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Factors Associated with Miscarriages and Abortions among Women of Reproductive Age in Kyrgyzstan: An Analysis of the Multiple Indicators Cluster Survey 2023

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Abstract

Reproductive health, including miscarriages and abortions, remains a critical public health issue, especially in low- and middle-income countries such as Kyrgyzstan, where access to quality health services is limited, particularly in rural areas. Unsafe abortions contribute significantly to maternal morbidity and mortality, while miscarriages can have physical, emotional, and social consequences for women. This study aims to explore factors associated with miscarriages and abortions among women of reproductive age in Kyrgyzstan. This study used secondary data from Kyrgyzstan's Multiple Indicator Survey (MICS) 2023, which provides comprehensive data on health, education, and living conditions. The survey focused on women aged 15–49 who had experienced miscarriage or abortion, analyzing factors such as age, marital status, education, and wealth index. Data analysis was performed using binary logistic regression with STATA software to identify demographic and socioeconomic factors associated with miscarriage and abortion. The finding of this study were 11.47% of women experienced miscarriage and 6.45% experienced abortion, with most participants aged 30-39, married, with a junior high school education, residing in rural areas, and belonging to the Kyrgyz ethnic group. Factors linked to miscarriage included age, marital status, rural residency, Russian ethnicity, and wealth level, while factors associated with abortion included age, marital status, rural residence, and certain wealth levels (second, middle, and fourth). The study suggests prioritizing reproductive health education and support for women, especially those in rural areas and with lower to middle income, to help reduce the risks of miscarriage and abortion.

Keywords: Abortion, Kyrgyzstan, Miscarriage, Reproductive Health, Wealth Index.

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1. INTRODUCTION

Reproductive health remains a major public health issue globally, particularly in low- and middle-income countries where access to health services and information is limited (Desrosiers et al., 2020; Ravindran & Govender, 2020). Miscarriage and abortion are significant reproductive health events that can have profound physical, emotional, and social consequences for women (La et al., 2021). Understanding the factors associated with these events is critical to developing targeted interventions to improve maternal health outcomes.

Miscarriage and abortion, especially unsafe abortion, are significant causes of maternal morbidity and mortality worldwide, including in Kyrgyzstan. Globally, an estimated 25 million unsafe abortions occur each year, resulting in an estimated 7 million health complications and 22,800 maternal deaths, with the majority occurring in low- and middle-income countries (Barrera et al., 2022). In Kyrgyzstan, although abortion is legal, unsafe abortion remains a serious public health problem, especially in rural areas where access to quality reproductive health services is limited (Tayebi et al., 2025). Untreated miscarriage and abortion can lead to complications such as severe bleeding, infection, and damage to reproductive organs, ultimately increasing maternal mortality (Wadhwa et al., 2022).

Miscarriage, or the spontaneous loss of a pregnancy before 20 weeks of gestation, can have serious medical and public health implications (Nepyivoda & Ryvak, 2020). From a medical perspective, miscarriage can lead to physical complications such as heavy bleeding, infection, and damage to the reproductive organs, which can affect fertility and future pregnancies (Strumpf et al., 2021). In addition, miscarriage can lead to psychological trauma, including depression, anxiety, and post-traumatic stress disorder, which require long-term medical and psychological support (Kukulskienė & Žemaitienė, 2022). High miscarriage rates can be an indicator of poor access to reproductive health services, lack of education about prenatal care, and inequities in the distribution of health resources (Sutton et al., 2021). Untreated miscarriage can increase the burden on public health, including medical care costs and lost productivity, and widen health disparities between different socio-economic groups (Kicia et al., 2021).

Abortion, especially when performed under unsafe conditions, can pose serious risks to both medical and public health. Unsafe abortion can lead to physical complications such as heavy bleeding, infection, damage to reproductive organs, and even death (Wall & Yemane, 2022). In addition, abortion can have long-term psychological impacts, including depression, anxiety, and guilt, which require medical and psychological intervention (Alipanahpour et al., 2021; Cuenca, 2023). High rates of unsafe abortion reflect a lack of access to quality reproductive health services, including contraception and sexual health education. This can exacerbate health inequalities, especially among women of low socioeconomic status. Unsafe abortion also increases the burden on health systems, including the cost of medical care to treat complications, as well as lost productivity due to associated morbidity and mortality (De Londras et al., 2022; Otsin et al., 2022; Ouedraogo et al., 2023).

