



Review Article

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The Negative Effect of Covid-19 Pandemic on Maternal Mortality in Uzbekistan



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Abstract

The new coronavirus 2019 has affected the global healthcare systems, economies, and social sectors in many ways. Both developed and developing countries are experiencing an increase in maternal mortality and morbidity due to deranged antenatal and perinatal care. This paper explores the effect of COVID-19 on maternal mortality in Uzbekistan in the period of January-September 2020.

This study employed a method of review (or subsequent reading) and analysis (or components study). It included analysis of the literature and application of the main concepts, theories and understandings, exploration of the available country specific data and facts from various open and closed sources, interviews with the national specialists and leaders of healthcare system in Uzbekistan.

The overall results collected and analysed from open data, closed sources, published literature and interviews signify that COVID-19 has led to a dramatic growth of the all-cause maternal mortality ratio in Uzbekistan during the period of January to September 2020. Besides the accessibility and quality of antenatal and perinatal care were negatively affected by COVID-19. This study evaluates the negative effect of COVID-19 on maternal mortality in Uzbekistan. It also explores the barriers in the health care system, which are experienced by women and their families while getting the access to quality antenatal and perinatal services. Besides, the authors provide policy recommendations on improving the situation despite the worsened national maternal and perinatal outcomes.

Keywords: Maternal mortality; Perinatal care; Antenatal care; COVID-19

Abbreviations: MMR: Maternal Mortality Ratio; NSDG: National Sustainable Development goal

Introduction

The COVID-19 has become a threat to global healthcare systems, economies and social sectors in many ways [1]. National healthcare systems of both developed and developing countries are experiencing an increase in maternal mortality and morbidity due to deranged antenatal and perinatal care [2]. The situation is exacerbated by the government-imposed lockdowns, quarantine and social isolation measures, disrupted access to healthcare services and attained uncertainty by pregnant women and their families [3].

Recent systematic review and meta-analysis of more than 6 million pregnancies from 40 studies across 17 countries by Chmielewska et al. [4] found increases in maternal deaths, stillbirth, ruptured ectopic pregnancies and maternal depression.

According to WHO, maternal mortality ratio (MMR) is defined as "the number of maternal deaths during a given time period per 100 000 live births during the same time period. It depicts

the risk of maternal death relative to the number of live births and essentially captures the risk of death in a single pregnancy or a single live birth" (WHO, 2021). According to ICD-10 maternal mortality causes are divided to direct and indirect obstetric causes. Direct causes of maternal death are deaths resulting from obstetric complications associated with pregnancy (during pregnancy, childbirth, and the postpartum period), as well as from interventions, omissions, inappropriate treatment, or in a chain of events following any of the above reasons. Indirect (indirect) causes of maternal death are deaths as a result of a pre-existing illness or illness that developed during pregnancy, unrelated to the direct obstetric cause, but aggravated by the physiological effects of pregnancy [5].

The latest global MMR estimates were presented in 2019 by the Maternal Mortality Estimation Inter-Agency Group (MMEIG) for the period of 2000-2017 [6]. It concluded that in developing countries women have more pregnancies and therefore more

risks of death compared to developed countries. The MMR in low-income countries in 2017 was 462 per 100 000 live births and 11 per 100 000 live births in high income countries [6].

The MBRRACE-UK rapid report stated that a maternal mortality rate in the UK during March-May 2020 raised from 9.7 per 100 000 in 2016–18 to 9.9 per 100,000 [4]. Such MMR increase in one of the most developed countries in the world (UNDP, 2020) has led us to question and investigate effect of the COVID-19 pandemic on maternal mortality and morbidity in Uzbekistan.

The model of “three delays” [7] was applied to analyse the effect of pandemic on antenatal and perinatal care. It proposes that pregnancy-related mortality rises due to delays in: (1) the decision to access antenatal and/or perinatal care by the woman and/or her family; (2) reaching, i.e. identification of and referral to an appropriate medical facility; and (3) receiving adequate and appropriate care/treatment when admitted in the facility (Figure 1).

