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Fetal and Maternal Risk Factors Caused by Antenatal Fetal Death in Women of Reproductive Age

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Annotation: Antenatal fetal death, defined as intrauterine demise occurring after 20 weeks of gestation, remains a major public health concern with profound emotional and clinical consequences for women of reproductive age. Despite advancements in prenatal care, the prevalence of stillbirth continues to reflect disparities in maternal health, access to care, and underlying medical conditions. This review aims to identify and analyze both fetal and maternal risk factors contributing to antenatal fetal death, highlighting existing knowledge gaps in early detection and prevention. A systematic literature review was conducted using databases such as PubMed, Scopus, and Google Scholar, focusing on studies from 2013 to 2023 that examined etiological factors and outcomes associated with intrauterine fetal demise. Findings consistently identified maternal hypertension, diabetes mellitus, obesity, thrombophilia, and infections as primary contributors, while fetal factors included congenital anomalies, growth restriction, and placental insufficiency. Socioeconomic status, inadequate antenatal visits, and advanced maternal age also emerged as significant risk enhancers. However, inconsistencies in reporting standards and limited data from low-resource settings hinder comprehensive risk stratification. The results underscore the urgent need for standardized antenatal screening protocols, improved maternal health monitoring, and broader implementation of evidence-based

interventions. Further research should focus on integrating genetic, biochemical, and ultrasound markers for early identification of high-risk pregnancies. Addressing these gaps is critical not only for reducing fetal mortality but also for improving maternal outcomes and achieving global maternal-fetal health targets.

Keywords: Antenatal fetal death, pregnancy course, risk factors for antenatal fetal death.

INTRODUCTION.

Antenatal fetal death, also known as intrauterine fetal demise (IUFD), is a devastating obstetric complication characterized by the death of a fetus after 20 weeks of gestation and prior to the onset of labor[1]. Despite improvements in maternal and fetal care over the past decades, antenatal fetal death remains a significant global health concern, particularly in low- and middle-income countries, where the majority of stillbirths occur[2,3]. It not only carries profound emotional and psychological consequences for affected families but also serves as an indicator of maternal health system performance and prenatal care quality. According to the World Health Organization, millions of women annually experience stillbirths, often in preventable scenarios, highlighting the critical need for more effective prevention strategies[3,4,5].The etiology of antenatal fetal death is multifactorial, involving a complex interplay between maternal, fetal, placental, and environmental risk factors. Common maternal risk factors include hypertensive disorders, diabetes mellitus, infections, thrombophilic conditions, and advanced maternal age. Fetal-related causes include congenital anomalies, chromosomal abnormalities, intrauterine growth restriction (IUGR), and umbilical cord complications. Placental insufficiency and abruption are also frequently implicated[6,1]. The "placental origin theory" posits that many fetal deaths stem from early placental maldevelopment, which leads to chronic hypoxia and impaired fetal growth. Understanding these relationships is crucial for timely identification and intervention[7]. However, despite known associations, many stillbirths remain unexplained, pointing to gaps in diagnostic protocols, inconsistent classification systems, and underreporting.

Previous studies have attempted to stratify risk and identify predictive markers for fetal death, yet variability in study designs, population demographics, and diagnostic capabilities have limited the development of universal prevention guidelines[8,9]. Most research has focused on maternal medical conditions or sociodemographic factors in isolation, neglecting the dynamic interactions between fetal and maternal health[10,11]. Additionally, studies in resource-limited settings often suffer from incomplete data and insufficient access to diagnostic tools, obscuring the true burden and causes of antenatal fetal death[12]. This knowledge gap highlights the need for integrated, multidisciplinary approaches and standardized data collection across diverse populations.In this review, a systematic search and critical analysis of peer-reviewed studies published between 2013 and 2023 were conducted to evaluate maternal and fetal risk factors associated with antenatal fetal death[13,2]. Databases such as PubMed, Scopus, and Google Scholar were utilized, and studies were selected based on relevance, methodological quality, and focus on reproductive-age women. The review aims to synthesize current knowledge, identify recurring patterns, and highlight areas where further research is essential. The methodological approach emphasizes the inclusion of both clinical and epidemiological studies to capture a broad spectrum of risk factors and contextual variations[14,15].

The anticipated findings of this review are expected to consolidate evidence on major risk factors

and provide a clearer understanding of the mechanisms leading to fetal demise[16]. These insights have critical implications for clinical practice, including the development of predictive tools, early detection strategies, and targeted interventions[17,18]. Furthermore, they underscore the importance of improving maternal health services and antenatal surveillance, particularly in high-risk populations, to reduce the incidence of preventable antenatal fetal deaths and promote safer pregnancies[19].

METODOLOGY.