Kyrgyzstan, with 68.5% of its population living in rural areas, faces disparities in access to reproductive health services between urban and rural areas, despite progress in maternal and child health. The 2023 Multiple Indicator Survey (MICS) provides comprehensive data on health, education, and socioeconomic indicators, allowing for analysis of factors associated with miscarriage and abortion among women of reproductive age (15-49 years). The study aims to identify demographic, socioeconomic, and health factors that contribute to miscarriage and abortion, and provide recommendations for policies and programs to improve reproductive health outcomes in Kyrgyzstan. This study uses data from MICS 2023 to explore the prevalence of miscarriage and abortion among women in Kyrgyzstan and to identify demographic and socioeconomic factors associated with these events. This study aims to identify demographic, social, and economic factors associated with the incidence of miscarriage and abortion among women of reproductive age (15-49 years) in Kyrgyzstan.

2. RESEARCH METHOD

This study utilized secondary data from the 2023 Multiple Indicator Cluster Survey (MICS) of Kyrgyzstan. The method of the study was cross-sectional which offers a comprehensive assessment of health, education, and living conditions nationwide, shedding light on significant disparities in access to services and overall well-being. In a country where 68.5% of the population lives in rural areas (National Statistical Committee of the Kyrgyz Republic and UNICEF, 2023), key findings provide valuable insights into early childhood nutrition, school attendance, and other factors impacting the well-being of Kyrgyzstan's youth. With data covering 177 distinct indicators, including 31 aligned with the Sustainable Development Goals (SDGs), the MICS provides policymakers and development partners with evidence-based tools to monitor progress, address inequalities, and implement targeted interventions aimed at improving living standards across the country.

The primary objectives of the 2023 Kyrgyzstan Multiple Indicator Cluster Survey (MICS) were to assess the status of children, adolescents, women, and households, while producing high-quality, disaggregated data to inform policies that promote the social inclusion of vulnerable groups. The survey also aimed to provide data for monitoring both national and global SDG indicators, validate existing data, and generate internationally comparable statistics. This collaborative effort was made possible through partnerships involving the National Statistical Committee of the Kyrgyz Republic, UNICEF, USAID, the Government of Switzerland, and the United Nations Population Fund (UNFPA). According to the National Statistical Committee of the Kyrgyz Republic and UNICEF (2023), the dataset is publicly accessible upon registration and can be accessed through the website: https://mics.unicef.org/news/just-released-kyrgyzstan-2023-mics-survey-findings-snapshots-and-datasets.

The Kyrgyzstan MICS survey had a total sample size of 7,200 individuals, of which 6,715 were located and 6,639 were interviewed. Among women of reproductive age, 5,753 were eligible for interview, and 98% (5,629 women) participated. After data management and cleaning, the final sample for this study consisted of 4,881 women. The inclusion criteria for this study were women aged 15–49 years who had experienced a miscarriage or abortion, while the exclusion criteria applied to those who did not complete the women's questionnaire.

This study specifically focused on women aged 15–49 years. The dependent variables in this study were miscarriage (yes/no) and abortion (yes/no). The main independent variables included age group (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49), marital status (currently married, living with partner, not married), education level (preschool or not/primary, primary secondary, secondary completed, primary/vocational secondary, higher), residence (urban and rural), ethnicity (Kyrgyz, Russian, and other ethnicities), and wealth index (poorest, second, middle, fourth, richest). Data analysis was performed using binary logistic regression with STATA software. The methodology and tools used in MICS have been approved by UNICEF. Since this study used anonymized data, no ethical approval was required.

3. RESULTS AND DISCUSSION

The data in this study was analysed by univariate, bivariate, and multivariate analyses. Table 1 below described the general characteristics of the study. Among 4,881 women of reproductive age joined the survey, 11.47% of them have experienced of miscarriages and 6.45% experienced abortion. The highest proportion of women were aged 30 – 39 years old, with most of them were married at the survey time (71.30%). In terms of women's education level, almost 40% of them completed the secondary school. More than half of the women residenced in rural area (62.36%) and the majority of them were Kyrgyz ethnic group member (79.35%). The wealth index of the women revealed the fourth and richest level with 24.44% and 25.06%, respectively.

Table 1. Demographic Profile and Reproductive Health of Women in Kyrgyzstan: Analysis by Age, Marital Status, Education, and Wealth Indeks.