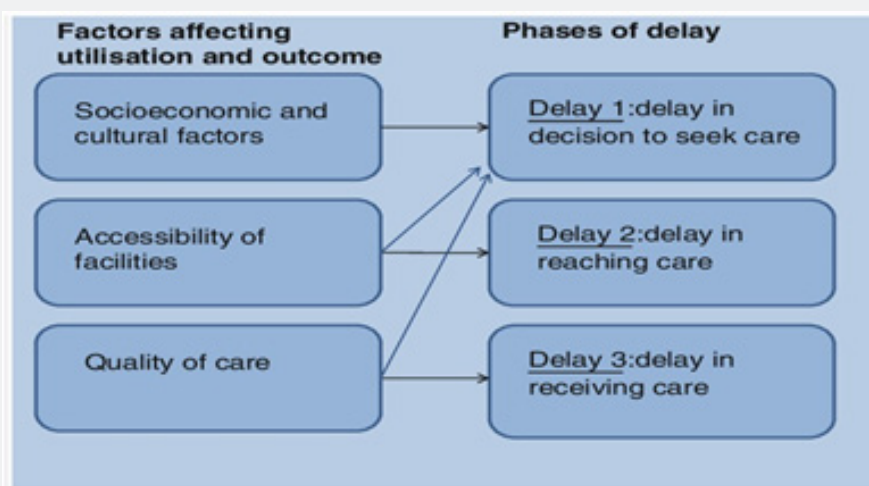


Figure 1: The-three-delays-model (Public Health Notes, 2021).

This model can help to recognize that timely and adequate care for obstetric complications is a major factor in reducing maternal deaths [8]. Other factors such as accessibility of facilities, quality of care or socio-economic and cultural factors will affect the lengths of these three delays indirectly or independently [9]. The restrictive measures related to COVID-19 and other interdependent factors related or caused by the pandemic have influenced the undue delays and effected the maternal mortality in Uzbekistan.

International policymaking aimed at accelerating the decline of maternal mortality have led to the Sustainable Development Goal 3 (SDG) “Ensure healthy lives and promote wellbeing for all at all ages” [10]. and its Target 1 “By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births” [10]. The Republic of Uzbekistan incorporated the SDG 3 and respective Target 1 into the National Sustainable Development Goal 3 (NSDG) and its Target 1 “By 2030, reduce the maternal mortality ratio by one third” [11]. This high-level government commitment has been also compromised by the pandemic and requires urgent evidence-based policy interventions.

This study evaluates the effect of COVID-19 on maternal mortality in Uzbekistan during the period of January to September

2020. It also explores the barriers in the health care system, which are experienced by women and their families while getting the access to quality antenatal and perinatal services. Besides, the authors provide policy recommendations on achieving NSDG3 and its target despite the worsened national maternal and perinatal outcomes.

Methods

This study was conducted based on the method of review (or subsequent reading) and analysis (or components study), which included:

- a) analysis of the literature and application of the main concepts, theories and understandings to the situation in Uzbekistan;
- b) exploration of the available country specific data and facts from various open and closed sources;
- c) interviews with the national specialists and leaders of the Maternal, Newborn & Child Health (MNCH) system in Uzbekistan.

These approaches allowed to formulate the hypothesis of the study, namely that the maternal mortality was negatively affected by COVID-19 pandemic in Uzbekistan.

The published literature was selected from the EmeraldInsight, ScienceDirect and Scopus databases due to subscription access via higher education provider. The keywords as maternal mortality, perinatal care, antenatal care, COVID-19 were used at the initial stage of selection. Additional filters as (1) articles for publication type, (2) period of 2020-2021 for published period, as well as (3) English for the language of publication were applied. We shortlisted 14 most relevant articles based on the content and research types.

The interviews were conducted with pre-formulated interview questionnaires. The following candidates were selected as interviewees based on their qualifications, area of expertise and availability:

a) Dr. D.Kh - PhD, Associate Professor of Family Health Department/Center for professional development of medical workers, the Ministry of Health;

b) Dr., Prof. M.A. - Advisor of National Ob/Gyn Scientific and Practical Medical Center, Head Ob/Gyn Department of the Center for professional development of medical workers, the Ministry of Health, a member of National Group on Confidential Enquiry into Maternal Death (CEMD) established by the Ministry of Health.

