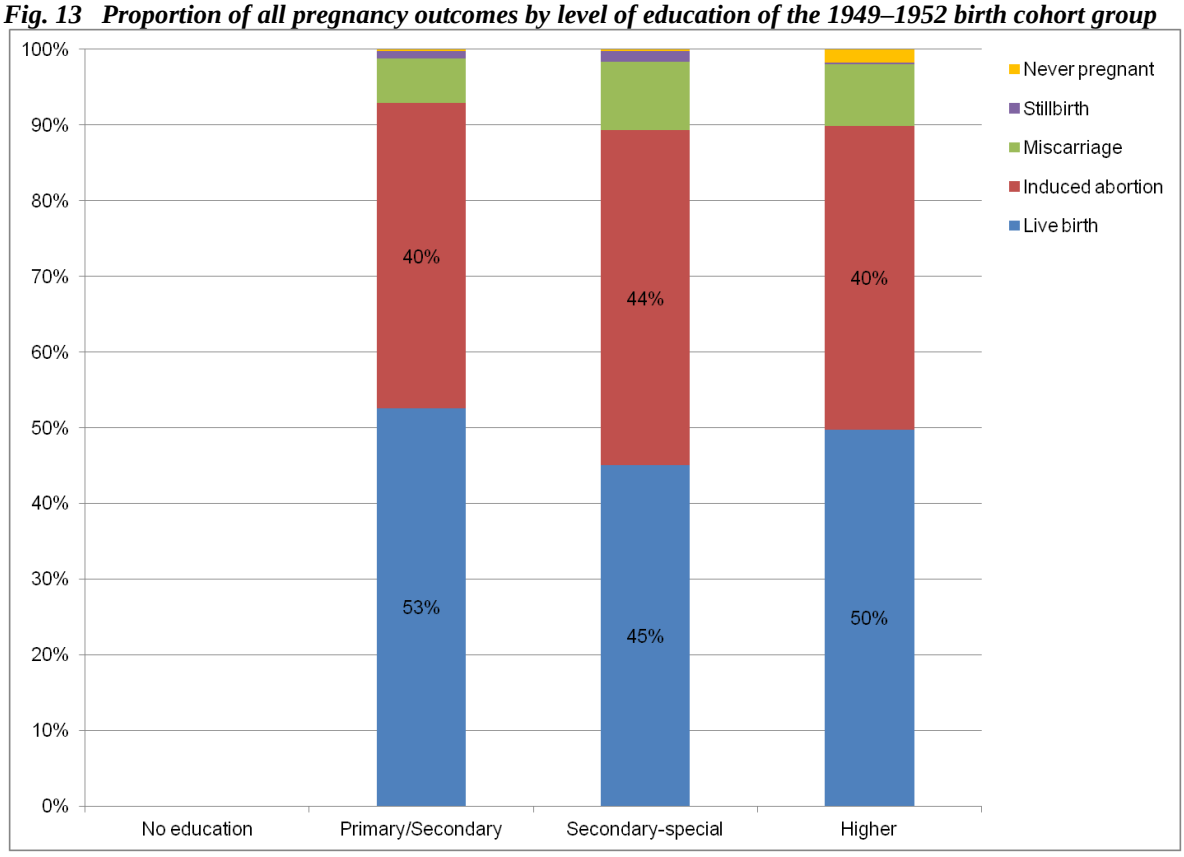


Source: Kazakhstan DHS 1999.

7.1.2 Education

Among the women born in 1949–1952, the only group that reported never having been pregnant (2%) was that with higher education (Fig. 13). Proportion of miscarriages remained relatively constant for all groups (6–9%), indicating that miscarriages were not affected much by the women's educational status at those birth cohorts. Proportions of induced abortions and live births were nearly equal between women with compulsory education (live births 53%, induced abortion 40%) and women with higher education (live births 50%, induced abortion 40%) in the older cohorts. Women with secondary-special education, however, reported fewer live births (45%) and more induced abortions (44%) than other groups.

Fig. 13 Proportion of all pregnancy outcomes by level of education of the 1949–1952 birth cohort group

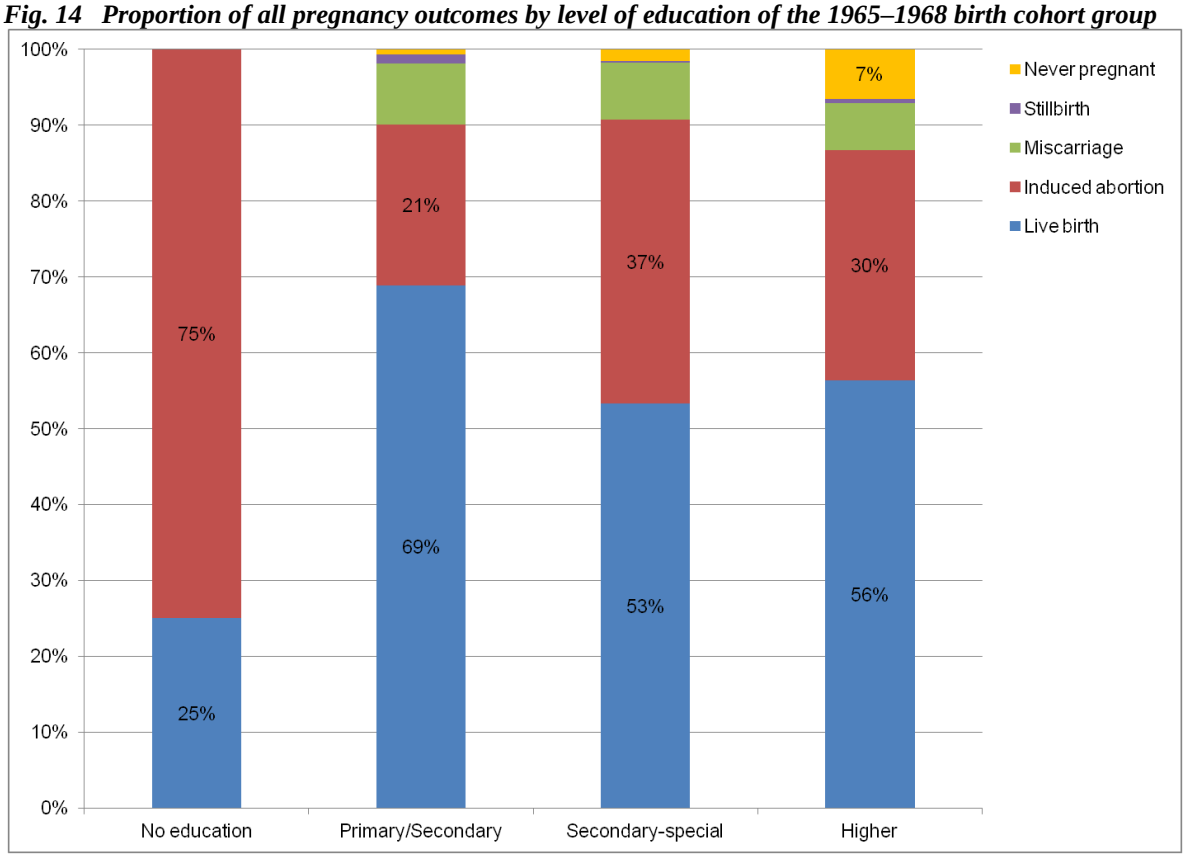


Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

Among women born in 1965–1968, the trend began to resemble the expected pattern, where higher education corresponds to fewer pregnancies (Fig. 14). Within these cohorts, all surveyed women with no education have been pregnant (there was only 1 reported case of live birth and 3 cases of induced abortions within this education category; one should remember that this is not a very representative sample), a small percentage of women with compulsory (1%) and secondary-special education (2%), and a slightly higher percentage (7%) of women with higher education reported never having been pregnant. Women with lower education also gave more live births than the rest. Women with no education reported the lowest percentage of live births (however, since there were very few reports by women with no education, this result should not be considered as statistically significant). Induced abortion percentages were the highest for women with secondary-special education (37%) and lowest for women with compulsory education (21%). Percentage of miscarriages was similar for all groups (6–8%).

Fig. 14 Proportion of all pregnancy outcomes by level of education of the 1965–1968 birth cohort group

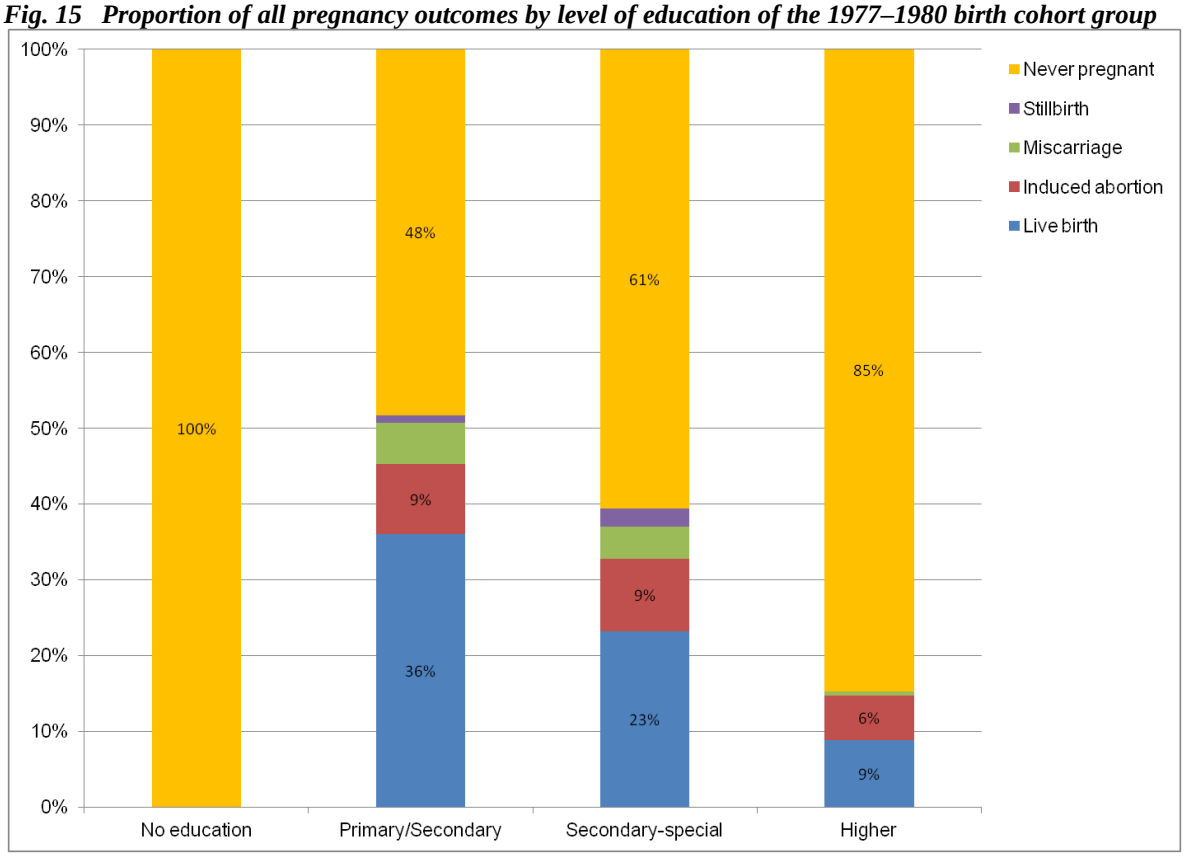


Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

In the 1977–1980 birth cohorts, women with compulsory education (primary/secondary) were the group less likely to report never having been pregnant (48%) and more likely to report having given live birth (36%) or having had a miscarriage (5%) than those with secondary-special (61%, 23%, 4%, respectively) and higher education (85%, 9%, 1%, respectively). Women with higher education gave 17 percentage points fewer live births than women with only compulsory education and 85% of them report never having been pregnant. This may be due to the fact that women who had any higher education were more likely to have as a priority exploring more opportunities and not yet creating own family. At the same time, those young women who have focused on further education were more likely to have had more information related to their reproductive health and contraception choices, thus reducing the chances of pregnancy.

Fig. 15 Proportion of all pregnancy outcomes by level of education of the 1977–1980 birth cohort group



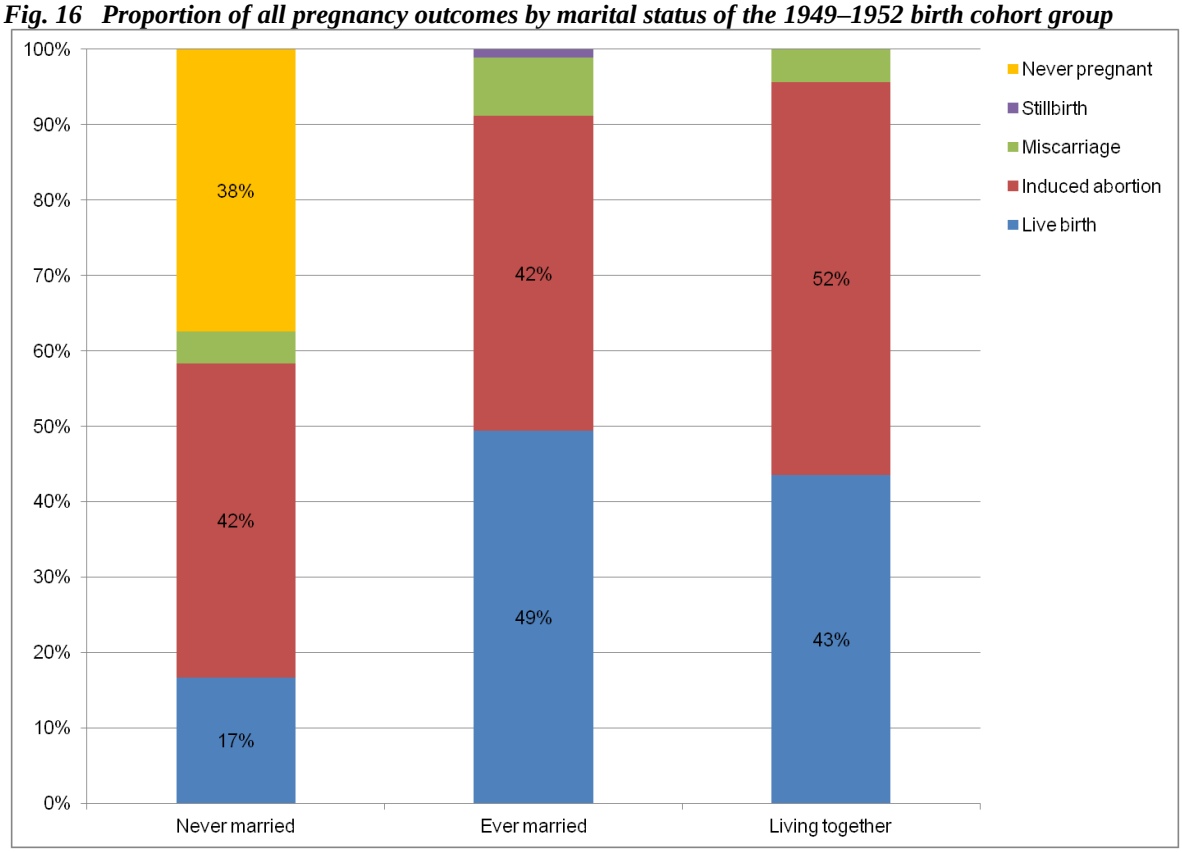
Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

7.1.3 Marital status

The most noteworthy fact about the 1949–1952 birth cohort group is that out of never married women about 40% have remained childless and reported to have never been pregnant (Fig. 16). Both never married and living together women reported lower percentage of live births, comparing to ever married women. It is to be expected that women who had never been married would be less likely to ever have children. It is possibly so because never married women have less willingness to start a family on their own. It is also likely that it is less socially acceptable and more financially difficult to raise children out of wedlock. Proportion of induced abortion was the highest among those living together with their partner (50%) and lowest among the never married (20%).

Fig. 16 Proportion of all pregnancy outcomes by marital status of the 1949–1952 birth cohort group

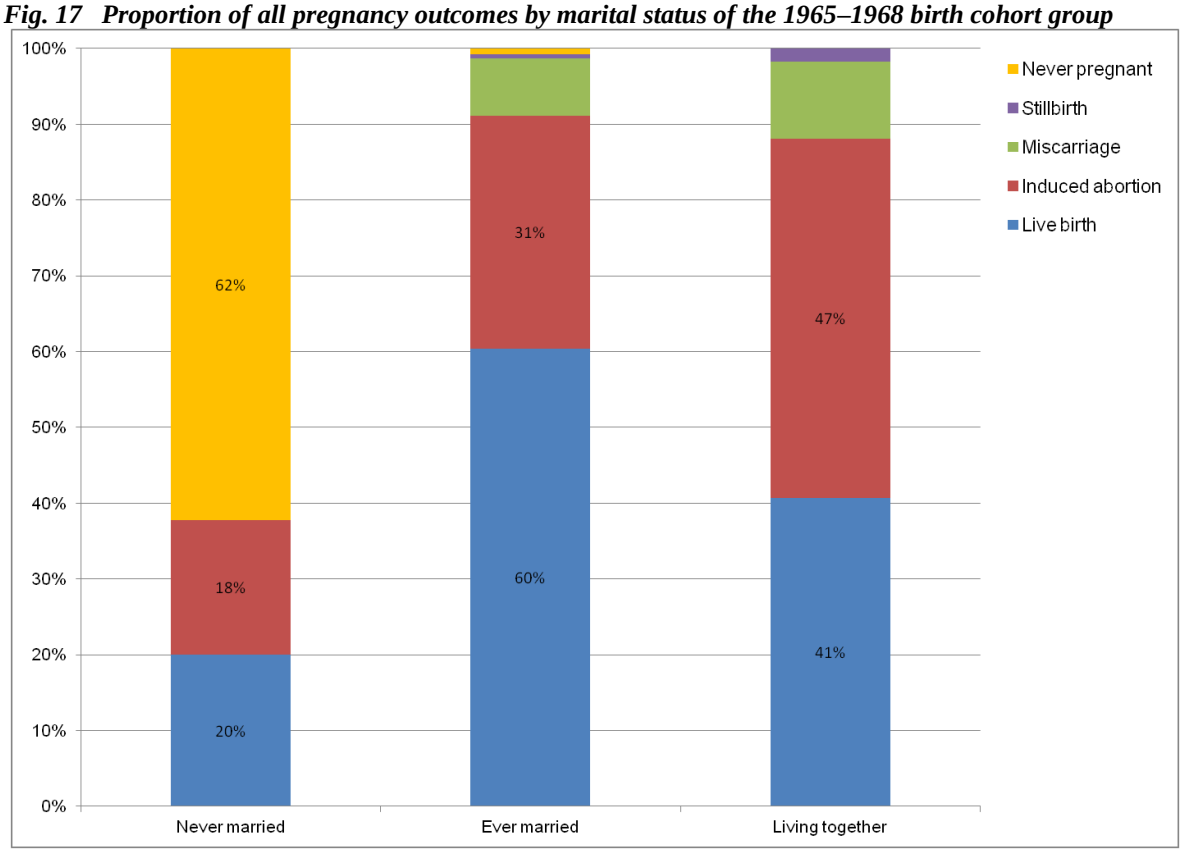


Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999

Within the 1965–1968 birth cohorts, proportion of never having been pregnant reported by women who never married was 62% (Fig. 17). The proportions of both live births and induced abortions among women who never married were the lowest – 20% and 18%, respectively. On the other hand, women living together with a partner have reported 47% proportion of induced abortions. Incidence of miscarriage was reported only by the ever married women and those living together with a partner. Ever married women reported the highest proportion of live births: 60% (Fig. 17).