Variables (n = 4.881)	**Frequency (f)**	**Percentage (%)**
Experience of miscarriages		
No	4.321	88.53
Yes	560	11.47
Experience of abortion		
No	4.566	93.55
Yes	315	6.45
Age group of women		
15-19	712	14.59
20-24	558	11.43
25-29	686	14.05
30-34	786	16.10
35-39	829	16.98
40-44	711	14.57
45-49	599	12.27
Marital status		
Currently married	3.480	71.30
Living with partner	109	2.23
Not in union	1.292	26.47
Education level		
Pre-school or none/Primary	26	0.53
Basic secondary	448	9.18
Complete secondary	1.942	39.79
Professional primary/middle	946	19.38
Higher	1.519	31.12
Place of residence		
Urban	1.837	37.64
Rural	3.044	62.36
Ethnicity		
Kyrgyz	3.873	79.35
Russian	823	16.86
Others ethnicity	185	3.79
Wealth Index		
Poorest	732	15.00
Second	823	16.86
Middle	910	18.64
Fourth	1.193	24.44
Richest	1.223	25.06

Table 2. Sociodemographic Factors of Miscarriage and Abortion.

Variables (n = 4,881)	**Miscarriages**				**Abortion**			
	No (%)	**Yes (%)**	**Total**	***p-value***	**No (%)**	**Yes (%)**	**Total**	***p-value***
Age group of women				<0.001				<0.001
15-19	100.00	0.00	712		100.00	0.00	712	
20-24	98.92	1.08	558		95.88	4.12	558	
25-29	96.36	3.64	686		90.38	9.62	686	
30-34	93.89	6.11	786		88.80	11.20	786	
35-39	90.47	9.53	829		82.51	17.49	829	
40-44	86.92	13.08	711		79.89	20.11	711	
45-49	89.32	10.68	599		84.14	15.86	599	
Marital status				<0.001				<0.001
Currently married	92.30	7.70	3.480		85.66	14.34	3.480	
Living with partner	88.99	11.01	109		80.73	19.27	109	
Not in union	97.29	2.71	1.292		96.90	3.10	1.292	
Education level				0.031				0.306
Pre-school or none/Primary	96.15	3.85	26		96.15	3.85	26	
Basic secondary	93.75	6.25	448		89.73	10.27	448	
Complete secondary	94.85	5.15	1.942		89.19	10.81	1.942	
Professional primary/middle	92.49	7.51	946		87.32	12.68	946	
Higher	92.43	7.57	1.519		87.95	12.05	1.519	
Place of residence				0.001				0.001
Urban	92.05	7.95	1.837		87.86	12.14	1.837	
Rural	94.45	5.55	3.044		88.93	11.07	3.044	
Ethnicity				0.303				0.364
Kyrgyz	93.80	6.20	3.873		88.20	11.80	3.873	
Russian	92.35	7.65	823		89.67	10.33	823	
Others ethnicity	93.51	6.49	185		90.27	9.73	185	
Wealth Index				0.014				0.091
Poorest	96.45	3.55	732		91.12	8.88	732	
Second	92.95	7.05	823		88.34	11.66	823	
Middle	93.52	6.48	910		88.35	11.65	910	
Fourth	92.79	7.21	1.193		86.92	13.08	1.193	
Richest	92.97	7.03	1.223		88.80	11.20	1.223	

Table 2 presents the Chi-square test results of the correlation between sociodemographics of the women and miscarriages and abortion. It revealed that the factors of age group, marital status, education level, place of residence, and wealth index are significantly associated with miscarriages with p-value <0.001, <0.001, 0.031, 0.001, and 0.014, respectively. However, ethnicity is not significantly associated with miscarriages. The factors associated with abortion are age group, marital status, and place of residence with p-value <0.001, <0.001 and 0.001, respectively. However, education level, ethnicity, and wealth index were found to be insignificantly associated with abortion.

Table 3. Demographic Factors Influencing the Incidence of Miscarriage and Abortion in Women in Kyrgyzstan.