These candidates are also main specialists for each specific area – AC and PC relatively. The both signed the agreement on using the information received from the interview for research purposes (the records, interviews' minutes and agreements are

available upon the request).

Two questionnaires (12 questions each in total) are focused on antenatal care and perinatal care. They both aim to evaluate the hypotheses and have questions related to ensuring access to AC and PC during the pandemic, challenges in quality services faced by the facilities and staff, national standards' implementation and impact of the restriction measures on MMR in Uzbekistan, as well as on delays in AC and PC service provision.

Result

The analysis of maternal mortality data for the period of January to September 2020 revealed a dramatic growth of the all-cause maternal mortality ratio (MMR) throughout the Republic of Uzbekistan. Accessibility and quality of antenatal and perinatal care were negatively affected by COVID-19 breakout in Uzbekistan.

Since 1990, the MMR in Uzbekistan was steadily and remarkably declining, it fell off by more than 3 times within the mentioned period (Figure 2). This achievement fulfilled one of the United Nations (UN) Millennium Development Goals commitments of Uzbekistan to decrease the MMR by two-thirds by 2015. To reinforce the established tendency the Government of Uzbekistan committed to decreasing the MMR by one-third according to its National Sustainable Development Goal 3 (NSDG) and Target 1 based on the UN Sustainable Development Goal 3 and Target 1 [12].

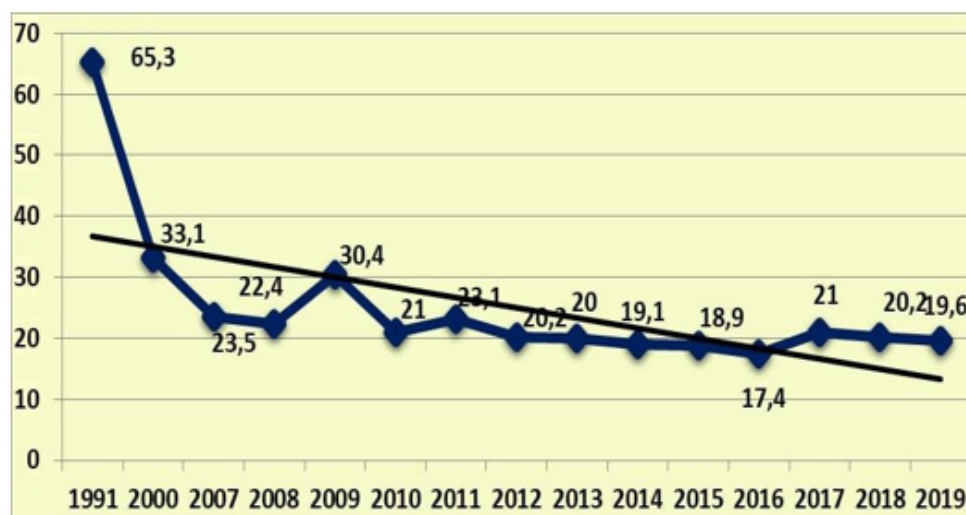


Figure 2: Maternal mortality ratio in Uzbekistan. 1990-2019.

It's notable that since 2010 the MMR was not showing substantial alteration, keeping between 19,2 to 21,4. Thus, in 2010-2012 average MMR was 21.4 per 100 000 live births, 19.3 in 2013-2015, and 19.2 per 100 000 live births in 2016–2017 (UNFPA, 2019, p.13). The National Statistics Committee of the

Republic of Uzbekistan reported on MMR for 2018 and 2019 as 20,2 and 19,6 respectively (State Statistics Committee of the Republic of Uzbekistan, 2020). The fluctuation of MMR over 2010-2019 has evidently been very minor.

The main causes of maternal death in Uzbekistan (Table 1) for many years have been direct obstetric causes – post-partum hemorrhage, preeclampsia/eclampsia, sepsis, thromboembolism, and they accounted for up to 80% of all cases of maternal death. Indirect causes of maternal death accounted for about 20% [13].