Fig. 17 Proportion of all pregnancy outcomes by marital status of the 1965–1968 birth cohort group

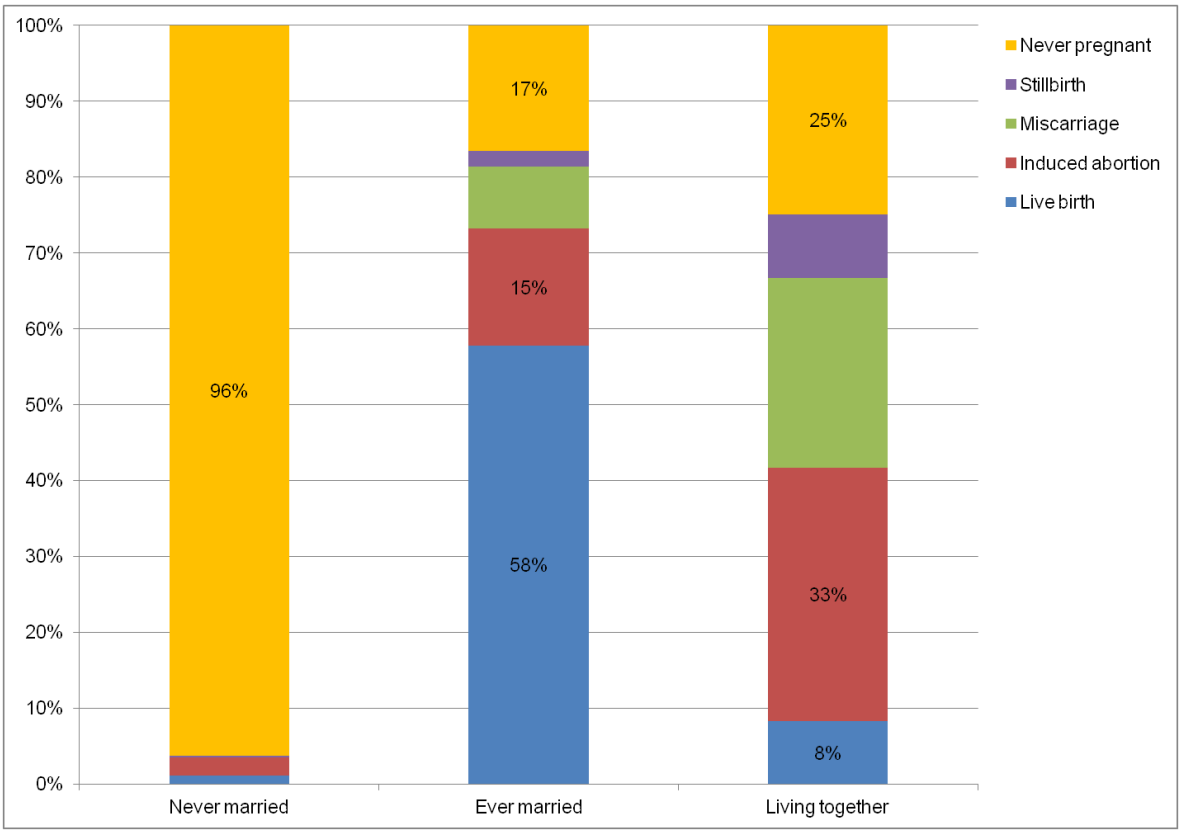


Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999.

The fact that never married women do not tend to get pregnant could also be observed among women who were 19–22 years old at the moment of the survey (Fig. 18). Women living together with a partner and married women, on the other hand, had about 80% of various pregnancy outcomes. What is noteworthy is the fact that young women living together with a partner but not married have reported a much higher percentage of miscarriages (25%) than the other groups. Women living together with a partner terminated one third of all pregnancies by an induced abortion. It may be due to the fact that women living together with a partner were not yet planning to start a family or were waiting until official marriage to start having children. Also, it may have been due to financial reasons as well as due to the fact that socially it may be less acceptable to have children out of wedlock. Women who have ever been married reported 58% of live births and about half the percentage of induced abortions than that of women living together with a partner.

Fig. 18 Proportion of all pregnancy outcomes by marital status of the 1977–1980 birth cohort group



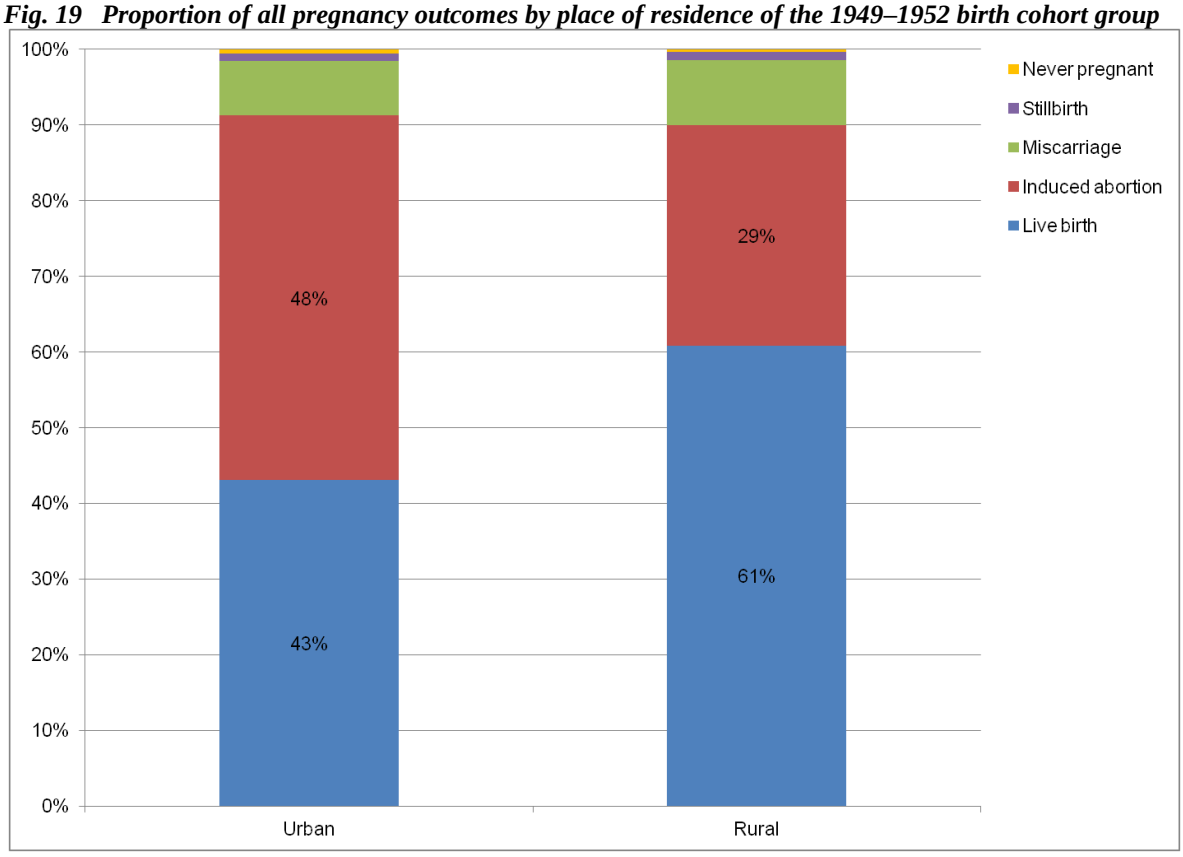
Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999.

7.1.4 Place of residence

From the 1949–1952 birth cohorts, both rural and urban women reported nearly equal incidence of having been pregnant, but only 43% live births were given by urban women, while 48% of their pregnancies were terminated by an induced abortion (Fig. 19). Induced abortions may be more readily available in urban settings and less stigmatized, plus the urban setting allows for a degree of anonymity – a woman may go to have an abortion without anyone knowing about it. Rural women, on the other hand, gave 61% of live births and only terminated one third of pregnancies by an induced abortion. Miscarriage percentages were approximately equal.

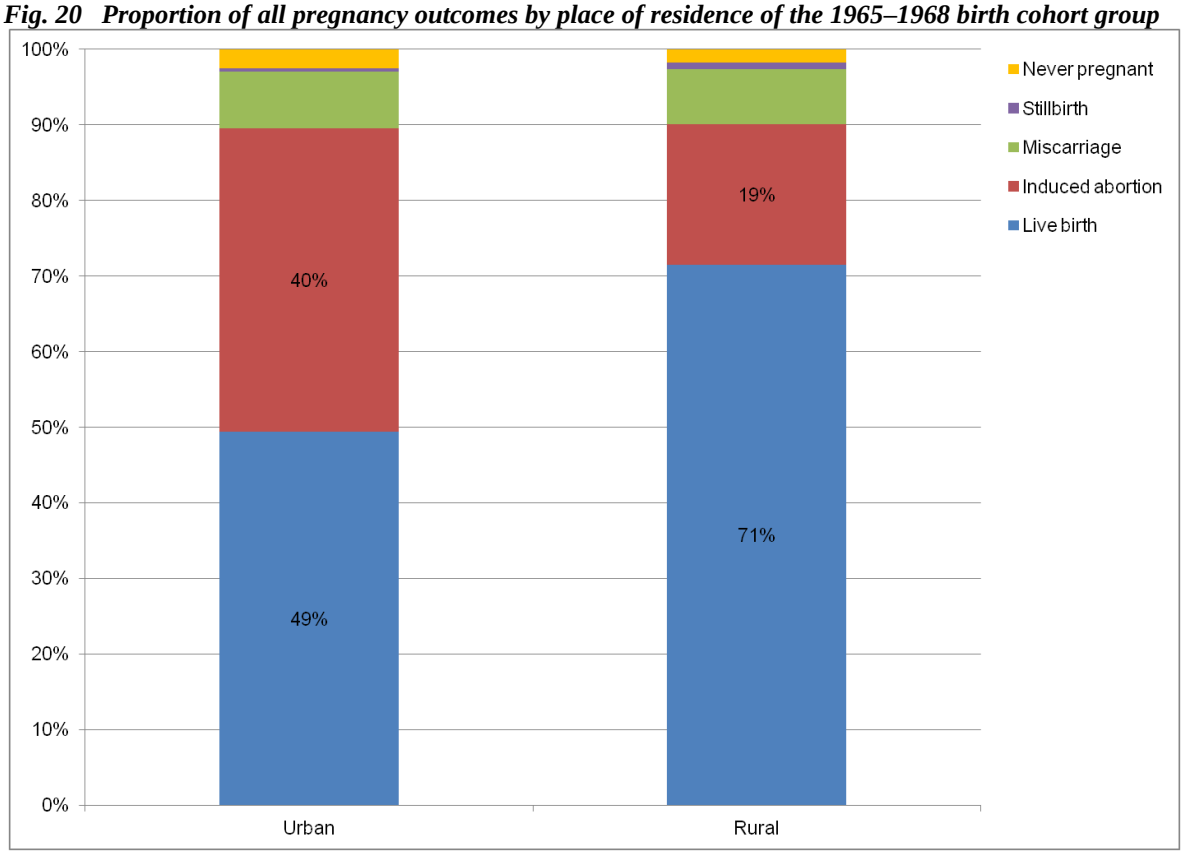
Fig. 19 Proportion of all pregnancy outcomes by place of residence of the 1949–1952 birth cohort group



Source: Kazakhstan DHS 1999.

Proportion of miscarriages remained nearly the same for women from the 1949–1952 birth cohorts and the 1965–1968 birth cohorts (Fig. 20), indicating that these miscarriages were most likely within the range of naturally occurring percentage of miscarriages in women. Proportion of induced abortions, however, was slightly higher for the older cohorts – by 8 percentage points among the urban women and by 10 percentage points among the rural women. This may be due to the fact that for older women induced abortion was the main known fertility control method, while women from the 1965–1968 cohorts were slightly more advanced in using modern contraception methods and, therefore, had less necessity for undergoing an induced abortion. Percentage of live births was 1.8 times more among rural women than among urban ones.

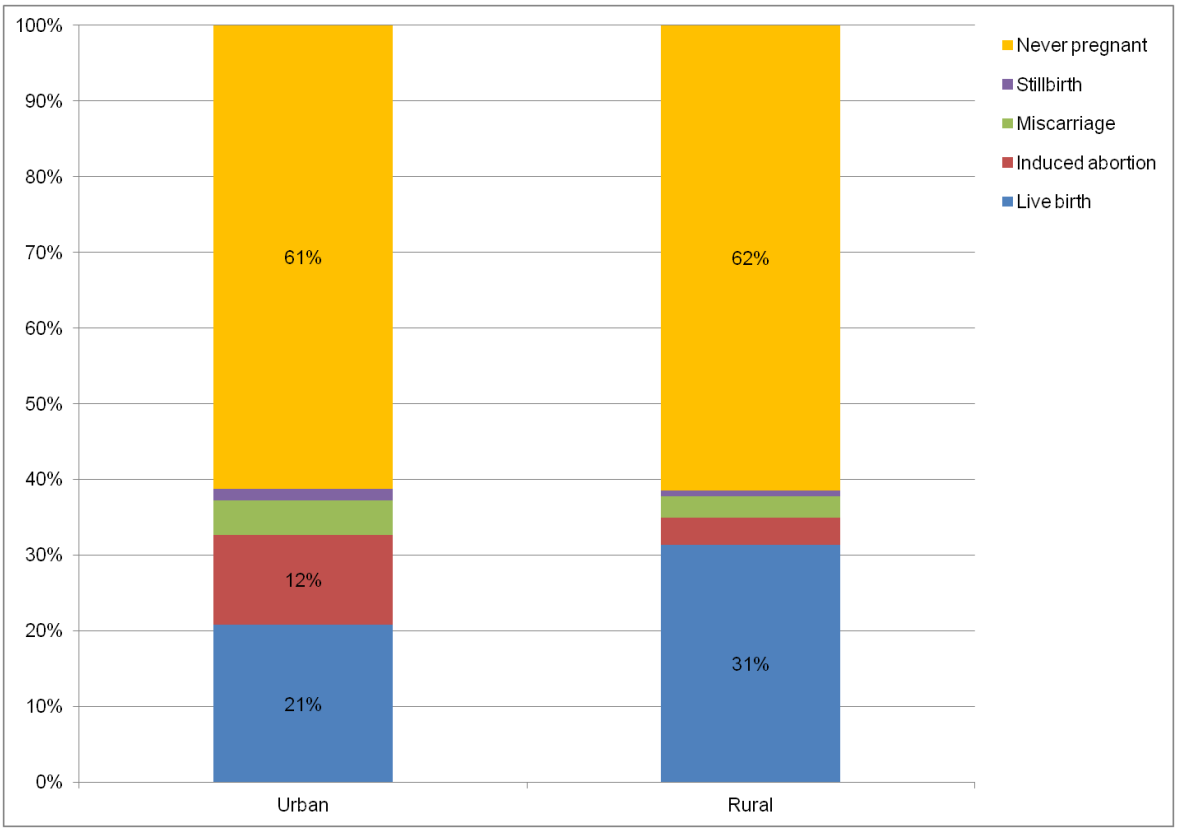
Fig. 20 Proportion of all pregnancy outcomes by place of residence of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

Among urban and rural young women of the 1977–1980 birth cohorts the incidence of having never been pregnant was nearly identical: 61%–62%, respectively (Fig. 21). However, percentages of induced abortion underwent by urban women were 3 times more compared to urban women. Rural women gave more live births (31%) than urban women (21%). It may be partially due to perspectives in their lives – urban women being more oriented towards a career, while rural towards a family.