Variables (n = 4,881)	Miscarriages			Abortion		
	AOR	**CI. 95% (lower-upper)**	***p-value***	**AOR**	**CI. 95% (lower-upper)**	***p-value***
Age of women	1.06	1.05-1.08	<0.001	1.09	1.08-1.11	<0.001
Marital status						
Currently married	ref			ref		
Living with partner	1.38	0.83-2.28	0.213	1.28	0.67-2.42	0.457
Not in union	0.29	0.21-0.41	<0.001	0.56	0.38-0.81	0.002
Education level						
Pre-school or none/Primary	ref			ref		
Basic secondary	5.74	0.74-44.43	0.094	2.78	0.35-22.19	0.334
Complete secondary	3.70	0.49-27.90	0.205	1.70	0.22-13.06	0.610
Professional primary/middle	4.58	0.60-34.79	0.141	2.70	0.35-20.89	0.342
Higher	4.04	0.53-30.57	0.177	2.59	0.34-19.98	0.362
Place of residence						
Urban	ref			ref		
Rural	0.70	0.55-0.89	0.004	0.56	0.41-0.75	<0.001
Ethnicity						
Kyrgyz	ref			ref		
Russian	0.73	0.55-0.96	0.026	1.10	0.79-1.53	0.585
Others ethnicity	0.79	0.47-1.31	0.355	1.08	0.58-2.00	0.814
Wealth Index						
Poorest	ref			ref		
Second	1.41	1.00-1.97	0.050	2.10	1.29-3.40	0.003
Middle	1.35	0.97-1.89	0.080	1.73	1.07-2.81	0.026
Fourth	1.49	1.09-2.06	0.014	1.84	1.15-2.93	0.010
Richest	1.20	0.83-1.75	0.338	1.35	0.80-2.27	0.263
LR chi2(14)	294.65			227.66		
Prob > chi2	0.00			0.00		
Pseudo R2	0.08			0.10		
Log likelihood	-1592			-1054		

Table 3 shows that the binary logistic regression of factors affecting the miscarriages and abortion. According to miscarriages as the outcome, it was revealed that increasing one year of women's age, the odds of miscarriages is increasing 1.06 times. Additionally, compared to currently married women, women who are not in union had 29% decreasing the probability to miscarriages. Compared to women lived in urban area, women residing in rural area had 30% lower probability to experience miscarriages. Moreover, compared to women from Kyrgyz ethnic group, women from Russian ethnic group had 27% lower the probability to have miscarriages. According to the wealth index, compared to the poorest women, women at the fourth level of wealth had 1.49 times more likely to experience miscarriages.

The analysis with abortion as a dependent variable revealed that increasing one year of women's age is associated with 1.09 times more to experience abortion. Additionally, compared to currently married women, women who are not in union had 44% lower probability of abortion. Compared to women who lived in urban area, women residing in rural area had lower probability of experience abortion by 44%. In terms of the wealth index, compared to women in poorest level, women in second, middle, and fourth level were more likely to

experience abortion by 2.10, 1.73, and 1.84 times, respectively. According to the model building, the factors build the miscarriages and abortion models explaining the outcome by 8% and 10%, respectively. The rest of the analysis are explained by the variables which not included in this study.

The results of this study indicate that every one-year increase in a woman's age increases the likelihood of miscarriage by 1.06 times. This finding is consistent with several previous studies that have shown a relationship between a woman's age and an increased risk of miscarriage. Older women have a higher risk of miscarriage, especially after the age of 35 (Du Fossé et al., 2020). This is in line with the biological theory that as women age, the quality of their eggs tends to decline, increasing the risk of miscarriage (Fett, 2023). In addition, other factors such as decreased hormone levels and increased chromosomal abnormalities in older women's eggs also contribute to the increased risk of miscarriage (Busnelli et al., 2021). Therefore, the results of this study strengthen the scientific understanding of how a woman's reproductive age can affect pregnancy outcomes, especially the risk of miscarriage.

The results of this study indicate that unmarried women are 71% less likely to have a miscarriage than currently married women, and women living in rural areas are 30% less likely to have a miscarriage than women living in urban areas. These findings are interesting and in line with some previous studies that suggest that marital status may play a role in reproductive health. One study found that married women tend to have better access to health care and social support, which may reduce the risk of miscarriage (Gao et al., 2020; Iwanowicz-Palus et al., 2021). However, socioeconomic and environmental factors, as found in this study, may also influence pregnancy outcomes. Socioeconomic theory suggests that women living in rural areas often have more limited access to health facilities and pregnancy-related information, which may lead to different reproductive patterns (Janaki & Prabakar, 2024; Kitole et al., 2025). Conversely, factors such as social stress and a more intensive lifestyle in urban areas may increase the risk of miscarriage. Environmental stress and urban lifestyles may contribute to reproductive health problems (Damayanti et al., 2023). Thus, these findings highlight the importance of social and environmental factors in influencing pregnancy outcomes, in addition to individual biological factors. The results of this study showed that women from the Russian ethnic group were 27% less likely to miscarry compared to women from the Kyrgyz ethnic group, and women in the fourth wealth level were 1.49 times more likely to miscarry compared to women in the lowest wealth level. These findings underscore the role of ethnicity and economic status in reproductive health. Ethnic differences may influence the risk of miscarriage, with genetic factors and lifestyle differences across ethnic groups likely contributing to these differences (Lee et al., 2023). On the other hand, regarding economic status, these findings are consistent with socio-economic theories suggesting that women from higher economic groups, despite having better access to health facilities, may also be more exposed to other risk factors, such as obesity, high blood pressure, or a busier lifestyle that may increase the risk of miscarriage (Ghimire et al., 2020; Okoth et al., 2022; Violanti & Andrew, 2024). Conversely, women from lower economic groups may face other health challenges, such as lack of access to quality health care, but may also be more exposed to healthier environmental conditions or simpler lifestyles that may positively influence pregnancy outcomes (Marshall et al., 2022). Thus, these findings demonstrate the complexity of the relationships between ethnic, economic, and reproductive health factors, which warrant further attention in public health research.