The analysis of maternal mortality data for the period of January to September 2020 revealed dramatic growth of the all-cause maternal mortality ratio throughout the Republic of Uzbekistan up to 26,2 compared to 20,2 and 19,6 in 2018 and 2019 and respectively. There were 152 maternal death cases from all causes in January-September 2020 which could be in a certain way directly or moderately attributed to COVID-19. This absolute figure is higher than that for the same period of 2018 and 2019 by

32 and 40 cases respectively (Table 2).

In 2020, as can be seen from Table 1, the leading cause of maternal death was a comorbidity (36%), the other causes, such as hemorrhage (35 cases, 23%), preeclampsia (23 cases, 15.1 %), pulmonary embolism (19 cases, 12.5%) fall far behind the first cause. The analysis of comorbidities that led to death depicts that the main cause of maternal death was COVID-19 (Table 3). The coronavirus occurs in more than half of the cases caused by comorbidities: 31 COVID-19 cases (56.4%) out of 55 cases of comorbidities, and that is 20% of all-cause maternal mortality cases. Besides, out-of-hospital-acquired pneumonia was reported in 13 cases that accounts for 23% of 55 cases caused by comorbidities.

Table 1: Causes of maternal deaths in Uzbekistan. 2017-2020.

Maternal Mortality Causes								
Causes	2017		2018		2019		2020(Jan-Sep)	
	quantity	%	quantity	%	quantity	%	quantity	%
Postpartum haemorrhage	33	25,90%	43	29,30%	47	32,40%	35	23,00%
Pre-eclampsia/eclampsia	24	18,90%	23	15,60%	23	15,90%	23	15,10%
Peripartum infection (genital tract sepsis)	24	18,90%	19	12,90%	18	12,40%	10	6,60%
Pulmonary embolism	17	13,40%	26	17,70%	19	13,10%	19	12,50%
Somatic pathologies	20	15,70%	21	14,30%	26	17,90%	55	36,20%
Anaphylaxis	2	1,60%	2	1,40%	1	0,69%	2	1,30%
Anaesthesia complications	2	1,60%	2	1,40%	1	0,69%	1	0,66%
Amniotic fluid embolism	5	3,90%	9	6,10%	9	6,20%	5	3,30%
Others	0	0	2	1,40%	1	0,69%	2	1,30%
COVID-19 within somatic pathologies	0	0	0	0	0	0	31	20,40%
Total	127	100%	147	100%	145	100%	152	100%

Table 2: Absolute number of maternal death cases in 2017-2019 by months and 2020 for January-September 2020.

Year	MMR	Number of maternal deaths									Total number of maternal deaths (Jan- Sept)	Oct	Nov	Dec	Total number of maternal deaths (Jan-Dec)
		Jan	Feb	March	April	May	June	July	Aug	Sept					
2020		21	9	17	12	11	12	52	11	7	152				
2019	19,6	8	10	11	9	18	12	20	15	12	115	9	8	13	145
2018	20,2	11	14	19	8	9	12	18	5	12	108	8	15	16	147
2017	21	9	14	5	15	12	10	14	8	10	97	8	9	13	127

Table 3: Analysis of the comorbidities that lead to death in Uzbekistan. 2017-2020.

Comorbidities caused maternal deaths	2017		2018		2019		2020(Jan-Sep)	
	q-ty	%	q-ty	%	q-ty	%	q-ty	%
Pneumonia	8	40%	12	57,10%	8	30,80%	13	23,60%
COVID-19	0		0		0		31	56,40%
Rupture of cerebral aneurysm, cerebral he	0		1	4,80%	1	3,90%		
Tuberculosis	0		1	4,80%	0		1	1,80%
Meningitis	0		0		0		1	1,80%
Cirrhosis of the liver, varicose veins of the	1	5%	1	4,80%	4	15,40%	1	1,80%
Aortic dissection and rupture			1	4,80%	0		1	1,80%
Congenital heart disease	2	10%	1	4,80%	2	7,70%		
Acquired heart disease	2	10%	1	4,80%	3	11,50%		
Leukaemia	0		1	4,80%	1	3,90%		
Oncological diseases	0		0		1	3,90%	1	1,80%
Aplastic anemia	0		0		1	3,90%		
Hypertension, cerebral hemorrhage	3	15%	1	4,80%	2	7,70%	2	3,60%
Dilated cardiomyopathy	0		0		1	3,90%	3	5,50%
Bowel disease, peritonitis	0		1	4,80%	2	7,70%	1	1,80%
Kidney disease, urosepsis	1	5%	0		0		0	
Epilepsy	1	5%	0		0		0	
Systemic lupus erythematosus	2	10%	0		0			
Total	20	100%	21	100%	26	100%	55	100%