Fig. 21 Proportion of all pregnancy outcomes by place of residence of the 1977–1980 birth cohort group

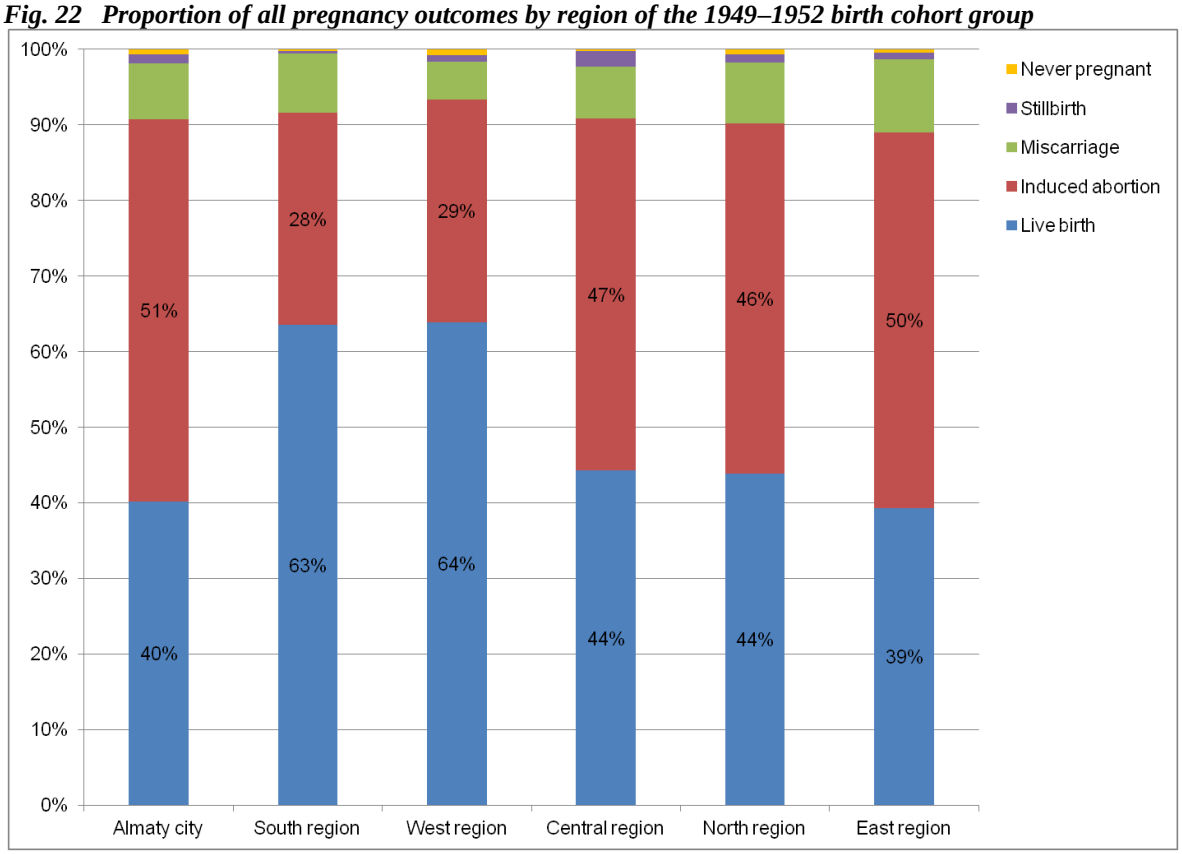


Source: Kazakhstan DHS 1999.

7.1.5 Regional differences

Further analysis is to determine whether there exist important regional differences in the selected indicators for the women of the chosen birth cohorts. In the 1949–1952 (Fig. 22) birth cohorts, women of East region and Almaty city reported the lowest percentage of live births – 39% and 40%, respectively, and the highest percentage of induced abortions – 51% and 50% respectively. East region is the region that is close to Russia. The Russian influence during the Soviet times may be partially responsible for such high proportions of induced abortion in North and East Kazakhstan. The highest percentage of live births was reported in the South and West regions (63% and 64%, respectively), where the reported rate of induced abortion was the lowest at 17% and 15%, respectively. At the same time, East region had the highest proportion of miscarriages –10%. The only region that reported incidents of stillbirth were the Central and East regions. It is possible that the fact that Central region is the basin of coal mining and thus rather polluted may have had influence over the incidence of stillbirths within these cohorts.

Fig. 22 Proportion of all pregnancy outcomes by region of the 1949–1952 birth cohort group

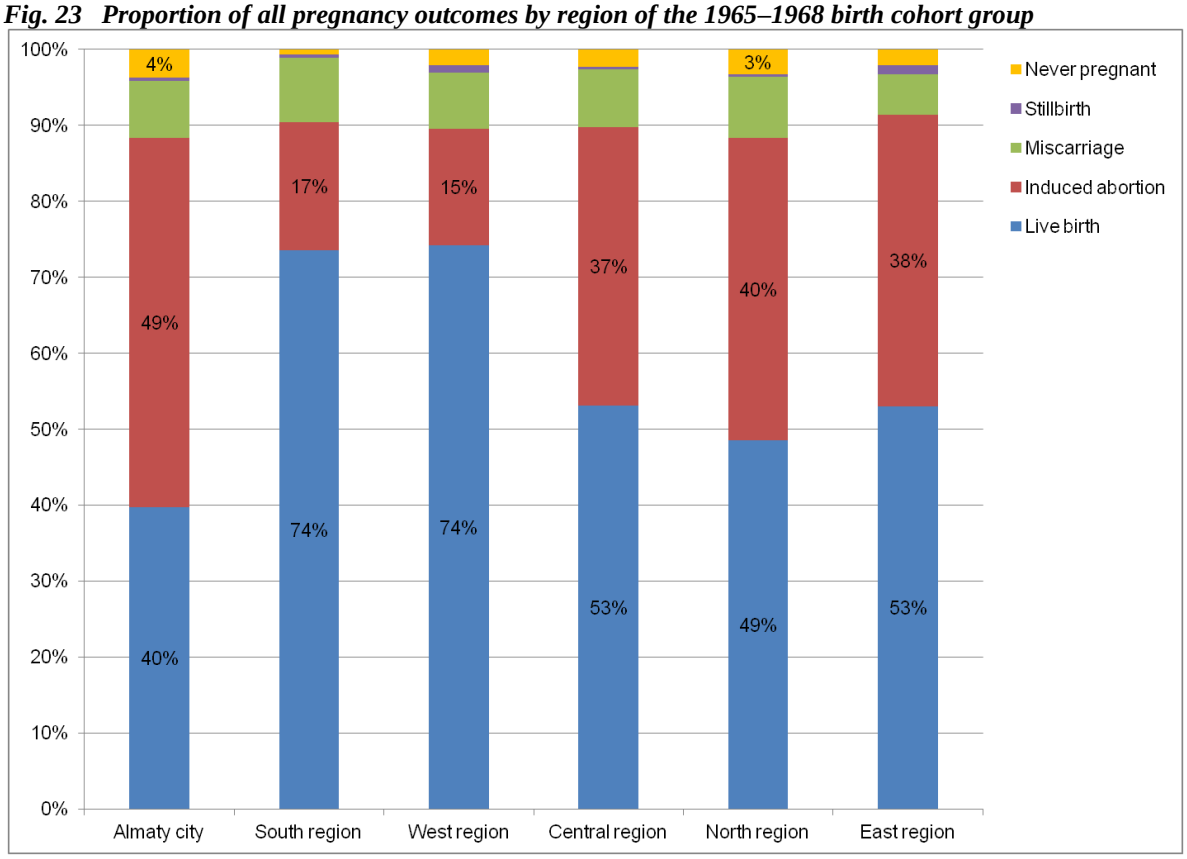


Source: Kazakhstan DHS 1999.

In the 1965–1968 birth cohorts most live births have been reported in the West and the South regions (74% and 74%) (Fig. 22), where again, as in the older cohorts, induced abortion percentages were the lowest – 15% and 17%, respectively, which is at least twice lower than everywhere else. South and Western regions of Kazakhstan are the ones that are primarily covered by either semi-deserts or deserts. In the South the way of life more traditional, influenced by Uzbek conservative mentality that stems from their religion and culture, and oriented towards a large family that is expected to help one in old age. These regions in both middle and older cohorts reported the highest percentages of live births and lowest percentages of induced abortion. In the Western region, on the other hand, some parts are adjacent to the Caspian Sea rich in fish and oil. Many rich people live near the Caspian Sea and they are more likely to be able to afford to have more children comparing to other regions of Kazakhstan.

Almaty city is a large city very dissimilar to the rest of the South region of Kazakhstan. It is Kazakhstan's former capital city that attracts many travelers, students, professionals and individuals from all walks of life. Interestingly, women from Almaty city for these cohorts have given fewest live births (40%), have had the most abortions (49%), but also at the same time had the highest percentage of women who had never been pregnant (4%). It indicates that some women chose not to have children and instead focused on other alternative activities, such as career, that are most available in the large cities.

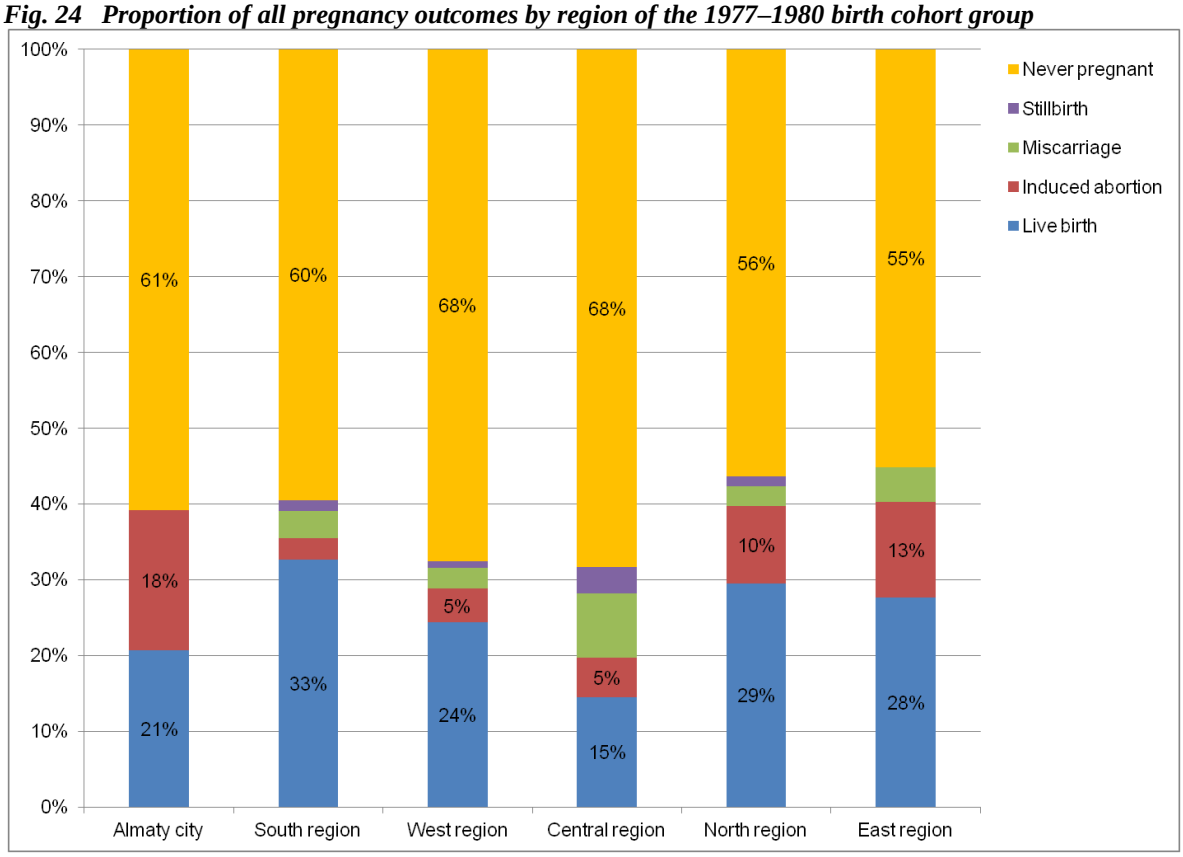
Fig. 23 Proportion of all pregnancy outcomes by region of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

Majority of young women in the 1977–1980 cohorts in all regions report never having been pregnant (Fig. 23). In the Central and West regions 78% of females reported never having been pregnant. Percentage of induced abortion was, as in the middle cohorts, highest in Almaty city (18%), suggesting a more ready availability of the procedure as well as a more tolerant attitude towards it. Women in South, West and Central regions have reported fewest abortions (3% and 5%, respectively) – at least twice as few as in the other regions. Women in the South region gave most live births (33%).

Fig. 24 Proportion of all pregnancy outcomes by region of the 1977–1980 birth cohort group



Source: Kazakhstan DHS 1999.

7.2 Impact of women's characteristics on pregnancy outcomes (regression analysis)

7.2.1 Live birth and factors

Poisson regression analysis has been used in order to determine factors impacting different pregnancy outcomes. Results of main effect model for live births as dependent variable are shown in table 23. When adjusted for all remaining variables in the model, the average number of live births was significantly lower in Almaty city (Odds ratio 0.909), and significantly higher in the South region (Odds ratio 1.169) than in the Central region. In the urban regions the average number of live births was significantly lower (Odds ratio 0.801) than in the rural regions. From the selected types of marital status, only being never married significantly affected the average number of live births – these women had fewer live births (Odds ratio 0.055) than the ever married. The effect of education on the number of live births was strong: when compared to women with only compulsory education, women with higher education (Odds ratio 0.718) and women with secondary-special education (Odds ratio 0.868) had, on average, fewer children. All other ethnicities differed significantly from Kazakh and had on average fewer children. Birth cohort groups were used as control variables.

Tab. 23 Relative average number of live births adjusted for region, place of residence, marital status, educational level, ethnicity, and birth cohort groups

Parameter		B	Sig.	Exp(B)	95% Wald Confidence Interval for Exp(B)	
					Lower	Upper
Intercept		1.482	0	4.401	3.991	4.854
Region	East region	-0.035	0.356	0.965	0.896	1.040
	North region	-0.042	0.322	0.959	0.882	1.042
	Almaty city	**-0.096**	**0.037**	**0.909**	**0.831**	**0.994**
	West region	0.056	0.158	1.058	0.978	1.143
	South region	**0.156**	**0**	**1.169**	**1.083**	**1.261**
	Central region	0	.	1	.	.
Residence	**Urban**	**-0.221**	**0**	**0.801**	**0.761**	**0.844**
	Rural	0	.	1	.	.
Marital status	Living together	-0.071	0.452	0.931	0.774	1.121
	Never married	**-2.892**	**0**	**0.055**	**0.042**	**0.074**
	Ever married	0	.	1	.	.
Education	**Higher**	**-0.331**	**0**	**0.718**	**0.672**	**0.767**
	Secondary-special	**-0.141**	**0**	**0.868**	**0.826**	**0.913**
	No education	-0.041	0.822	0.960	0.673	1.370
	Primary/Secondary	0	.	1	.	.
Birth cohort groups	**1981-1984**	**-3.003**	**0**	**0.05**	**0.026**	**0.094**
	1977-1980	**-1.438**	**0**	**0.237**	**0.201**	**0.280**
	1973-1976	**-0.908**	**0**	**0.403**	**0.361**	**0.450**
	1969-1972	**-0.553**	**0**	**0.575**	**0.525**	**0.630**
	1965-1968	**-0.371**	**0**	**0.690**	**0.632**	**0.754**
	1961-1964	**-0.188**	**0**	**0.829**	**0.762**	**0.901**
	1957-1960	**-0.082**	**0.049**	**0.922**	**0.850**	**1**
	1953-1956	-0.008	0.854	0.992	0.912	1.079
	1949-1952	0	.	1	.	.
Ethnicity	**Other**	**-0.155**	**0**	**0.856**	**0.794**	**0.923**
	Ukrainian	**-0.194**	**0.002**	**0.823**	**0.730**	**0.929**
	Russian	**-0.324**	**0**	**0.723**	**0.684**	**0.765**
	Kazakh	0	.	1	.	.

Notes: Bold font indicates statistical significance.
Exp(B) is Odds ratio.

Source: Kazakhstan DHS 1999. Author's calculations in SPSS.

7.2.2 Induced abortion

Results of main effect model for induced abortions as dependent variable are shown in Table 24. With all remaining variables adjusted, North region females reported higher numbers of induced abortions (Odds ratio 1.290), while West region females reported a significantly lower average number of induced abortions (Odds ratio 0.710) than females of the Central region. Place of residence, yet again, had a strong effect on this indicator: on average, more induced abortions were reported by urban women (Odds ratio 1.157) than by rural women. Having a higher education proved a significant factor in determining the average number of induced abortions to be lower (Odds ratio 0.661). Among the types of marital status, never married women reported significantly lower average numbers of induced abortions (Odds ratio 0.613) than that the ever married women. All ethnicities have reported on average much higher numbers of induced abortions than Kazakh women. Birth cohort groups were used as controlling variables.

Tab. 24 Relative average number of induced abortions adjusted for region, place of residence, marital status, ethnicity, birth cohort groups, and educational level.

Parameter		B	Sig.	Exp(B)	95% Wald Confidence Interval for Exp(B)	
					Lower	Upper
Intercept		1.976	.000	7.210	5.617	9.256
Region	East region	.053	.512	1.054	.900	1.236
	North region	**.255**	**.006**	**1.290**	**1.077**	**1.545**
	Almaty city	.104	.252	1.110	.928	1.327
	West region	**-.342**	**.000**	**.710**	**.597**	**.846**
	South region	-.129	.143	.879	.739	1.045
	Central region	0	.	1	.	.
Residence	**Urban**	**.146**	**.016**	**1.157**	**1.028**	**1.302**
	Rural	0	.	1	.	.
Marital status	Living together	.386	.056	1.472	.990	2.187
	Never married	**-.489**	**.000**	**.613**	**.519**	**.724**
	Ever married	0	.	1	.	.
Education	**Higher**	**-.414**	**.000**	**.661**	**.574**	**.762**
	Secondary-special	-.068	.268	.934	.828	1.054
	No education	-.791	.077	.454	.189	1.089
	Primary/Secondary	0	.	1	.	.
Birth cohort groups	**1981-1984**	**-1.784**	**.000**	**.168**	**.127**	**.223**
	1977-1980	**-1.767**	**.000**	**.171**	**.133**	**.220**
	1973-1976	**-1.704**	**.000**	**.182**	**.143**	**.232**
	1969-1972	**-1.294**	**.000**	**.274**	**.217**	**.346**
	1965-1968	**-1.065**	**.000**	**.345**	**.272**	**.436**
	1961-1964	**-.757**	**.000**	**.469**	**.372**	**.591**
	1957-1960	**-.517**	**.000**	**.596**	**.474**	**.750**
	1953-1956	**-.262**	**.032**	**.770**	**.606**	**.978**
	1949-1952	0	.	1	.	.
Ethnicity	**Other**	**.509**	**.000**	**1.664**	**1.401**	**1.975**
	Ukrainian	**.729**	**.000**	**2.073**	**1.579**	**2.721**
	Russian	**.698**	**.000**	**2.009**	**1.784**	**2.263**
	Kazakh	0	.	1	.	.