The results of this study indicate that every one-year increase in a woman's age is associated with 1.09 times increase in the likelihood of having an abortion. This finding is consistent with previous research showing that a woman's age is a significant factor in the risk of abortion (Moradinazar et al., 2020; Ralph et al., 2020). Older women, especially those over the age of 35, are at higher risk of abortion, possibly due to declining egg quality and increased

chromosomal abnormalities with age (Zhang et al., 2021). Biological theories support these findings by suggesting that ageing in women may affect the body's ability to maintain a pregnancy, primarily through mechanisms related to lower embryo genetic quality (Wasielak-Politowska & Kordowitzki, 2022). In addition, hormonal factors that change with age may interfere with the implantation process and fetal survival, leading to spontaneous abortion (Oliveira et al., 2020). Thus, the findings of this study reinforce the existing scientific understanding that a woman's age plays a significant role in increasing the risk of abortion.

The results of this study indicate that women not in union are 44% less likely to have an abortion than currently married women. Additionally, women living in rural areas are 44% less likely to have an abortion than women living in urban areas. In addition, women with levels of wealth (second, middle, and fourth levels) are more likely to have an abortion than women in the lowest levels of wealth, with a factor of 2.10, 1.73, and 1.84 times, respectively. These findings are in line with previous studies showing that marital status can influence reproductive decisions and abortion risk (Nyarko & Potter, 2020). Married women often face social and cultural pressures to maintain a pregnancy, which may be associated with increased abortion risks in married women, while unmarried women may prefer to avoid pregnancy or have an abortion due to different social and economic factors (Ayamolowo et al., 2024; Foster et al., 2022). In addition, environmental and economic factors also play an important role. Women living in urban areas are often more exposed to stress factors, social pressures, and easy access to abortion services, which may increase the likelihood of abortion. In contrast, women in rural areas tend to have limited access to such facilities and may be more influenced by more conservative social norms (Heymann et al., 2022). Regarding wealth factors, these findings are consistent with socio-economic theory suggesting that women from middle socio-economic strata often have better access to health services, including safe abortion, which in turn increases the likelihood of abortion (Rodgers et al., 2021). Therefore, the results of this study highlight the importance of social, economic, and geographic context in understanding the factors that influence women's abortion decisions.

Limitations of this study include the reliance on secondary data from the Multiple Indicator Survey (MICS) 2023, which may not capture all relevant factors influencing miscarriage and abortion. The scope of the study was limited by the availability of certain sociodemographic variables, and certain potentially influential factors such as medical history, access to health services, or cultural practices related to reproductive health were not included. In addition, the study only included women who experienced a miscarriage or abortion and excluded those who did not complete the women's questionnaire, which could potentially introduce selection bias. The use of cross-sectional data also limits the ability to establish causal relationships, as findings only reflect associations rather than causal pathways. Furthermore, reliance on self-reported information may lead to recall bias or underreporting, especially on sensitive topics such as miscarriage and abortion.

4. CONCLUSION

The results of the study showed that of the 4,881 women of childbearing age, 11.47% experienced miscarriage, 6.45% experienced abortion, with the majority being aged 30-39 years, most of them were married, had a junior high school education, lived in rural areas, and most were members of the Kyrgyz ethnic group, and most were at the middle to highest wealth levels. Factors associated with miscarriage included age, marital status, rural residence, Russian ethnicity, and the fourth wealth level, while factors associated with abortion included age, marital status, rural residence, and second, middle, and fourth wealth levels. Based on these findings, it is recommended to pay more attention to reproductive health education and support for women of childbearing age, especially those living in rural areas and with low to middle wealth levels, to reduce the risk of miscarriage and abortion.

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