The data above allows understanding whether COVID-19 directly or indirectly affected the maternal mortality ratio in Uzbekistan. If the 31 maternal deaths caused by COVID-19 are not considered, the MMR for all-other-but COVID-19 -caused cases (121) will be 20.8, which is very close to the MMR over the past 10 years. Thus, it can be concluded that the maternal deaths caused by COVID-19 directly affected the overall 2020 maternal mortality ratio in Uzbekistan.

In addition, the assessment of a possible indirect impact of the COVID-19 pandemic on maternal mortality requires analysis of the data for those causes of maternal mortality that have been the main causes for many years, that is, postpartum hemorrhage and preeclampsia/eclampsia. The 35 cases of postpartum hemorrhage of the total number of maternal deaths in January- September 2020 for all-other-but-COVID-19-caused cases, accounted for 29%, and 23 cases of preeclampsia/eclampsia accounted for 19%. This analysis suggests that the proportion of maternal deaths from postpartum hemorrhage increased from 22 to 29 between January and September 2020 compared to previous years [13]. This indicates an indirect effect of COVID-19 on the maternal mortality ratio in Uzbekistan.

The analysis of selected published literature has also supported the above findings and conclusions. Such as Robertson et al. [3] in their study, assuredly state that the mortality rate would increase due to the COVID-19 virus and urge to consider not only the immediate effects, but also the indirect effects of

the pandemic such as disrupted health systems and decreased access to food. The authors define that women of reproductive age and children from low-income and middle-income countries are more prone to be affected by the indirect effects of the pandemic. As WHO [14] suggests, “People, efforts, and medical supplies all shift to respond to the emergency. This often leads to the neglect of basic and regular essential health services. People with health problems unrelated to the epidemic find it harder to get access to health care services.”

Similarly, Sochas, Channon, Nam [15] propose that during past pandemics the coverage of antenatal care decreased by 22%, family planning by 6%, facility delivery by 8%, postnatal care by 13%. According to Robertson et al (2020), the COVID-19 pandemic and response to it have negatively affected the maintenance and utilisation of reproductive, maternal, newborn, and child health (RMNCH) services. It can be explained by redirection of health workers, equipment and facilities’ use for coronavirus positive patients.

Findings from the literature were also stated by Dr. D. Kh. in her interview about maternal mortality in Uzbekistan during COVID-19 outbreak: “One of the major risk factors of maternal death were lack of adequate antenatal care that led to lack of timely examination and quality diagnostics of some conditions in high-risk pregnancies”. According to the interviewee, “The pandemic limited access to essential primary health care not only for pregnant women, but for the entire population, because there

were restrictive measures for entering polyclinics, counseling was provided online and by phone, and in this regard, pregnant women had difficulties in obtaining qualified face-to-face counseling from an obstetrician-gynecologist or a family doctor, and therefore some conditions could be missed because not all pregnant women could correctly assess their health status and pay attention to possible warning signs”.

Dr. M. A. shared the same opinion: “Access to antenatal care which directly correlates with a pregnancy outcome was very much limited due to COVID-19 related restrictions, moreover, the quality of ANC has been very low nationwide, population awareness about warning signs in pregnancy has been dramatically low, public health authorities had failed to introduce a “mother’s passport” that could serve as an informative tool and a guide for mothers and their families during pregnancy”.

From a policymaking perspective Dr. M. A. summarized that COVID-19 exposed and aggravated the problems which existed in antenatal and perinatal health care in Uzbekistan long before the COVID-19 pandemic. She believed that they lie deep in the quality of medical pre- and post-diploma education system, numerous thoughtless reforms of the primary health care system, and multiple staff replacements on the managerial and policy making levels. Maternal health care, as part of the whole health care system needs reformation that should start from education system, and even when all updated national programmes, curricula, standards and protocols are in place the health care system will need a strategy and plan of action for implementation as well as integrated national policy and comprehensive system for implementation quality control.