Notes: Bold font indicates statistical significance. Exp(B) is Odds ratio.

Source: Kazakhstan DHS 1999. Author's calculations in SPSS.

7.2.3 Miscarriage

Using the same modeling approach, the only factor that had a significant effect on miscarriage was marital status: never married women in that group reported, on average, much lower incidence of miscarriage (Odds ratio 0.830) than their married counterparts (Tab. 25). Birth cohort groups were used as control variables.

Tab. 25 Relative average number of miscarriages adjusted for region, place of residence, marital status, ethnicity, birth cohort groups, and educational level

Parameter		B	Sig.	Exp(B)	95% Wald Confidence Interval for Exp(B)	
					Lower	Upper
Intercept		0.463	0	1.59	1.454	1.738
Region	East region	-0.031	0.28	0.969	0.916	1.026
	North region	0.032	0.328	1.033	0.968	1.101
	Almaty city	-0.001	0.986	0.999	0.938	1.065
	West region	-0.056	0.08	0.946	0.889	1.007
	South region	0.024	0.443	1.024	0.963	1.09
	Central region	0	.	1	.	.
Residence	Urban	-0.004	0.86	0.996	0.955	1.039
	Rural	0	.	1	.	.
Marital status	Living together	0.029	0.689	1.029	0.894	1.185
	Never married	**-0.187**	**0**	**0.83**	**0.782**	**0.88**
	Ever married	0	.	1	.	.
Education	Higher	-0.039	0.127	0.961	0.914	1.011
	Secondary-special	0.009	0.694	1.009	0.966	1.053
	No education	-0.23	0.149	0.795	0.581	1.086
	Primary/Secondary	0	.	1	.	.
Birth cohort groups	**1981-1984**	**-0.251**	**0**	**0.778**	**0.703**	**0.86**
	1977-1980	**-0.272**	**0**	**0.762**	**0.697**	**0.834**
	1973-1976	**-0.269**	**0**	**0.764**	**0.701**	**0.833**
	1969-1972	**-0.222**	**0**	**0.801**	**0.737**	**0.87**
	1965-1968	**-0.17**	**0**	**0.844**	**0.776**	**0.918**
	1961-1964	**-0.156**	**0**	**0.856**	**0.788**	**0.929**
	1957-1960	**-0.123**	**0.003**	**0.884**	**0.814**	**0.959**
	1953-1956	**-0.099**	**0.023**	**0.906**	**0.832**	**0.987**
	1949-1952	0	.	1	.	.
Ethnicity	Other	-0.056	0.072	0.945	0.889	1.005
	Ukrainian	0.019	0.706	1.019	0.925	1.123
	Russian	-0.013	0.538	0.987	0.946	1.03
	Kazakh	0	.	1	.	.

Notes: Bold font indicates statistical significance.
Exp(B) is Odds ratio.

Source: Kazakhstan DHS 1999. Author's calculations in SPSS.

7.2.4 Stillbirth

Within the model almost none of the factors had a significant effect on the average incidence of stillbirths among females. Never married females reported, on average, significantly lower numbers of stillbirths (Odds ratio 0.997) compared to the married ones, which is to be expected as never married women undergo fewer pregnancies (Tab. 26). Birth cohort groups were used as control variables.

Tab. 26 Relative average number of stillbirths adjusted for region, place of residence, marital status, ethnicity, birth cohorts, and educational level

Parameter		B	Sig.	Exp(B)	95% Wald Confidence Interval for Exp(B)	
					Lower	Upper
Intercept		0.071	0	1.073	1.05	1.097
Region	East region	-0.007	0.336	0.993	0.979	1.007
	North region	-0.002	0.85	0.998	0.983	1.015
	Almaty city	-0.008	0.303	0.992	0.976	1.008
	West region	-0.006	0.438	0.994	0.979	1.009
	South region	-0.002	0.81	0.998	0.983	1.014
	Central region	0	.	1	.	.
Residenc e	Urban	-0.007	0.162	0.993	0.982	1.003
	Rural	0	.	1	.	.
Marital status	Living together	0.014	0.423	1.014	0.98	1.051
	Never married	**-0.023**	**0.002**	**0.977**	**0.963**	**0.992**
	Ever married	0	.	1	.	.
Education	Higher	-0.009	0.183	0.992	0.979	1.004
	Secondary-special	-0.01	0.07	0.99	0.98	1.001
	No education	0.037	0.344	1.038	0.961	1.122
	Primary/Secondary	0	.	1	.	.
Birth cohort groups	**1981-1984**	**-0.038**	**0.003**	**0.963**	**0.939**	**0.987**
	1977-1980	**-0.03**	**0.009**	**0.97**	**0.949**	**0.992**
	1973-1976	**-0.037**	**0.001**	**0.964**	**0.943**	**0.985**
	1969-1972	**-0.033**	**0.002**	**0.968**	**0.948**	**0.988**
	1965-1968	**-0.034**	**0.001**	**0.966**	**0.946**	**0.987**
	1961-1964	**-0.028**	**0.007**	**0.972**	**0.953**	**0.992**
	1957-1960	**-0.037**	**0**	**0.963**	**0.944**	**0.983**
	1953-1956	**-0.03**	**0.006**	**0.971**	**0.95**	**0.991**
	1949-1952	0	.	1	.	.
Ethnicity	Other	0.007	0.363	1.007	0.992	1.022
	Ukrainian	0.017	0.176	1.017	0.993	1.041
	Russian	0.002	0.661	1.002	0.992	1.013
	Kazakh	0	.	1	.	.

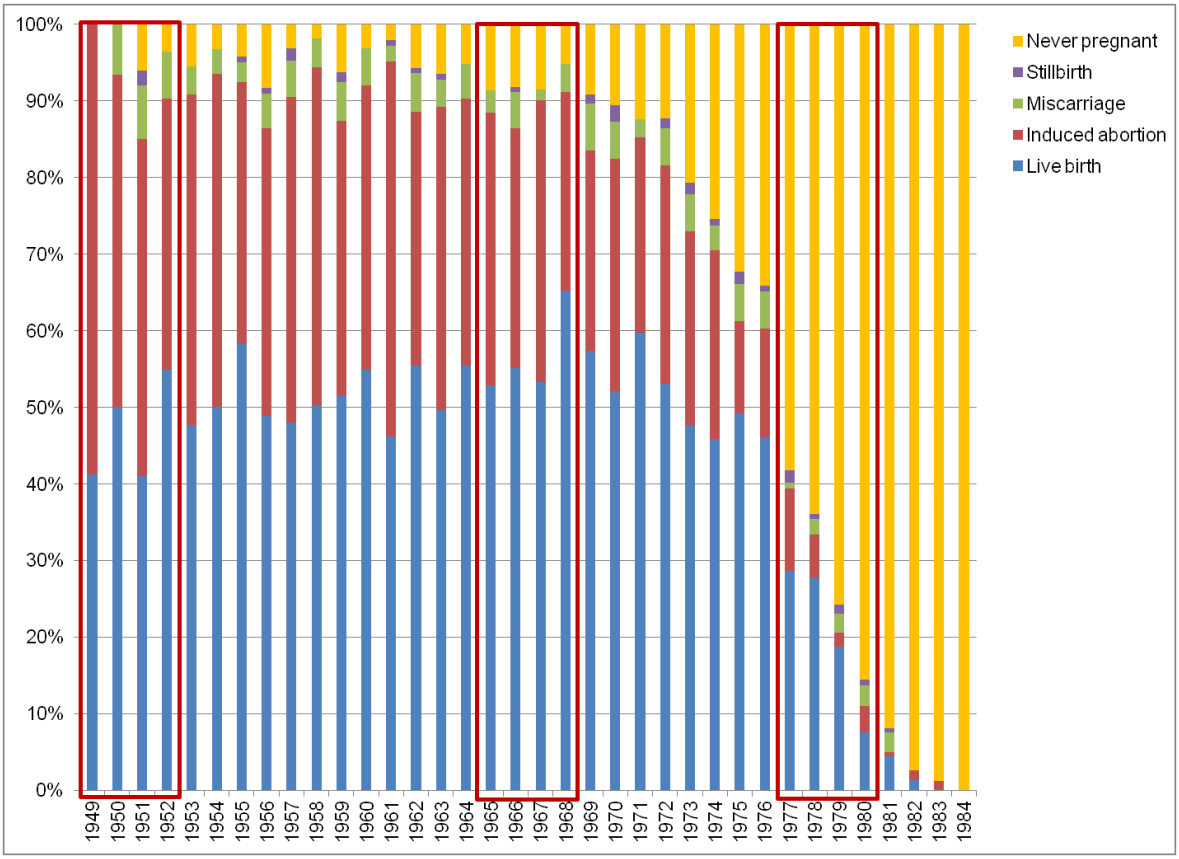
Notes: Bold font indicates statistical significance.
Exp(B) is Odds ratio.

Source: Kazakhstan DHS 1999. Author's calculations in SPSS.

7.3 First pregnancy outcomes from the survey

The figure below illustrates the proportion of the first pregnancy outcomes of all women born from 1949 to 1984 surveyed by the Kazakhstan DHS 1999, as well as three birth cohort groups (highlighted rectangles) which have been selected for further analysis.

Fig. 25 Proportion of first pregnancy outcomes by women of 1949–1984 birth cohorts and three selected birth cohort groups



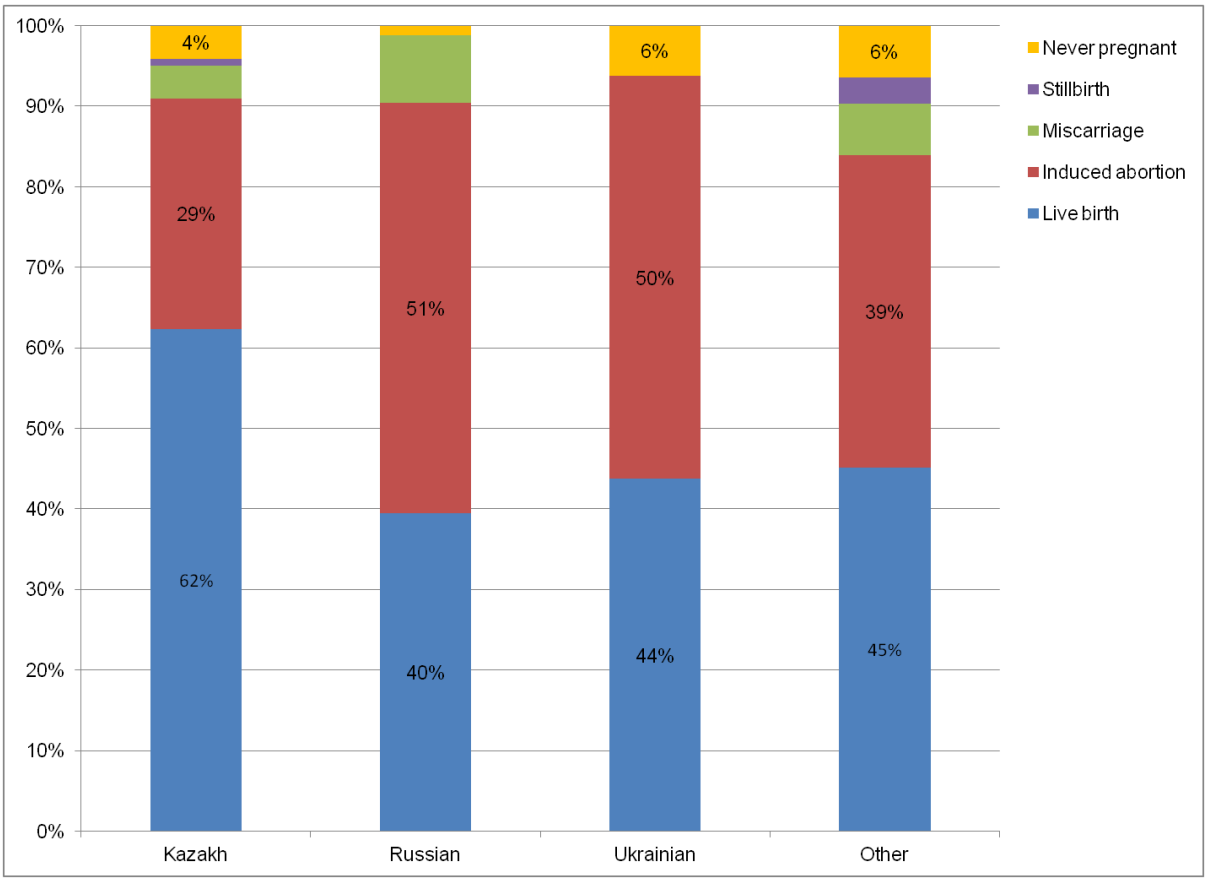
Source: Kazakhstan DHS 1999.

Figure 25 illustrates, from left to right, the transition of first pregnancy outcomes starting with surveyed women who were at the end of their reproductive age and ending with women who were at the beginning of it. Surprisingly, the first pregnancy outcome of women born in 1949 ended up with induced abortion more (59% out of 100%) than live births. Generally, women living in Kazakhstan clearly showed a strong tendency of undergoing induced abortion even for the first pregnancy outcome. Therefore, to some extent, this may explain much higher maternal mortality indicators when compared to the developed countries.

7.3.1 First pregnancy outcomes by ethnicity

Certain differences in first pregnancy outcomes existed between the ethnicities in all analyzed birth cohorts.

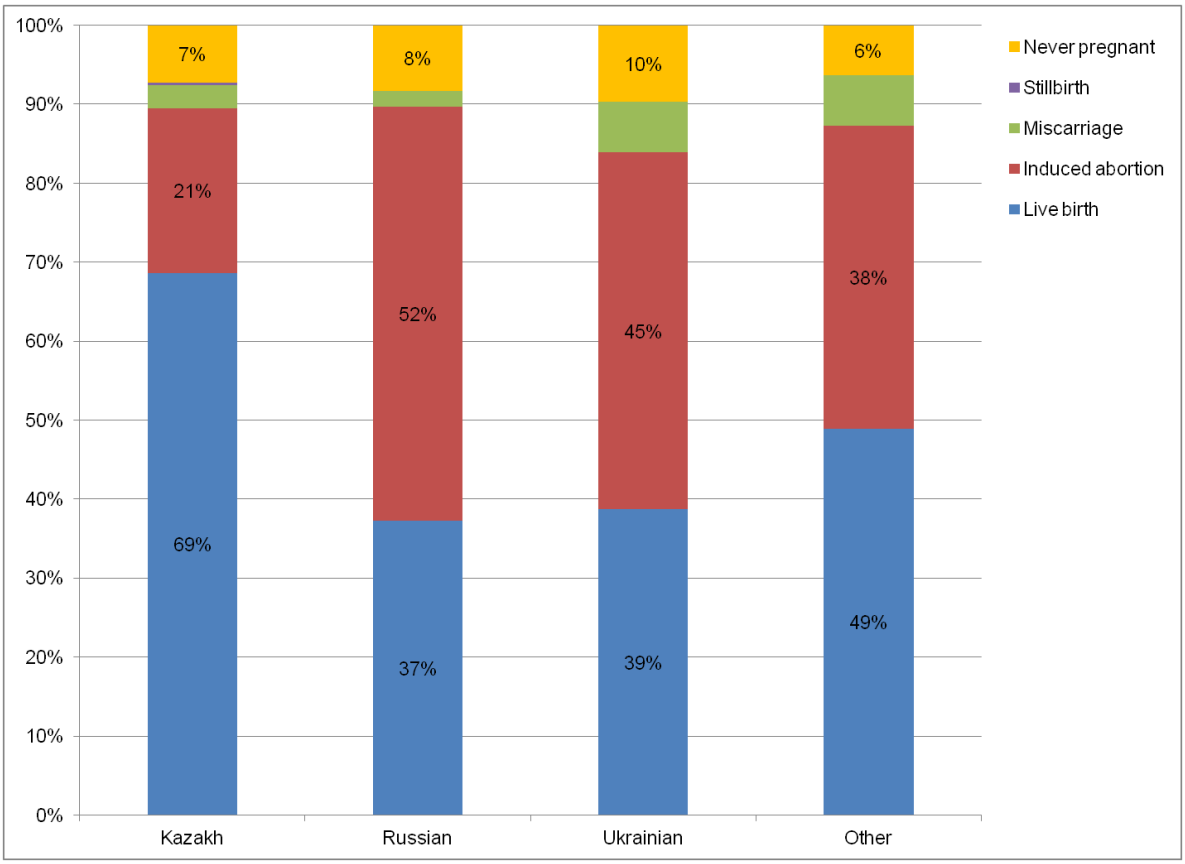
Fig. 26 Proportion of first pregnancy outcomes by ethnicity of the 1949–1952 birth cohort group



Source: Kazakhstan DHS 1999.