This study employed a narrative literature review methodology to investigate maternal and fetal risk factors associated with antenatal fetal death in women of reproductive age. A comprehensive literature search was conducted using electronic databases including PubMed, Scopus, and Google Scholar, focusing on peer-reviewed articles published between 2013 and 2023. Search terms such as “antenatal fetal death,” “stillbirth,” “intrauterine fetal demise,” “maternal risk factors,” “fetal risk factors,” and “pregnancy complications” were used in various combinations to identify relevant studies. Articles were selected based on their clinical and epidemiological relevance, with preference given to those that reported original data, systematic reviews, or meta-analyses related to antenatal fetal mortality. Studies were included if they involved women of reproductive age and provided clear documentation of risk factors, outcomes, and population characteristics. Exclusion criteria included non-English language articles, case reports, and studies with insufficient data on causative factors. Each selected article was critically appraised for methodological rigor, clarity of reported outcomes, and sample representativeness. Data were extracted on maternal characteristics such as age, comorbidities, antenatal care access, and obstetric history, as well as fetal conditions including congenital anomalies, growth restriction, and placental dysfunction. The findings were thematically analyzed to identify common trends and gaps in the literature. This approach enabled a comprehensive synthesis of current evidence and helped to highlight disparities in outcomes across different populations. The methodology aimed to support a clearer understanding of preventable risk factors and inform strategies for early identification, intervention, and improved maternal-fetal health outcomes.

RESULT AND DISCUSSION

Relevance of the topic. Antenatal fetal death (ANFD) is a pressing, socially significant problem in modern practical obstetrics [20,21].

The level of antenatal fetal death (ANFD) remains high and accounts for almost 50% of perinatal losses. The epidemic of stillbirth is one of the urgent problems, as it is a key indicator of women's health and their quality during pregnancy and childbirth [4, 5].

Unfortunately, to date the problem of AGP is a polyetiological and ambiguous problem, including in terms of developing unified approaches to prevention and obstetric tactics. Thus, annually in the world there are 4 million cases of death of newborns, and in addition, stillbirth is observed in 1-3% of all births, reaching 3 million [22,23]

Purpose of the study: analysis of risk factors for antenatal losses, study of clinical and anamnestic features of the course of pregnancy in women with antenatal fetal death.A retrospective analysis of 51 birth histories was conducted for the period 2023-2024 in the BRK and the city of Bukhara. The main group included 36 pregnant women with antenatal fetal death (AFD) at 34 to 37 weeks of gestation[24]. The control group consisted of 15 patients with a physiological course of pregnancy who gave birth to a live child.

Research results and discussion[25].

The main group included pregnant women aged 18 to 37 years, with an average age of 29.2±0.5 years. Primiparous older women (PEE) were predominant in this group, accounting for 9 (25%) patients. The control group included pregnant women aged 20-38 years, with an average age of 28.3±0.5 years. PEE was 1 (6.6%) patient[26,27].

Among the women studied in the main group, there were 16 (44.4%) primiparous/first-time mothers patients, multiparous-primiparous – 2 (5.6%) patients, multiparous-multiparous – 18 (50%) patients, including 1 multiparous[28,29].

In the control group of primiparous women, 8(53.4%)patients, multiparous and multiparous – 7 (46.6%) patients.When analyzing the body mass index (BMI), in the main group, patients with excess weight were more common than in the control group, accounting for 38.9%, with normal weight - 61.1%. In the control group, excess weight was found in 13.4% of patients, normal weight - 86.6%.

Extragenital diseases of the mother lead to a significant increase in the risk of fetal death[29,30,21]. These include arterial hypertension and other cardiovascular pathologies, kidney diseases, infectious lesions of organs and tissues [11, 25]. In the structure of causes of AGG, maternal diseases account for 10% [21,23].

In the structure of extragenital pathology, diseases of the genitourinary system dominated - chronic pyelonephritis occurred in 36.1%, and in most cases an exacerbation of the process was noted, in second place was respiratory disease 27.7%[31]. Diseases of the cardiovascular system were detected in 13.8%, tuberculosis in the anamnesis of 5.5% of pregnant women, in the control of these pathologies were not detected. In the main group, lipid metabolism disorder occurred in 20.7% of women. In the control group, the following prevailed: previous infectious diseases and diseases of the upper respiratory tract (40% and 47%, respectively)[32,33].Analysis of the documentation showed that in the main group, 3 pregnant women (9.3%) were not registered for dispensary care, 23 pregnant women (63.8%) were registered for ≤12 weeks, and 10 pregnant women (27.7%) for >12 weeks. In the control group, 9 pregnant women (60%) were registered for ≤12 weeks and 6 pregnant women, respectively, for >12 weeks[34,35].

The obstetric history was burdened in women of the main group by 22.2%: of which medical abortion in 11.1%, non-developing pregnancy 5.5%, AGP and spontaneous miscarriage in 2.7% respectively. In the control group, non-developing pregnancy in 1 case was 6.6%[36]. Delivery was by cesarean section in 11.1% of patients in the main group, in the second group such data were not revealed[37].