Also, the interviewee mentioned that the total maternal mortality in 2020 was equal to 247 and among them about 90 were COVID-19 caused. Though this information was never officially published and recognized anywhere, on the other hand Dr. M.A., as a member of National CEMD Working Group, can be referred to for such data. Simple calculation results in MMR equal to 29,3 for 2020. She underlined the fact “driving her to despair that maternal mortality for 2020 was underreported by the Ministry of Health of the Republic of Uzbekistan, as all COVID-19-caused maternal deaths were attributed to general COVID-19 deaths and excluded from the maternal mortality ratio. She explained it as a political decision to deviate from globally accepted definition of maternal death.

Discussion

The factors that may have caused maternal mortality identified in the course of this study fit into the “three delays” model described by Thaddeus et al. [7]:

Delay 1

Timeliness in seeking for antenatal and/or perinatal care was affected by the tight restrictions introduced nationwide as supported by Dr. D. Kh’s interview. Antenatal care (ANC)

has always been an inalienable right of pregnant women in Uzbekistan. National Standard on antenatal care requires at least 7 antenatal visits during normal pregnancy [16]. In response to the COVID-19 outbreak, the Ministry of Health (MoH) of Uzbekistan issued Interim Clinical Guidelines on management of pregnancies in women with COVID-19 [17]. The Guidelines have been based on WHO recommendations with the aim to instruct medical personnel at PHC and hospital level on both antenatal and perinatal care. Yet, as was pointed out within our interviews with local health care specialists, lockdown measures had a negative impact on pregnant women accessing care, fear of viral contamination multiplied by poor understanding of complications and risk factors in pregnancy may have suppressed the willingness of women to undergo physical checks and lab tests. Thus, the delay in the decision to seek for medical assistance due to fear of contamination and to low level of awareness contributing to the restricted access to primary medical facilities had been one of the major factors in the delayed access to medical facilities and may have contributed to the increase of maternal mortality.

Delay 2

Subsequent to the limited access to antenatal care was the factor of delayed identification and referral to the medical facility. As mentioned by Dr. D.Kh.: “Failure to timely detect a pregnancy complication at the primary health care level led to delays in proper referral to a relevant hospital”. An observation about delays in referral was added by Dr. M.A. who mentioned a mess in referral of pregnant women between hospitals that happened due to discrepancies in local protocols.

It should be mentioned that the Ministry of Health designated one specialized maternity house to serve those pregnant women who have confirmed COVID-19 in each region of the country [18]. Dr. M.A. underlined that there were cases when a pregnant woman with COVID-19 symptoms was not admitted to ‘non-specialised’ maternity hospitals without certification that she had no COVID-19 and at the same time she could not be admitted to a specialised maternity hospital until she provided a certificate that she had COVID-19. This caused additional delay in reaching timely medical assistance, as well as referral between specialized and non-specialized facilities.

Delay 3

Receiving adequate and appropriate obstetric care and treatment when admitted in the facility was totally subject to the quality of perinatal care in Uzbekistan, which might have been negatively affected by COVID-19 outbreak. This is also observed by KC Ashish et al. [19] who state that “due to COVID-19 restrictions in low-income and middle-income countries the quality of care might be deteriorating, risking deaths and reversals of hard-won gains in MMR over the past two decades” [19].

Dr. D. Kh. described situation in hospitals, “Public health authorities often changed decisions on methods and medicines to be used for COVID-19 treatment. Doctors, when facing pneumonia

in patients, used traditional methods of treatment for bacterial pneumonia, namely antibacterial drugs, there were major errors in treatment and, as a result, patients fell into serious conditions and needed lung ventilation". Dr. D. Kh. also mentioned that both primary and hospital level suffered shortage of medical staff available to serve due to COVID-19 contamination and health care workers burnout.