For instance, the percentage of Kazakh women of the 1949–1952 birth cohorts whose first pregnancy resulted in live birth was 22 percentage points higher than of Russian women, 18 percentage points higher than that of the Ukrainian women and 17 percentage points higher than that of all other ethnicities (Fig. 26). Fewer Kazakh women decided to terminate the first pregnancy by an induced abortion than all other ethnicities: Russian and Ukrainian women reported terminating by 22 and 21 percentage points, respectively, while women of other ethnicities by 10 percentage points more first pregnancies by an induced abortion. This may indicate that induced abortion was less acceptable among Kazakhs of those birth cohorts. It may also be the case that Kazakh women were less likely to have an accidental first pregnancy out of wedlock or a stable relationship and thus they were more likely to carry their first pregnancy to term. The proportion of first pregnancy miscarriages reported within these birth cohorts varied among the ethnicities: the number was approximately twice as low for Kazakh women than for Russian and other ethnicities, except Ukrainians. Ukrainian women, interestingly, reported no miscarriages at all, while Russian women reported the highest percentage of it. Both Ukrainian and Russian women also reported no stillbirths. Other ethnicities of these birth cohorts reported a higher incidence of the first pregnancy ending in a stillbirth than Kazakh.

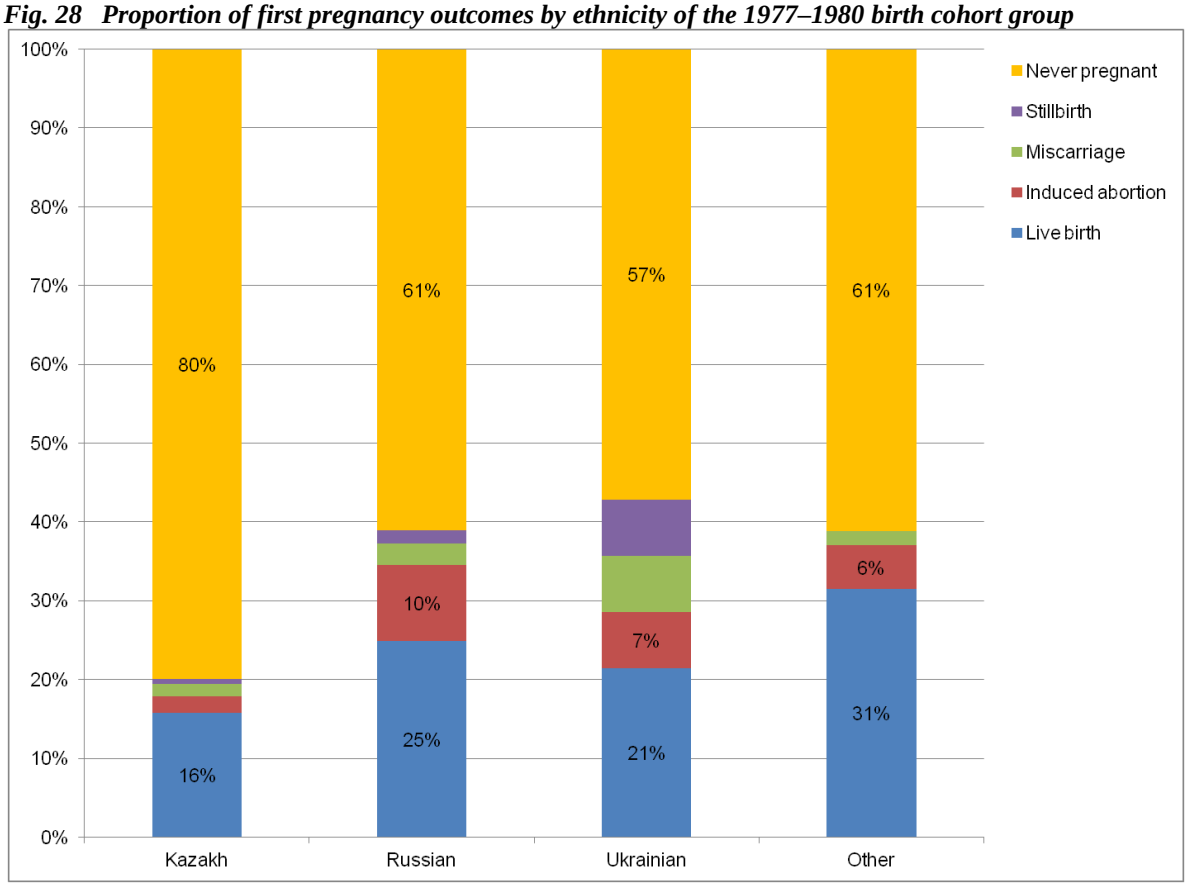
Fig. 27 Proportion of first pregnancy outcomes by ethnicity of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

The middle birth cohorts reported slightly different percentages for the first pregnancy outcomes than the older birth cohorts. The first pregnancy was more likely to end up with a live birth for Kazakh women of middle cohorts than those of the older cohorts (62% for 1949–1952 birth cohorts vs. 69% for 1965–1968 birth cohorts). Kazakh women also had approximately 30 percentage points more live births compared to Russian and Ukrainian women and 10 percentage points more than that of other ethnicities (Fig. 27). Fewer Kazakh women of these cohorts decided to terminate the first pregnancy by an induced abortion than those of the older cohorts (29% for 1949–1952 birth cohorts vs. 21% for 1965–1968 birth cohorts). There was almost no change in percentage of having undergone an induced abortion between older and middle birth cohorts.

Fig. 28 Proportion of first pregnancy outcomes by ethnicity of the 1977–1980 birth cohort group



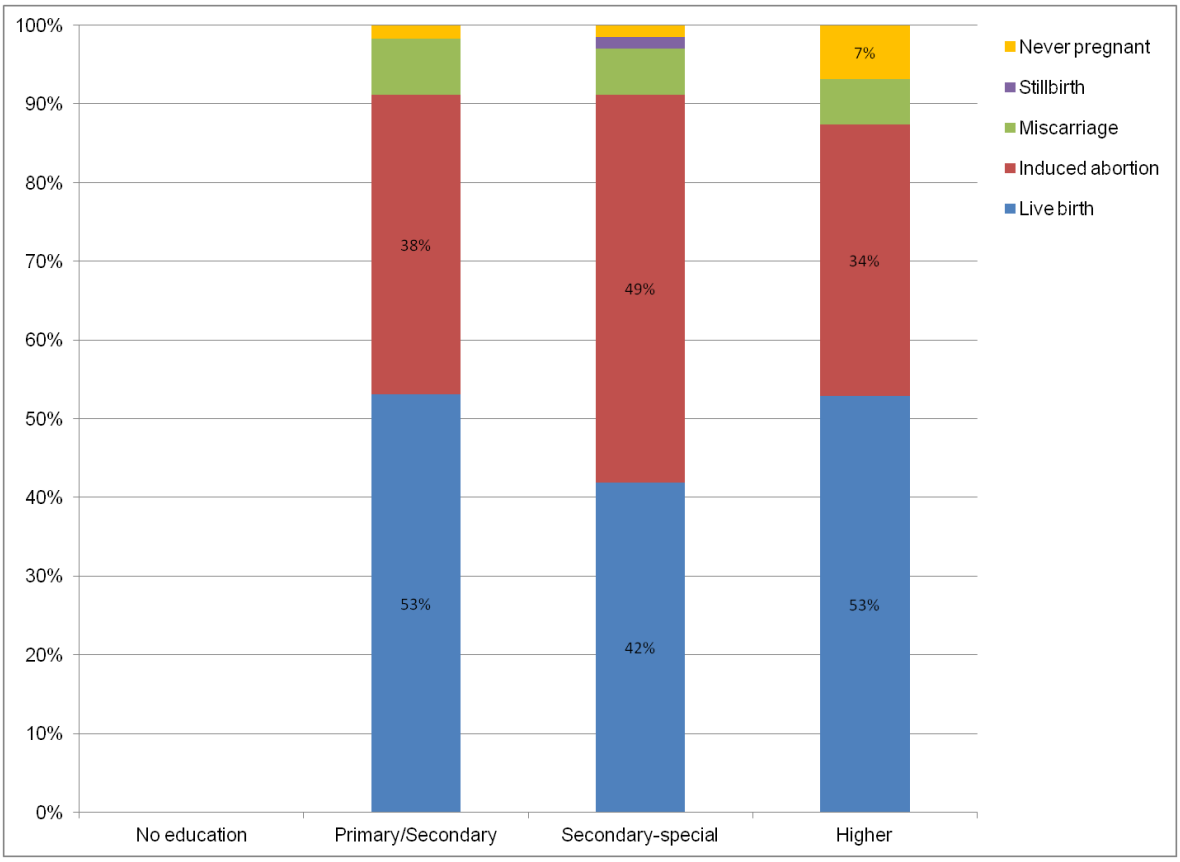
Source: Kazakhstan DHS 1999.

For women born in 1977–198, it is remarkable that the majority of Kazakh women (80%) have never been pregnant, while young women of all other ethnicities have approximately 20 percentage points higher events of first pregnancy outcomes (Fig. 28). It seems that Kazakh women started having children slightly later than other ethnicities, but further demonstrate highest percentage of giving live birth comparing to other ethnicities. One of the factors influencing this can be that these young Kazakh women did not yet find a serious partner to marry and to start a family with; or because these young women continued studying and had education rather than family as a priority. Even though all women from different ethnicities have entered reproductive age, the percentage of pregnancy outcomes was low across all the ethnicities. This is understandable, since many people of these ages are continuing education, which seems to be their main priority, and childbirth is postponed until later in life. Nevertheless, from the data available, percentages of termination of first pregnancy by induced abortion was 4, 3 and 2.5 times more by Russian, Ukrainian, and other ethnicities, comparing to Kazakh women. Higher percentage of stillbirths was reported by women of these cohorts than by women of the middle and older cohorts. Higher percentages of first pregnancies ending in a stillbirth among the youngest cohorts could indicate certain problems with the state of female reproductive health care in Kazakhstan.

7.3.2 First pregnancy outcomes by education

Among the women born in 1949–1952, those with primary/secondary and those with university education have reported equally 53% of first pregnancies resulting in live birth, while those with secondary-special education reported 42%. At the same time, 4 percentage points more terminations of first pregnancies by an induced abortion have been carried out by women with only primary/secondary education than by those with university education, and even 15 percentage points more induced abortions have been done by women with secondary-special education.

Fig. 29 Proportion of first pregnancy outcomes by level of education of the 1949–1952 birth cohort group

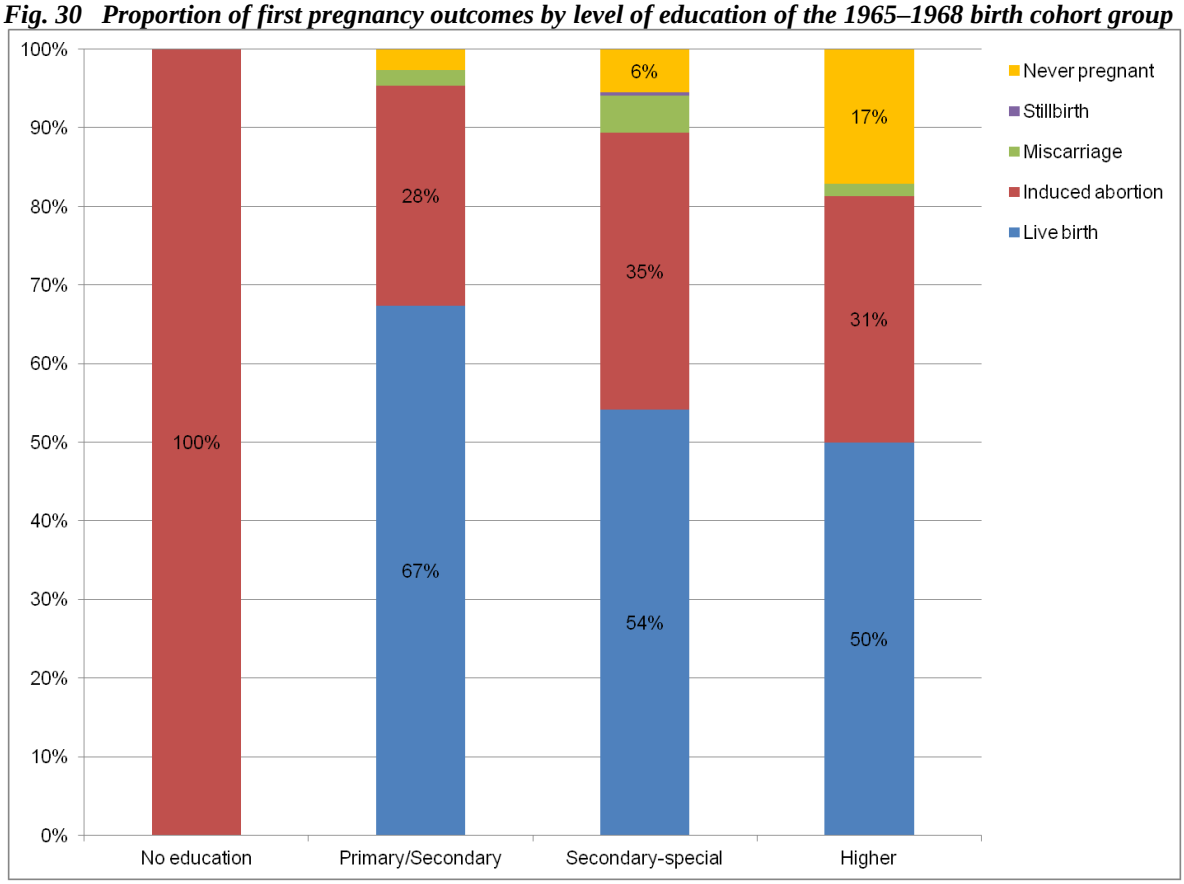


Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

Percentage of first pregnancies ending by a miscarriage remained similar across all educations, indicating that it is most likely a statistical outcome unaffected by levels of education. Only 1% of stillbirths were reported by women with secondary-special education. Highest percentage (7%) of having never been pregnant was reported by women with university education.

Fig. 30 Proportion of first pregnancy outcomes by level of education of the 1965–1968 birth cohort group

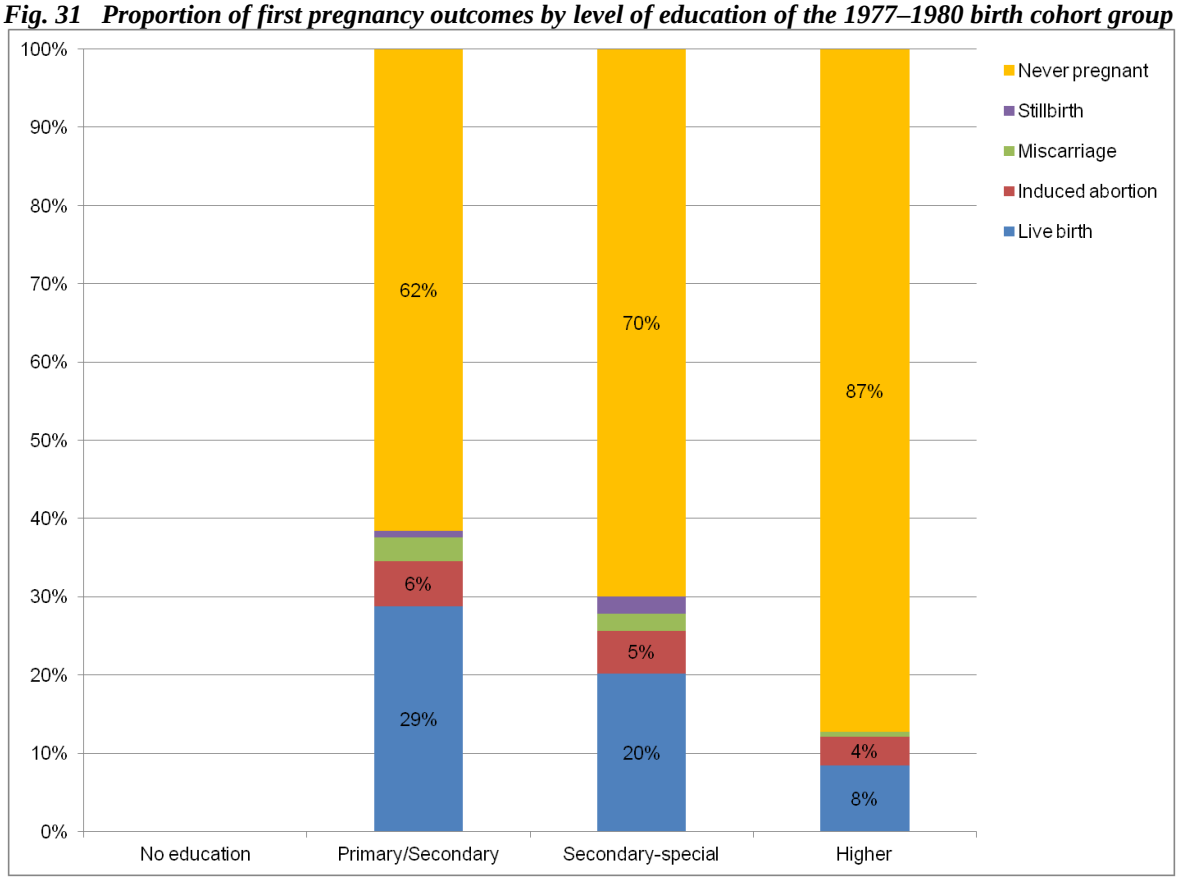


Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

Among the women born in 1965–1968 birth cohorts, Figure 14 shows that highest preference of giving live birth at the first pregnancy was reported by women with lower level of education – primary/secondary; the percentage was slightly lower among women with secondary-special and even lower than that among women with higher education. The lowest percentage of live births from the first pregnancy was reported by women with higher education. The 100% of induced abortions among women with no education on the graph was the result of one single incident of an induced abortion reported by a woman with no education. Percentage of having never been pregnant increased with the levels of education. Percentages of induced abortion as the first pregnancy outcome were approximately twice less than percentages of live birth across all levels of education. Proportion of miscarriages as first pregnancy outcome was slightly higher among the women with secondary-special education.