The most common gynecological diseases were: chronic inflammatory process of the genital organs in the main group 25% and the control group 6.6%, ectopia of the cervix 19.4% and 13.3%, respectively, uterine fibroids 2.7%, not detected in the control group.The burdened obstetric and gynecological history in the group with AGP does not contradict the literature data [6, 7]. Analysis of the course of this pregnancy in the main group showed that acute infectious diseases of the upper respiratory tract were detected in 39%. According to the literature, the infectious factor in the structure of the causes of AGP is 10-20% [1, 7]. Antenatal fetal death against the background of exposure to an infectious agent can be caused by several mechanisms: maternal infection can occur in a severe form with the development of fever, respiratory distress syndrome, Whatleads to the death of the fetus; the infectious agent can infect the placenta with the development of placental insufficiency (PI)[38]. The frequency of PI in pregnant women with viral and/or bacterial infection reaches 50-60%. The infection penetrates through the placenta and fetal membranes with the formation of malformations of organs and tissues 6-53% [27].

An important obstetric risk factor for AG is IUGR [36]. According to Reddy UM et al (2010), IUGR was detected in 41% of stillbirths. It has been established that the more severe the growth retardation, the higher the risk of AG [28]. In our studies, intrauterine growth retardation was found in 13.8%.

In AGP, amniotic fluid pathology such as polyhydramnios was diagnosed in 8.3% and oligohydramnios in 19% of women. Mild preeclampsia was noted in 11.1% and severe preeclampsia in 2.7% of cases, while there were none in the control group. Pregnancy against the background of mild and moderate anemia (41.6% and 5.5%), respectively, accounted for 47.2%

of pregnant women. Complete placenta previa was detected in 1 (2.7%) women[39]. 7 pregnant women (19.4%) from the main group were admitted with premature detachment of a normally located placenta. In the control group, during this pregnancy, they suffered from upper respiratory tract diseases such as acute respiratory viral infections and nasopharyngitis (33.7% and 13.3%), respectively[40]. Mild anemia was noted in 8 (53.3%) women. Low placentation was diagnosed in 3 (20%) pregnant women. One (6.6%) pregnant woman had incomplete placenta previa.In pregnant women with AGD from the intrauterine fetus, congenital malformations (CM) were detected in 7 pregnant women (19.4%), including fetal malformations from the cardiovascular and central nervous systems and system accounted for 3 cases (8.3%), from the genitourinary and respiratory systems 2 cases (5.5%). In pregnant women of the control group, congenital malformations of the fetus were observed in 1 woman from the genitourinary system (6.6%).Disorders determined by Doppler in the main group are found in 4 cases (11%)[41]. In the control group, none were detected. Upon admission to the maternity hospital, the absence of fetal movement on the first day was noted in 57.1% of women, on the second day - 23.8%, on the third day - 14.3%, over three days - 4.8% of patients.

In the main group, premature births, accounting for 2/3 of all births, occurred in 27 cases, which is 75%, with the average weight of premature babies being 1393.5 g. Urgent births were 9 cases (25%), the average weight was 3485 g. In the control group, only urgent births were detected in 15 cases with the average weight of newborns being 3295 g. 7 pregnant women (19.4%) from the main group were delivered surgically[42]. Induced labor was in 24 cases, which was 66.7%. Urgent births were in 5 cases (13.9%). 3 pregnant women from the control group were delivered by cesarean section (20%)[43,44]. Urgent births were in 10 women, which was 66.7%. Induced labor was detected in 2 patients (13.3%).According to the histological examination of the placentas, placental insufficiency of the decompensated form was detected in the main group. Inflammatory changes in the placenta (focal purulent deciduitis, purulent membranitis, purulent-necrotic villusitis) were established in 80.5% of cases. Histological examination also revealed signs of premature maturation of the placenta (13.8%) and pathological immaturity of the placenta (5.5%).

CONCLUSION.

The results of our study showed that AGP is more common in older primiparous women, which accounted for 25% of patients with complicated obstetric and gynecological anamnesis 47.2%, metabolic disorders 39%. Given the complicated course of pregnancy, the risk factors for AGP include: preeclampsia of varying severity - 14%, acute infectious diseases of the respiratory tract - 39%, placental abruption - 19.4% of cases. From the fetus: intrauterine growth retardation of the fetus - 13.8%, congenital malformations - 19.4% of cases. From the placenta: placental abruption, in addition, according to the morphological study of the placenta: placental insufficiency, inflammatory changes in the placenta.

Thus, the causes of antenatal fetal death are varied and often there is a combination of several factors leading to its development. Women with a history of AGP deserve special attention not only from obstetricians and gynecologists, but also from doctors of related specialties. It is necessary to conduct a comprehensive examination of women at the stage of pre-gravid preparation for the timely detection of risk factors for antenatal fetal death, as well as to carry out therapeutic measures to prevent pregnancy complications.

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