Looking deeper into the challenges faced by perinatal service, Dr. M. A. commented: "One of the underlying factors of the maternal and perinatal mortality growth during pandemic was the lack of appropriate clinical protocols at that time. There was polypragmasy, rush, fear, resulting in inadequate obstetric care and in increase of the number of caesarean sections. This was caused by the fact that the maternal health quality assurance tools that had been introduced and implemented in Uzbekistan since the late 1990s, was unfortunately slowed down due to frequent unjustified replacements in the management, more or less trained specialists left the service, new managers are not trained and are not familiar with these tools, new graduates do not even have a clue about evidence-based medicine, clinical protocols, the skills to assess existing information."

The above said could be attributed to the delay in provision of adequate obstetric care. Overall, in Uzbekistan the quality of obstetric care might have been not always adequate to pregnancy complications triggered directly or indirectly by COVID-19.

Conclusion

The maternal mortality data for the period of January to September 2020 provides evidence that pregnant and postpartum women are at increased risk of severe complications associated with COVID-19, and are more prone to death due to COVID-19.

The main factors that prevented women from receiving or seeking care during pregnancy and childbirth at global, regional and national levels were also observed in Uzbekistan. These include: "accessibility to facilities; lack of information; inadequate and poor-quality services and cultural beliefs and practices" [20]. These factors were aggravated during COVID-19 pandemic and affected women's decision to timely visiting medical facilities.

The capacity of the health system to ensure quality services at the primary level, as well as to refer to the tertiary level maternity hospitals is sensitive for maternal mortality. Especially in an emergency environment, such as COVID-19 pandemic when the health care system in Uzbekistan had been pressured, it was critical to figure out what to prioritize, and how restricted essential health services may affect various population groups disproportionately.

Maternal mortality pinpoint on women of reproductive age, which in the pandemic situation was not classified as a high-risk group by health care authorities, worldwide and in Uzbekistan. At an early stage of the worldwide COVID-19 pandemic, the

major concern regarding pregnant women was about avoiding the exposure of a fetus to the disease. The reports from other countries which faced COVID-19 earlier than Uzbekistan did not reveal any higher risk to develop severe manifestations due to COVID-19 among pregnant women [21,22]. There were no reports on maternal deaths related to COVID-19. Therefore, health care administration and facilities in Uzbekistan did not recognize maternal health or risk of mortality to be a fundamental issue.

Overall, COVID-19 has contributed negatively to maternal mortality in Uzbekistan during January-September 2020. Uzbekistan jumped many years back on its track to decrease the maternal mortality ratio. Moreover, the NSDG 3 and its Target 1 is dramatically affected and probably will experience setbacks on achieving its objectives by 2030. While pre-pandemic indicators can be regained when massive COVID-19 vaccination is implemented, this analysis features deficiencies and fragility of Uzbekistan's healthcare system in an emergency.

The following recommendations are proposed based on the findings and conclusions of the

study:

a) The interventions required of the healthcare system in a pandemic situation required a range of strategies to translate policies into effective action plans (Kickbusch and Buckett, 2010). Thus, effective policy and programmes on maternal health to avoid increase of preventable mortality in emergencies need to be developed and implemented by Uzbekistan based on the evidences and best practices.

b) Most maternal deaths are preventable, and there are a number of international standards and algorithms for preventing or treating complications. It is necessary to ensure access and high-quality service in antenatal and perinatal care by professionally trained personnel, appropriate management and treatment based on lives saved tools. The barriers in access to quality maternal and newborns health (MNH) service need to be addressed at both health system and societal levels.

c) Regionalization of perinatal care should be strengthened; the capacity of existing health facilities to deliver quality antenatal and perinatal care should be increased.

d) Statistical data collection and analysis methodology should be enhanced and strictly adhered to by the public health authorities in order ensure effective planning and implementation of quality interventions.

e) Maternal health promotion concept/approach must be included in the strategies for community advocacy, education/health literacy and peer-support groups [23]. National programme on raising population awareness on reproductive health and rights, pregnancy warning signs, principles of safe pregnancy should be developed and implemented [24-34].

Conflict of Interest

The study was carried out without any commercial or financial ties that maybe viewed as a possible conflict of interest, according to the authors.

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