Fig. 31 Proportion of first pregnancy outcomes by level of education of the 1977–1980 birth cohort group



Notes: A very small number of women with no education have been surveyed; therefore, any results from this category cannot be considered as statistically representative.

Source: Kazakhstan DHS 1999.

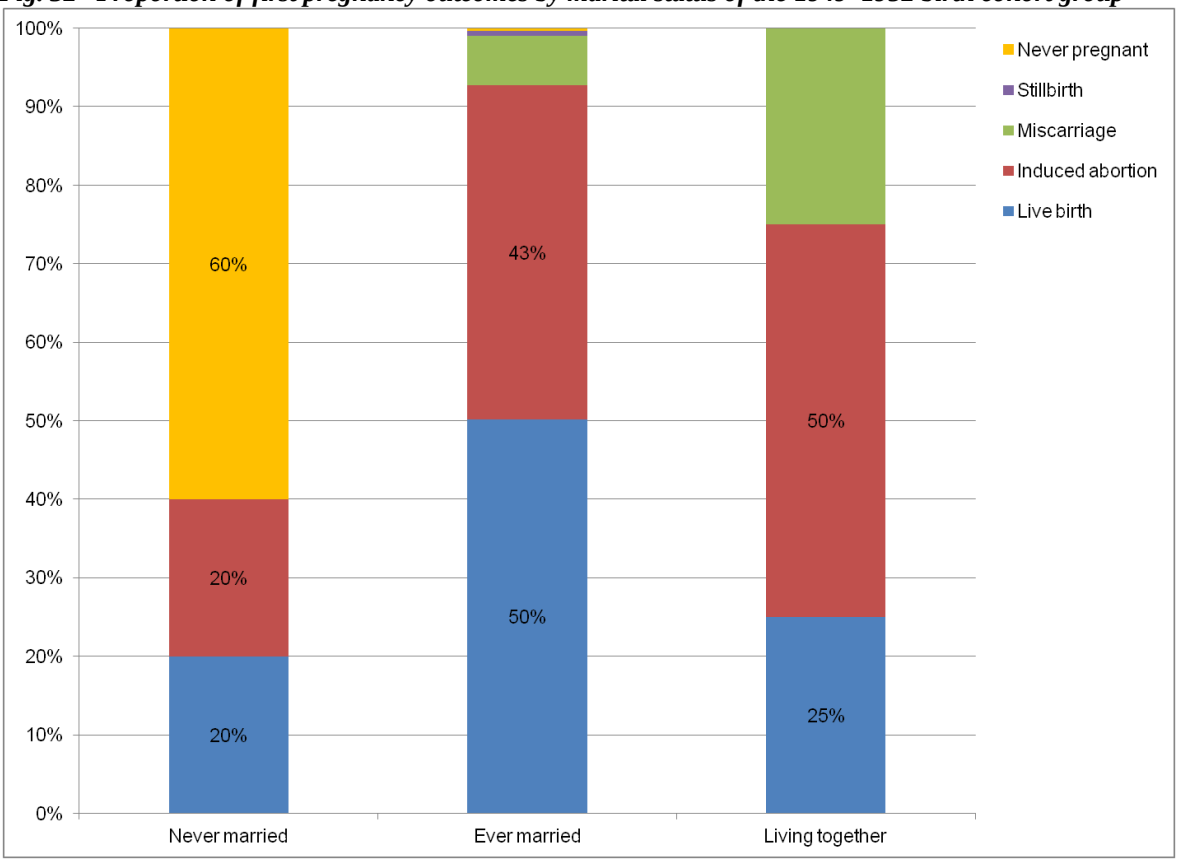
Understandably, much lower percentage of first pregnancies happened among the women of 1977–1980 birth cohorts, when compared to women from the middle birth cohorts. Again, the higher percentage of live birth as the first pregnancy outcome belonged to young women with primary/secondary education, and the lowest levels belonged to young women with university education.

7.3.3 First pregnancy outcomes by marital status

Within the 1949–1952 birth cohorts, cases of never having been pregnant were the highest among women who never married. Percentage of live births as an outcome of the first pregnancy was the lowest among women who never married, because possibly it was less socially acceptable and moreover financially difficult to raise a child out of marriage. Second lowest percentage of live birth was reported by women living together with a partner. Those women were probably aware of the stigma attached to a child born into a union that had not been formalized, and thus percentage of the live birth is not as high as for the married couples. As expected, proportion of first pregnancies resulting in a live birth was the lowest among the never married women (20%). Proportion of first pregnancy miscarriages was the highest (25%) among the women living together with their partner.

Proportion of first pregnancies terminated by an induced abortion was the highest (50%) among those living together with their partner and lowest among the never married (20%).

Fig. 32 Proportion of first pregnancy outcomes by marital status of the 1949–1952 birth cohort group

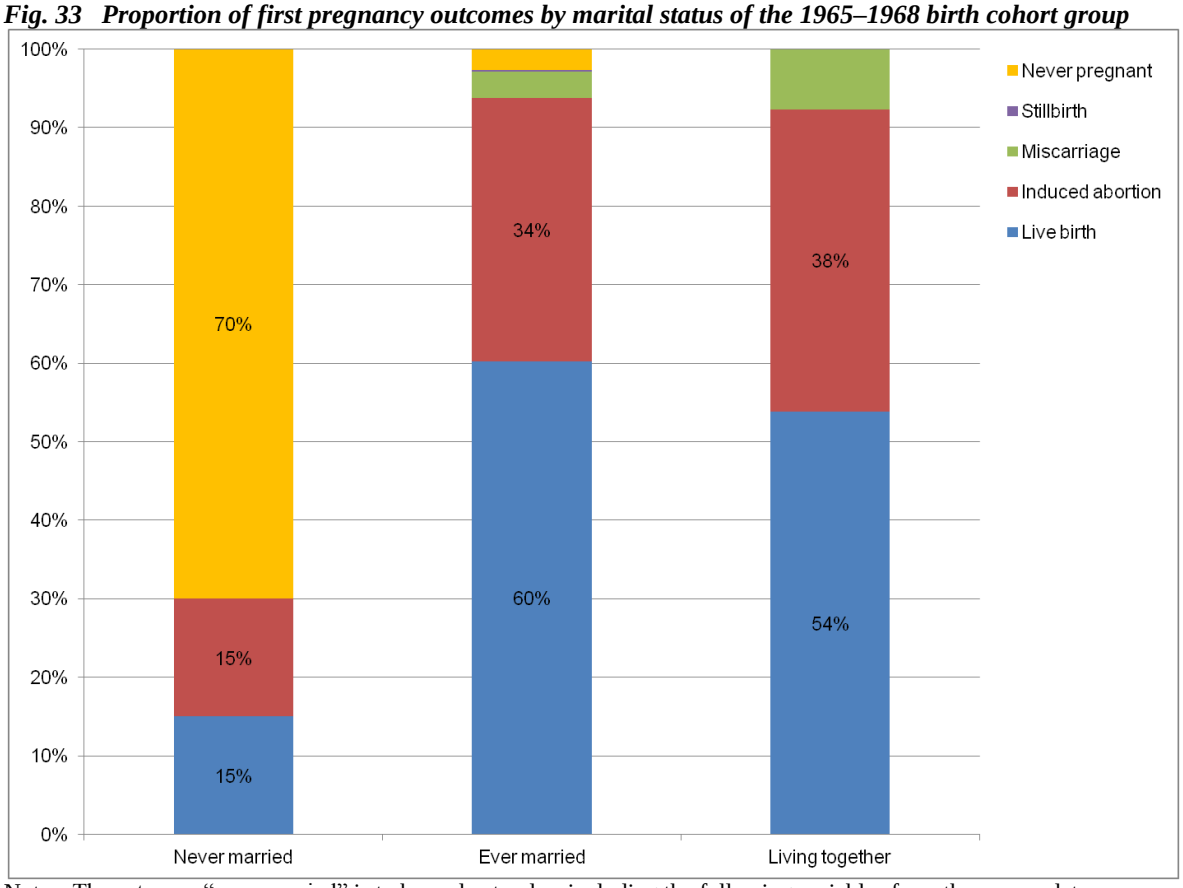


Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999.

In the birth cohorts 1965–1968, 70% of never married women were never pregnant (Fig. 33). While no cases of being never pregnant were reported by women living together with a partner, there were some reported by the married women. The highest percentage of first pregnancies resulting in live births (60%) was reported by the married women. It is interesting that percentage of live births as a result of first pregnancy is higher for women from middle cohorts rather than older cohorts. Proportion of first pregnancies terminated by an induced abortion was the lowest among the never married (15%) and highest among those living together with a partner. Strangely, while similar percentages of first pregnancy resulting in a live birth or terminated by an induced abortion were reported by women ever married and living together with a partner, the proportion of first pregnancies ending in a miscarriage was almost 3 times higher for the latter category.

Fig. 33 Proportion of first pregnancy outcomes by marital status of the 1965–1968 birth cohort group

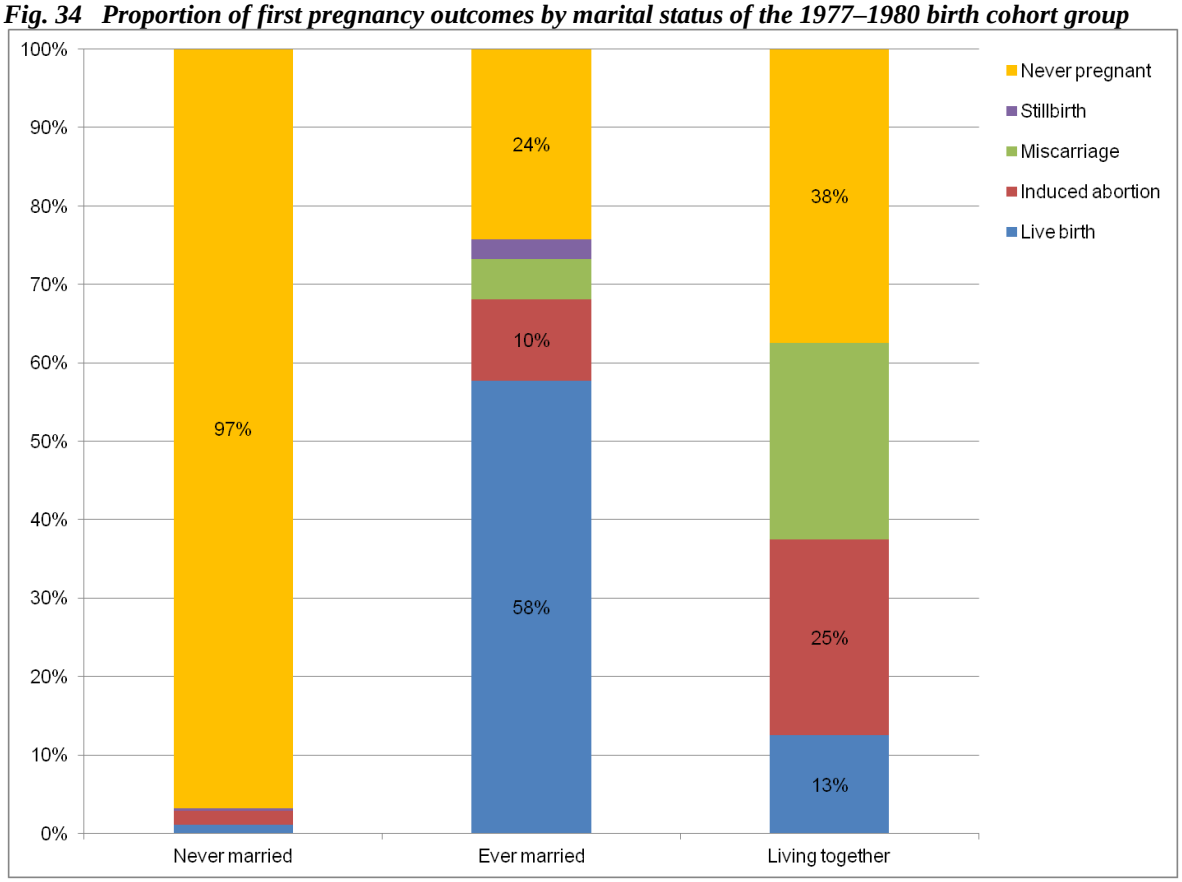


Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999.

It is to be expected that very young women aged 19–22 at the moment of the survey were not likely to have had many pregnancy outcomes (Fig. 34). Almost all (97%) of never married young women of these cohorts have never been pregnant. Only 24% and 38%, respectively, of married women and women living together with a partner were never pregnant. Leading group which had reported most first pregnancies resulting in miscarriages (25%) was young women living together with a partner. Married women reported 5% of miscarriages and never married women reported none. Women living together with a partner terminated one quarter of first pregnancies by an induced abortion – 14 percentage points more than married women. It is also noteworthy that young women living together with a partner reported about 4 times lower percentage of live births (13%) than the married ones (58%).

Fig. 34 Proportion of first pregnancy outcomes by marital status of the 1977–1980 birth cohort group



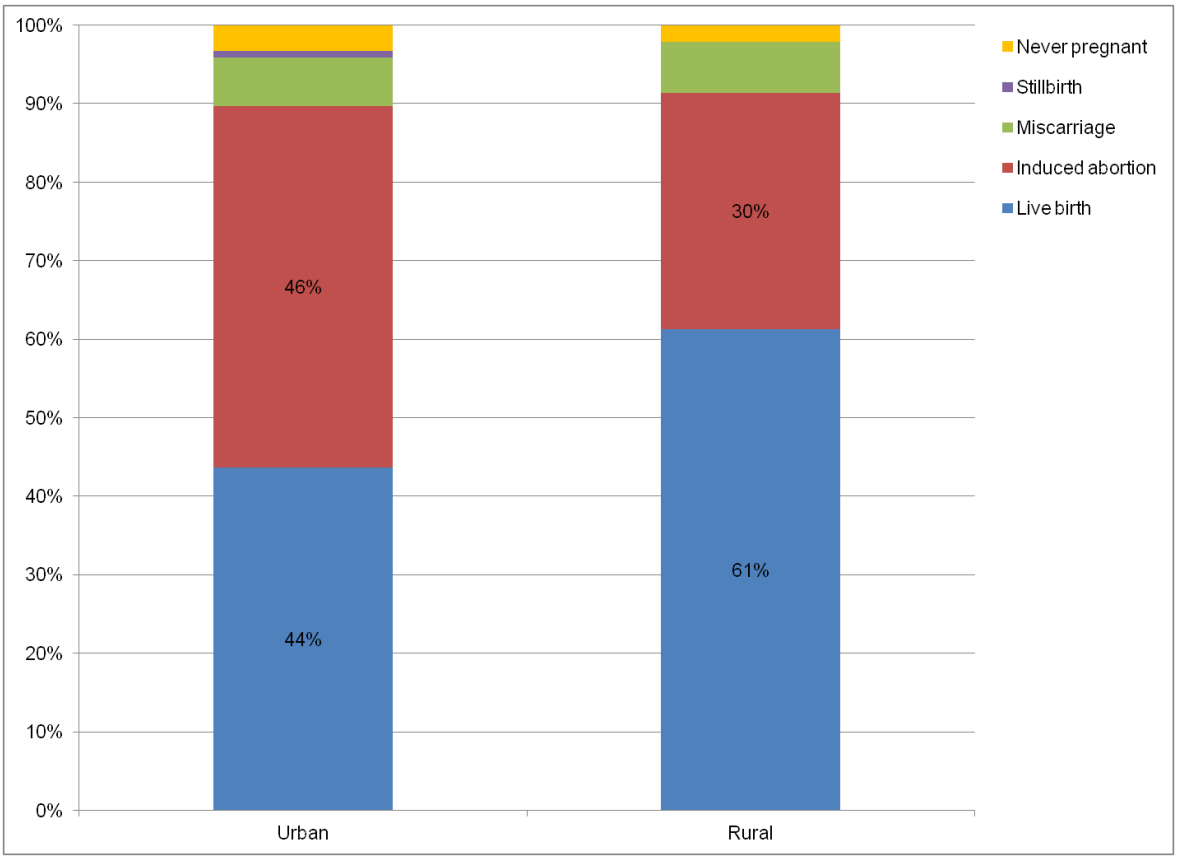
Notes: The category "ever married" is to be understood as including the following variables from the survey data: "married" (civil or religious marriage living together or married not living together - to be understood as separated but not legally divorced), "widowed" (living alone), "divorced" (living alone). The category "living together" is to be understood as cohabitation of divorced, widowed or never married people; "never married" category refers to not cohabiting single women.

Source: Kazakhstan DHS 1999.

7.3.4 First pregnancy outcomes by place of residence

Since whether a woman is resident of a rural or an urban area determines her reproductive health state, it was interesting to observe whether any differences would be apparent in the data.

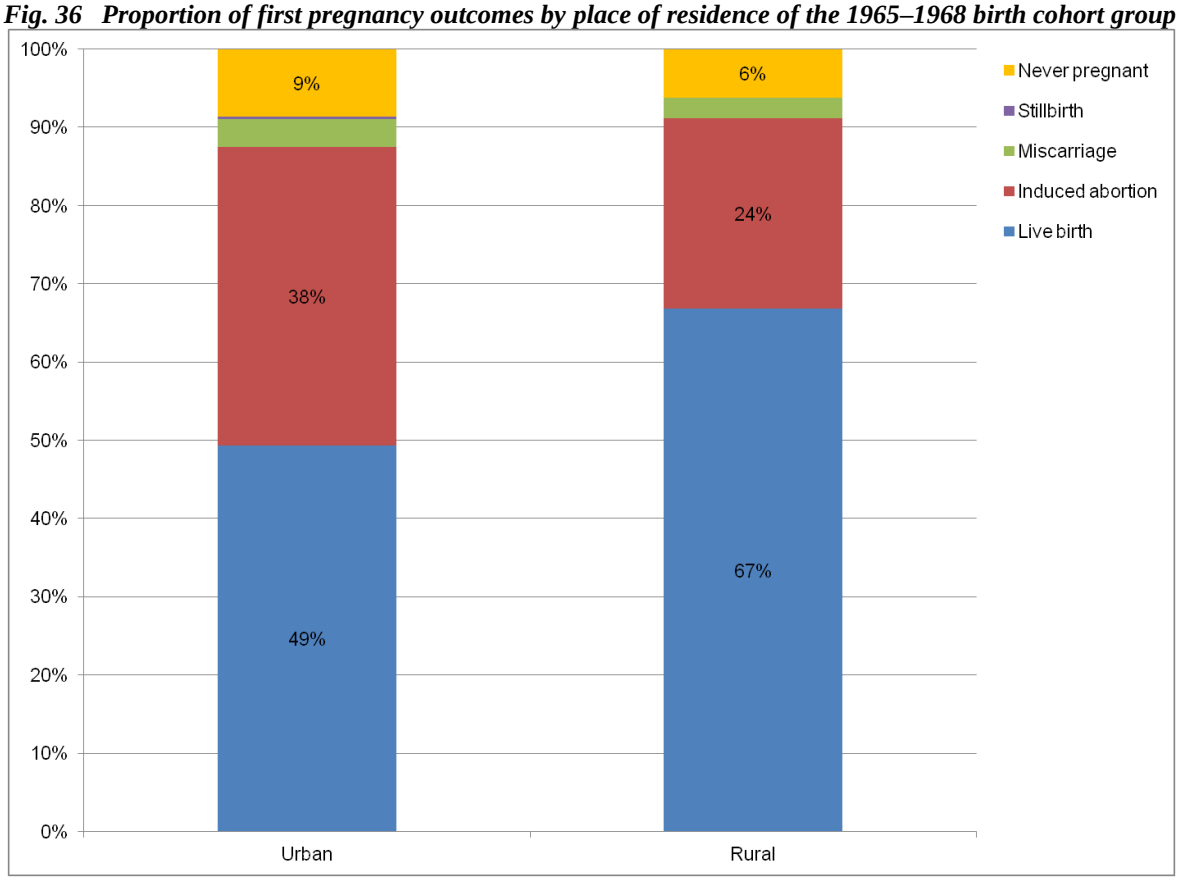
Fig. 35 Proportion of first pregnancy outcomes by place of residence of the 1949–1952 birth cohort group



Source: Kazakhstan DHS 1999.

From the 1949–1952 birth cohorts, both rural and urban women reported nearly equal incidence of having been pregnant, but only 44% of first pregnancies of urban women resulted in live births, while 46% of first pregnancies were terminated by an induced abortion (Fig. 35). Induced abortions may have been more readily available in urban settings and less stigmatized, plus the urban setting allowed for a degree of anonymity – a woman could go to have an abortion without anyone knowing about it. Rural women, on the other hand, allowed 61% of first pregnancies to result in live births and only terminated one third of first pregnancies by an induced abortion. The same percentages of first pregnancies terminating in a miscarriage have been reported by both groups.

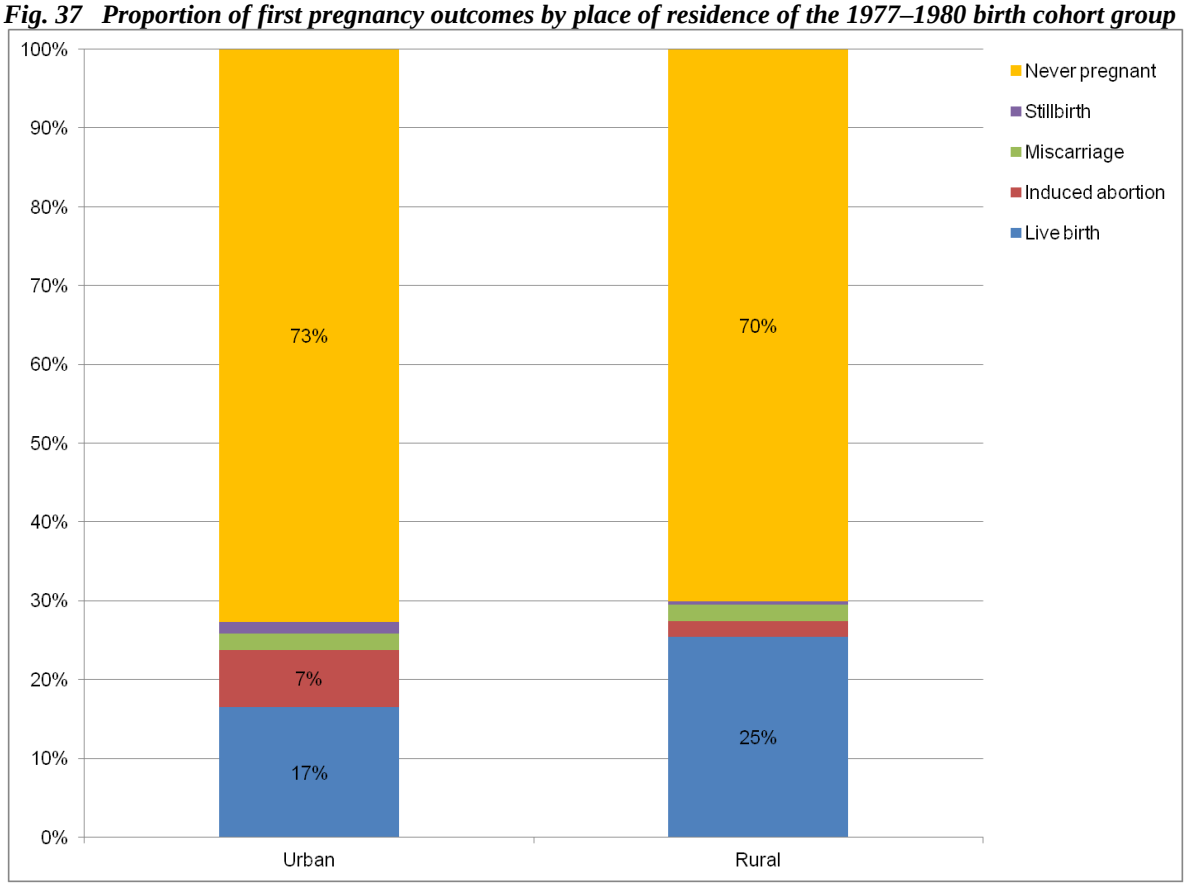
Fig. 36 Proportion of first pregnancy outcomes by place of residence of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

Proportion of first pregnancy miscarriages remained the same for women from the 1949–1952 birth cohorts and the 1965–1968 birth cohorts (Fig. 36), indicating that these miscarriages were most likely within the range of naturally occurring percentage of miscarriages in women. Proportion of first pregnancies terminated by induced abortions, however, was slightly higher for the older cohorts – by 8 percentage points among the urban women and by 6 percentage points among the rural women. This may be due to the fact that for older women induced abortion was the main known fertility control method, while women from the 1965–1968 cohorts were slightly more advanced in using other modern contraception methods and, therefore, had less necessity of undergoing an induced abortion. Both urban and rural women of the middle cohorts reported higher percentages of first pregnancies resulting in live births than women of the older cohorts (by 4 percentage points and 6 percentage points, respectively).

Fig. 37 Proportion of first pregnancy outcomes by place of residence of the 1977–1980 birth cohort group



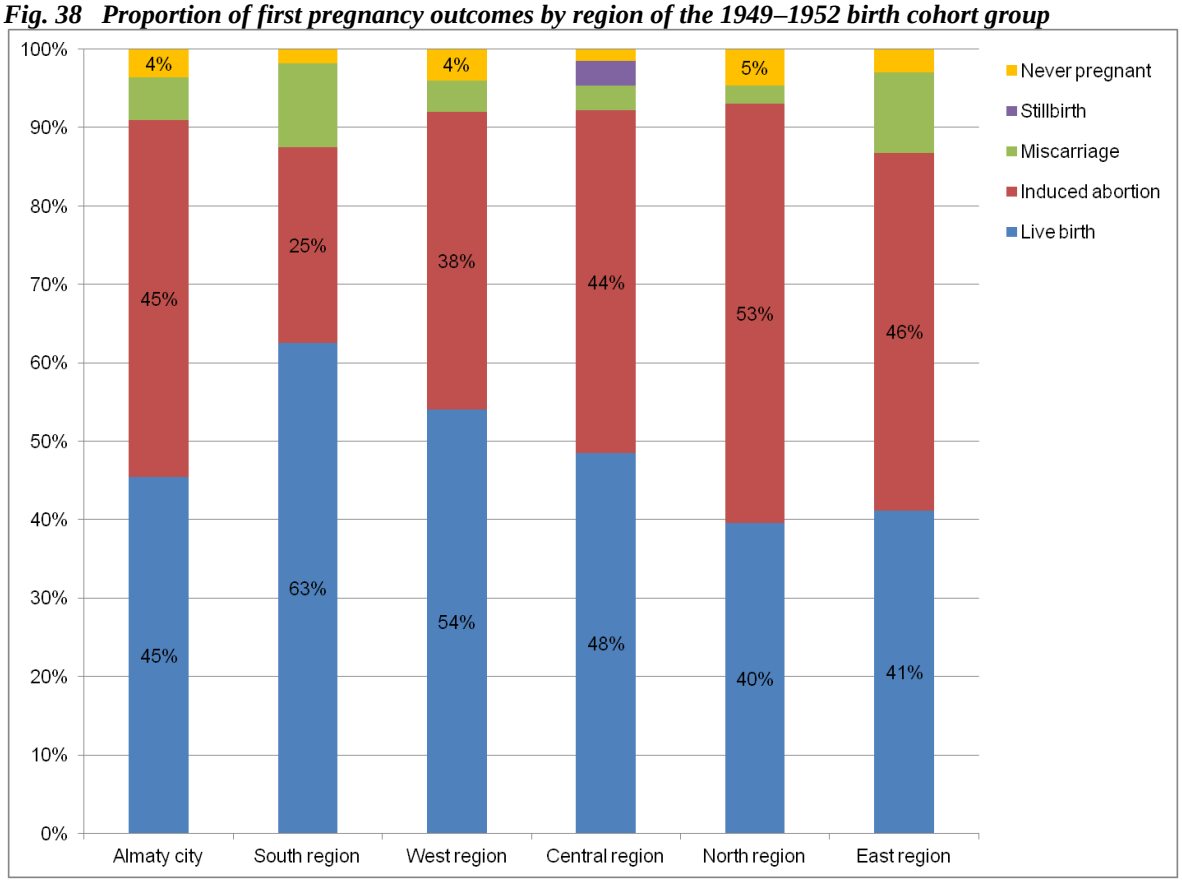
Source: Kazakhstan DHS 1999.

Among young women of the 1977–1980 birth cohorts the incidence of having never been pregnant was nearly identical: 70%–73% (Fig. 37). However, urban women were 5% more likely at that age to terminate their first pregnancy by an induced abortion. Rural women gave more live births at first pregnancy (25%) than urban women (17%). It may have been partially due to different focus of young urban and rural women – urban ones being more oriented towards a career, while rural towards a family – availability of facilities for carrying out the procedure, less parental supervision and thus more opportunity to undergo the procedure without anyone knowing. Notably, in all three cohorts the percentage of urban women reporting never having been pregnant was slightly higher than that of rural women. This supports the preposition that urban women of those ages are more likely to focus on education and career rather than family than rural women, on whom community pressure may be strong to adhere to the traditional child-bearing gender role.

7.3.5 First pregnancy outcomes by region

Further analysis is to determine whether important regional differences exist in the selected indicators for the females of the chosen birth cohorts.

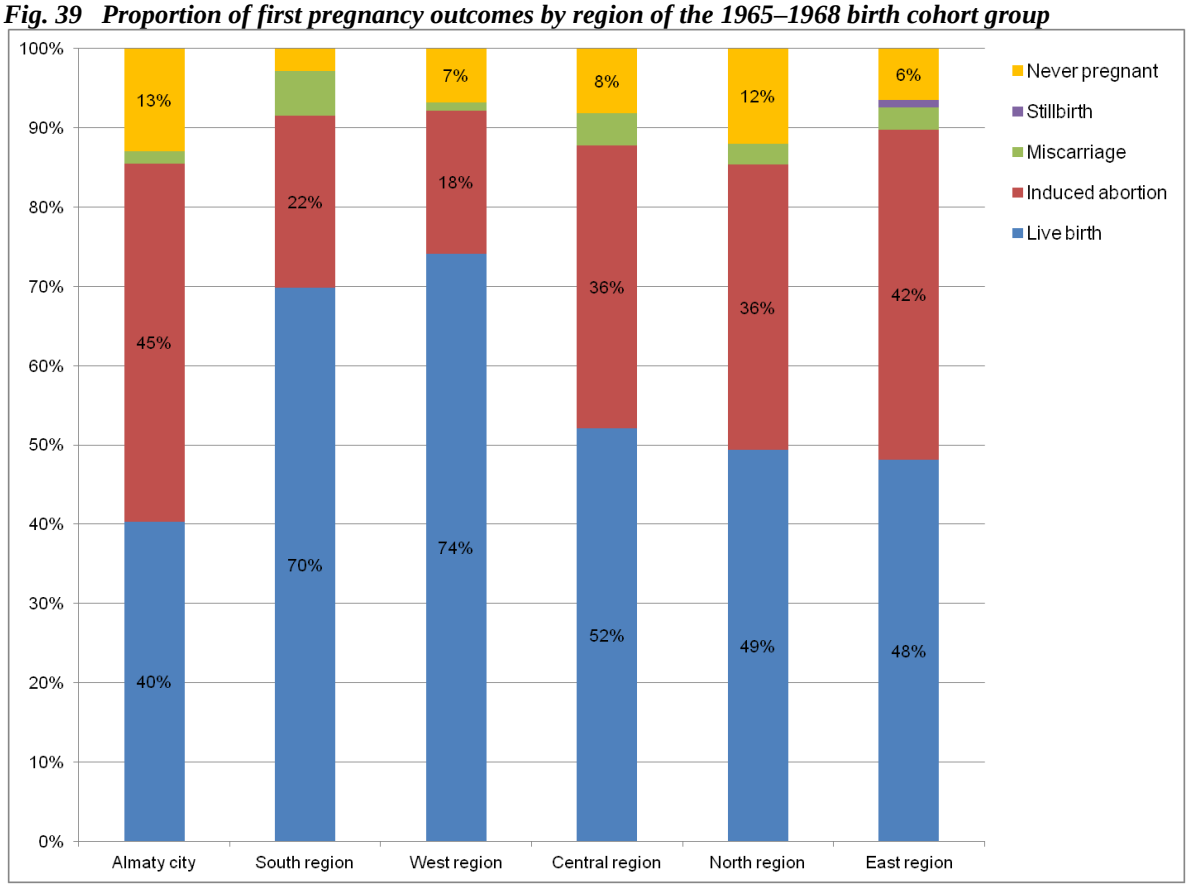
Fig. 38 Proportion of first pregnancy outcomes by region of the 1949–1952 birth cohort group



Source: Kazakhstan DHS 1999.

In the 1949–1952 (Fig. 38) birth cohorts, women of North and East regions reported the lowest percentage of first pregnancies resulting in live births – 40% and 41%, respectively, and the highest percentage of first pregnancies terminated by induced abortions – 53% and 46%, respectively. This is a very high percentage that indicates that women in these regions chose induced abortion as their primary birth control method, instead of other modern contraception methods less damaging to their health. These are also the regions that are closest to Russia, where induced abortion used to be the most popular methods of birth control. The Russian influence during the Soviet times may be partially responsible for such high proportions of induced abortion in North and East Kazakhstan. The highest percentage of first pregnancies resulting in live births (63%) was reported in the South region, where the reported rate of first pregnancies being terminated by an induced abortion was the lowest at 25%. At the same time, South region as well as East region had the highest proportion of first pregnancy miscarriages (11% and 10% respectively), which is at least twice higher than in the other regions. The only region that reported incidents of first pregnancy stillbirth was the Central region. It is possible that the fact that Central region is the basin of coal mining and thus rather polluted may have had influence over the incidence of stillbirths within these cohorts.

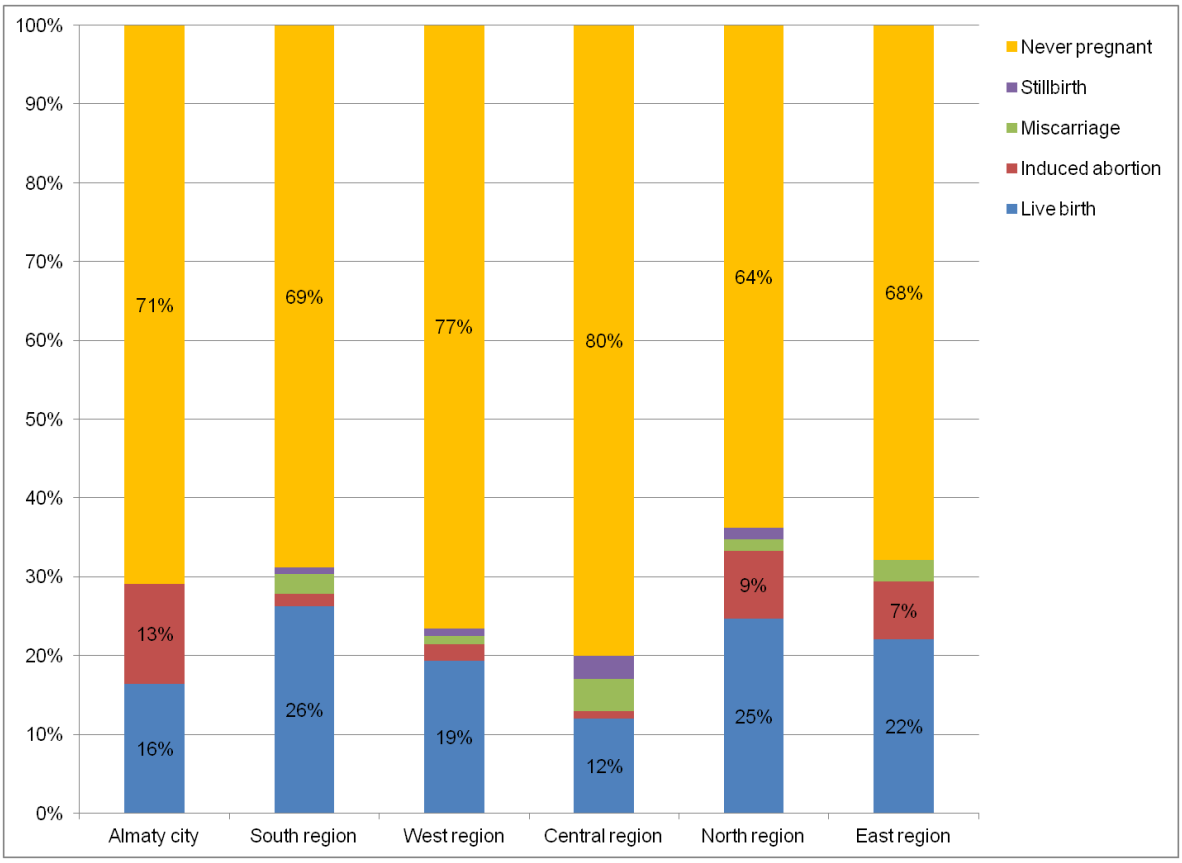
Fig. 39 Proportion of first pregnancy outcomes by region of the 1965–1968 birth cohort group



Source: Kazakhstan DHS 1999.

In the 1965–1968 cohorts most first pregnancies resulting in live births have been reported in the West region (74%) and the South region (70%) (Fig. 39), where again, as in the older cohorts, first pregnancy terminated by an induced abortion percentages were the lowest – 18% and 22%, respectively, which is almost twice lower than everywhere else. Women of Almaty city of these cohorts have decided to let the fewest first pregnancies result in live births (40%), have terminated the most first pregnancies by induced abortions (45%) but also at the same time reported the highest percentage of women who had never been pregnant (13%). It indicates that some women choose not to have children and instead focus on other alternative activities, such as career, that are more available in the large cities, as had already been explained.

Fig. 40 Proportion of first pregnancy outcomes by region of the 1977–1980 birth cohort group



Source: Kazakhstan DHS 1999.

Majority of young women in the 1977–1980 cohorts in all regions reported never having been pregnant (Fig. 40). In the Central region only 12% reported having given live birth at first pregnancy. Percentage of first pregnancies terminated by an induced abortion was, as in the middle cohorts, highest in Almaty city (13%), suggesting a more ready availability of the procedure as well as a more tolerant attitude towards it. Unlike in other cohorts, the youngest cohorts reported first pregnancy stillbirths in all regions except the East and Almaty city. It may be related to the environmental problems in Kazakhstan and their effects on women's health. For instance, a lot of Kazakh soil is being polluted by the winds blowing salt from the drying Aral Sea onto cultivated agricultural lands, residuals of pesticides and by industrial waste.

7.4 Impact of women's characteristics on reproductive decisions

In order to analyze the impact of women's characteristics on reproductive decisions, multinomial logistic regression modeling has been used (Tab. 27). First pregnancy outcomes (induced abortion, miscarriage, stillbirth, and live birth), including never pregnant, represented dependent categorical variables with the reference category live birth at first pregnancy. Explanatory variables were the same as in the previous regression focused on all pregnancy outcomes: region, place of residence, marital status, education, and ethnicity. Birth cohorts were taken as control variables. Unlike the Poisson regression, where each pregnancy outcome was regressed alone, here the results of

multinomial regression represent one complex model. In addition, never pregnant women were included in multinomial regression.

Very few factors had a significant effect on the incidence of never having been pregnant. As it could be expected, never married women were significantly more likely (Odds ratio 81.844) to never have been pregnant. Having a higher education meant it was more likely (Odds ratio 1.640) for a woman to report being never pregnant, which is also an expected result.

The selected factors also had an effect on the likelihood of the first pregnancy being terminated by an induced abortion. Women from East and North regions were significantly more likely (Odds ratio 1.390 and 1.582, respectively) to terminate their first pregnancy by an induced abortion. Urban females were significantly more likely (Odds ratio 1.664) to terminate their first pregnancy by an induced abortion than rural women. Having never been married meant it was significantly more likely (Odds ratio 2.681) for the first pregnancy to be terminated by an induced abortion, when compared to having been married. All ethnic groups were significantly more likely to terminate the first pregnancy by an induced abortion than Kazakh women.

Women living in the South region were more likely (Odds ratio 1.729) to have their first pregnancy result in a miscarriage than women from the Central region. Women living together with a partner reported a significantly higher incidence of the first pregnancy miscarriage (Odds ratio 4.641) than married women. Ukrainian and Russian women were significantly more likely (Odds ratio 2.364 and 1.750, respectively) to have the first pregnancy result in a miscarriage.

No factor had a statistically significant effect on the incidence of the first pregnancy resulting in a stillbirth.

Tab. 27 Impact of woman characteristics on first pregnancy outcome (multinomial logistic regression; reference category=first live birth)

Never pregnant		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Intercept		-3.319	.000			
Region	East region	-.019	.924	.981	.658	1.462
	North region	-.086	.718	.918	.576	1.462
	Almaty city	-.136	.559	.873	.553	1.378
	West region	.140	.533	1.150	.741	1.785
	South region	.074	.740	1.076	.698	1.660
	Central region	0	.	.	.	.
Residence	Urban	.212	.164	1.236	.917	1.666
	Rural	0	.	.	.	.
Marital status	Living together	.659	.152	1.932	.785	4.759
	Never married	**4.405**	**.000**	**81.844**	**57.251**	**117.002**
	Ever married	0	.	.	.	.
Education	No education	-31.552	.	.000	.000	.000
	Higher	**.494**	**.006**	**1.640**	**1.155**	**2.327**
	Secondary-special	.181	.249	1.199	.880	1.632
	Primary/Secondary	0	.	.	.	.

Never pregnant		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Birth cohorts	**1981-1984**	**3.029**	**.000**	**20.668**	**8.959**	**47.680**
	1977-1980	**2.107**	**.000**	**8.219**	**4.313**	**15.664**
	1973-1976	**1.052**	**.001**	**2.862**	**1.497**	**5.472**
	1969-1972	.524	.121	1.688	.871	3.269
	1965-1968	.280	.421	1.324	.669	2.620
	1961-1964	.221	.531	1.247	.625	2.490
	1957-1960	.155	.664	1.168	.581	2.347
	1953-1956	.199	.583	1.220	.599	2.485
	1949-1952	0	.	.	.	.
Ethnicity	Other	.320	.145	1.377	.896	2.117
	Ukrainian	.240	.519	1.271	.613	2.634
	Russian	.218	.158	1.244	.919	1.684
	Kazakh	0	.	.	.	.

Induced abortion		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Intercept		-1.271	.000			
Region	**East region**	**.329**	**.006**	**1.390**	**1.097**	**1.760**
	North region	**.459**	**.001**	**1.582**	**1.212**	**2.066**
	Almaty city	.227	.093	1.254	.963	1.634
	West region	-.168	.231	.845	.641	1.113
	South region	-.023	.870	.977	.742	1.288
	Central region	0	.	.	.	.
Residence	**Urban**	**.509**	**.000**	**1.664**	**1.384**	**2.001**
	Rural	0	.	.	.	.
Marital status	Living together	.433	.128	1.542	.883	2.695
	Never married	**.986**	**.000**	**2.681**	**1.738**	**4.134**
	Ever married	0	.	.	.	.
Education	No education	-5.668	.165	.003	.000	10.317
	Higher education	-.082	.462	.921	.741	1.146
	Secondary-special	-.051	.579	.951	.795	1.137
	Primary/Secondary	0	.	.	.	.
Birth cohorts	1981-1984	-.817	.073	.442	.181	1.080
	1977-1980	**-1.206**	**.000**	**.300**	**.187**	**.479**
	1973-1976	**-.635**	**.000**	**.530**	**.375**	**.750**
	1969-1972	-.302	.059	.740	.541	1.012
	1965-1968	-.138	.388	.871	.637	1.191
	1961-1964	.048	.754	1.049	.776	1.420
	1957-1960	.084	.583	1.088	.806	1.468
	1953-1956	.024	.882	1.024	.749	1.400
	1949-1952	0	.	.	.	.
Ethnicity	**Other**	**.904**	**.000**	**2.469**	**1.923**	**3.169**

Induced abortion		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
	Ukrainian	**1.054**	**.000**	**2.870**	**1.968**	**4.187**
	Russian	**.924**	**.000**	**2.521**	**2.111**	**3.010**
	Kazakh	0	.	.	.	.

Miscarriage		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Intercept		-2.613	.000			
Region	East region	.127	.631	1.136	.675	1.911
	North region	-.011	.971	.989	.537	1.821
	Almaty city	-.024	.937	.976	.534	1.782
	West region	-.358	.270	.699	.370	1.321
	South region	**.547**	**.045**	**1.729**	**1.011**	**2.955**
	Central region	0	.	.	.	.
Residence	Urban	.188	.341	1.207	.819	1.779
	Rural	0	.	.	.	.
Marital status	**Living together**	**1.535**	**.000**	**4.641**	**2.153**	**10.005**
	Never married	.031	.955	1.031	.357	2.982
	Ever married	0	.	.	.	.
Education	No education	-42.514	.	.000	.000	.000
	Higher education	-.062	.798	.940	.586	1.508
	Secondary-special	-.008	.965	.992	.682	1.443
	Primary/Secondary	0	.	.	.	.
Birth cohorts	1981-1984	.569	.374	1.766	.504	6.185
	1977-1980	-.273	.483	.761	.356	1.631
	1973-1976	-.307	.355	.736	.384	1.410
	1969-1972	-.331	.292	.718	.387	1.330
	1965-1968	**-.714**	**.040**	**.490**	**.248**	**.969**
	1961-1964	-.434	.181	.648	.343	1.224
	1957-1960	-.252	.419	.777	.422	1.432
	1953-1956	-.536	.124	.585	.295	1.158
	1949-1952	0	.	.	.	.
Ethnicity	Other	.344	.229	1.411	.805	2.472
	Ukrainian	**.860**	**.031**	**2.364**	**1.084**	**5.159**
	Russian	**.559**	**.005**	**1.750**	**1.188**	**2.576**
	Kazakh	0	.	.	.	.

Stillbirth		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Intercept		-5.040	.000			
Region	East region	-.688	.256	.502	.153	1.646
	North region	.076	.896	1.079	.342	3.405
	Almaty city	-.880	.227	.415	.099	1.731

Stillbirth		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
	West region	-.109	.853	.896	.283	2.841
	South region	.133	.813	1.143	.379	3.447
	Central region	0	.	.	.	.
Residence	Urban	.371	.379	1.449	.634	3.311
	Rural	0	.	.	.	.
Marital status	Living together	.951	.333	2.588	.377	17.759
	Never married	1.045	.111	2.843	.786	10.284
	Ever married	0	.	.	.	.
Education	No education	-32.588	.	.000	.000	.000
	Higher education	.529	.312	1.697	.609	4.731
	Secondary-special	.411	.346	1.509	.641	3.548
	Primary/Secondary	0	.	.	.	.
Birth cohorts	1981-1984	1.943	.088	6.982	.748	65.146
	1977-1980	1.499	.070	4.478	.884	22.674
	1973-1976	.689	.411	1.992	.385	10.298
	1969-1972	.602	.460	1.825	.370	9.006
	1965-1968	-.959	.396	.383	.042	3.516
	1961-1964	.204	.813	1.226	.226	6.661
	1957-1960	-.057	.949	.944	.162	5.521
	1953-1956	-.390	.700	.677	.093	4.910
	1949-1952	0	.	.	.	.
Ethnicity	Other	.355	.557	1.427	.436	4.667
	Ukrainian	-.334	.796	.716	.056	9.068
	Russian	.492	.239	1.636	.721	3.712
	Kazakh	0	.	.	.	.

Notes: Bold font indicates statistical significance.
Reference category of the dependent variable is live birth.
Exp(B) is Odds ratio.
Source: Kazakhstan DHS 1999. Author's calculations in SPSS.

CONCLUSIONS

In this thesis the differences and similarities in five post-Soviet Central Asian countries from 1990 to 2008 were investigated, with a focus on maternal mortality and reproductive health indicators, as well as the main factors that influence their trends and levels.

Finding relevant data on maternal mortality has been a challenge. Some countries only release data at specific intervals, other countries do not release any official data on some of the indicators, and sometimes, according to many international organizations, data are inaccurate. Nevertheless, it was possible to compile enough data for the analysis from several databases.

First, different trends and developments of the maternal mortality indicators on a global scale, as well as in the region of post-Soviet Central Asia, have been analyzed. It has been found that globally maternal mortality indicators in most countries improved from 1990 until 2008. Any global improvements in the indicators, however, were not sufficient to meet the set MDGs in time. Different results were achieved by the studied countries of Central Asia. For example, Kazakhstan, Tajikistan and Uzbekistan made progress in reducing MMRatio (–42%, –44%, –44%, respectively), Turkmenistan made insufficient progress (–16%) and Kyrgyzstan made no progress (5%) from 1990 until 2008.

Women in Central Asia suffer from iron-deficiency anemia: 49% of women in Kazakhstan, 60% in Uzbekistan and 38% in Kyrgyzstan were found anemic to some extent in the surveys of 1995, 1996 and 1997, respectively. In Kazakhstan more ethnic Kazakhs than ethnic Russians were found to be anemic. Anemia was higher among women from Western regions and higher among women from rural areas; women with higher than primary or secondary education were less likely to be anemic. In Uzbekistan more women from Ferghana Valley and Aral Sea region reported being anemic, most likely due to environmental and socio-economic problems. Other factors did not have a statistically significant effect on anemia among women in Uzbekistan. In Kyrgyzstan ethnic Uzbek and Kyrgyz women were more likely to suffer from anemia than Russian ones. More cases of anemia have been reported from the Southern region. Similarly to the findings in Kazakhstan, women from rural areas of Kyrgyzstan reported higher prevalence of anemia. It was concluded that at least these three countries in the Central Asian region had generally high prevalence of anemia.

Many literary sources highlight high prevalence of induced abortions in the Central Asian countries. Women of this region are exposed to risks associated with induced abortions, since this method of birth control remains common. In addition, birth attendance by skilled health personnel remains relatively low in Tajikistan, compared to the other studied countries.

Available sources showed that most common causes of maternal deaths worldwide and in Central Asia are sepsis, postpartum bleeding or eclampsia. Cluster analysis helped to see which countries were most similar by the indicators related to maternal mortality and reproductive health. In the cluster analysis for the year 1990, for example, the Central Asian countries were grouped together with the Caucasus countries and Albania. Tajikistan was separated into its own cluster with indicators slightly worse than those of the remaining four Central Asian countries. The Central Asian countries have made progress on most maternal mortality indicators by the year 2008 and so did all the other countries of the analysis. The 2008 grouping was found to be different: Kazakhstan, Uzbekistan, Caucasus countries, Albania and Croatia created a new cluster, while Kyrgyzstan and Turkmenistan formed a separate cluster with slightly worse indicators and Tajikistan remained alone as a cluster.

Main statistically significant factors that influence the average number of live births, induced abortions, miscarriages, and stillbirths were examined. Regression analysis was a very useful tool for checking which of the variables from the results of the Demographic and Health Survey were statistically significant for the average number of pregnancy outcomes.

Results of the main effect model for induced abortion as dependent variable in Poisson regression were as follows: with all remaining variables adjusted, West region females reported a significantly lower average number of induced abortions, while North region females reported higher numbers of induced abortions than women of the Central region; place of residence had an impact on average number of induced abortions – a greater average number of induced abortions was made by urban women than by rural women; never married women reported a significantly lower average number of induced abortions that women who were ever married; women with higher education also had lower average number of induced abortions than women with primary/secondary education.

To investigate the differences in the decision making process during the first pregnancy based on certain social and geographic factors, multinomial logistic regression was applied. The analysis showed that never married women and women with a higher education had preferred to never get pregnant rather than to give a live birth. Belonging to any of the ethnicities, being never married, living in an urban setting, in the East and North regions significantly affected the incidence of the first pregnancy being terminated by an induced abortion rather than carried to term. Finally, while no variables had a statistical significance on incidence of first pregnancies resulting in stillbirths, there was a statistically significant effect of living in the South region, living together with a partner or being of Ukrainian or Russian ethnicity on the first pregnancies resulting in miscarriages.

With the help of the findings in this thesis, it is possible to state that the first hypothesis proposed in this thesis has been confirmed. Since gaining independence after the collapse of the Soviet Union, women's reproductive health in the Central Asian countries has improved and has showed a positive development over time.

Country grouping to reproductive health in 1990 and 2008 helped to find out that comparing to other post-Soviet countries Central Asian countries, in fact, were close to the Caucasus countries of

Azerbaijan, Armenia and Georgia and differ from other post-Soviet countries. This finding makes the second hypothesis being partially proven.

According to the cluster analysis done for the 2008, Kazakhstan together with Uzbekistan has a better reproductive health pattern compared to the rest of the post-Soviet Central Asian republics. Regarding third hypothesis, Kazakhstan found to be not the only one with better reproductive health patterns, but with Uzbekistan, which makes the third hypothesis also being succeeded partially. Finally, it has been confirmed by the DHS and regression analyses that, as proposed by the fourth hypothesis, compared to other ethnicities the proportion of Kazakh women who underwent induced abortion was smaller.

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