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THE MAIN TOOLS OF THE CONFIDENTIAL AUDIT OF PERINATAL MORTALITY: A REVIEW

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Abstract

Introduction. Perinatal mortality audits and reviews are conducted to identify preventable factors in mortality, identify weaknesses in health services, and make recommendations to improve the quality of neonatal care.

This study **aimed** to assess the effectiveness of confidential audit of perinatal mortality through a content analysis of the use of different confidential audit tools in various countries.

Research Strategy. Data were searched in medical databases such as Scopus, Cohrane Library, PubMed, and Embase. 50 relevant articles on the topic were selected, in addition, data from WHO and UNICEF manuals and reports.

Results. The main methods of confidential audit are verbal and social autopsy, analysis and expert evaluation of medical history and clinical cases, classification of suboptimal help, and a combination of these methods. Identification of modifiable factors is widely and effectively used in many countries. The involvement of bereaved parents in the audit process has benefits and value for parents and healthcare providers, and it has gradually been introduced into the audit process in some countries.

In the Netherlands, a decrease in perinatal mortality from 2.3 to 2.0/1000 births ($p<0.00001$) was observed during the audit between 2010 and 2012 [15]. A meta-analysis of 7 studies also found that perinatal mortality decreased by an average of 30% (95% confidence interval, 21 to 38%) in low- and middle-income countries following perinatal audits [42]. In Uganda, the perinatal mortality rate was 47.9 deaths per 1000 births in 2008 after the introduction of the audit, compared to 52.8 per 1000 births in 2007 [37].

Conclusions. Based on the review, it can be concluded that the main tools of confidential audit, such as identification of suboptimal care, modifiable factors, and expert assessment, are used quite effectively in different countries. According to the meta-analysis and systematic review, perinatal mortality is reduced by audits in both developed and developing countries. Perinatal mortality reviews should be continued to better understand the effectiveness of audit.

Key words: *perinatal audit, perinatal mortality, confidential audit, newborns, neonatal mortality.*

Резюме

ОСНОВНЫЕ ИНСТРУМЕНТЫ КОНФИДЕНЦИАЛЬНОГО АУДИТА ПЕРИНАТАЛЬНОЙ СМЕРТНОСТИ: ОБЗОР ЛИТЕРАТУРЫ

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Введение. Аудиты и обзоры перинатальной смертности проводятся для выявления предотвратимых факторов смертности, выявления слабых мест в медицинских услугах и выработки рекомендаций для улучшения качества ухода новорожденных.

Целью работы была оценка эффективности проведения конфиденциального аудита перинатальной смертности с помощью контент анализа использования различных инструментов конфиденциального аудита в разных странах.

Стратегия поиска. Был проведен поиск данных в медицинских базах, таких как Scopus, Cochrane Library, PubMed, Embase. Были отобраны 50 актуальных статей по данной теме, а также данные из Руководств и отчетов ВОЗ и ЮНИСЕФ.

Результаты. Основными методами конфиденциального аудита являются вербальная и социальная аутопсия, анализ и экспертная оценка истории и клинических случаев, классификация субоптимальных помощей, а также комбинирование данных методов. Выявление предотвратимых факторов смертности широко и эффективно используется во многих странах. Вовлечение в процесс аудита родителей, перенесших утрату ребенка, имеет пользу и ценность для родителей и медицинских работников, и начал постепенно внедряться в процесс аудита в некоторых странах.

В Нидерландах во время проведения аудита отмечается снижение перинатальной смертности с 2,3 до 2,0/1000 рождений (p<0,00001) в 2010-2012 годах. [25] Также мета анализ 7 исследований показал, что по проведенным перинатальным аудитам в странах с низким и средним доходом снижение перинатальной смертности приходило в среднем на 30% (95% доверительный интервал, от 21 до 38%) [26]. В Уганде показатель перинатальной смертности составил 47,9 смертей на 1000 родов в 2008 году после введения аудита по сравнению с 52,8 на 1000 родов в 2007 году. [27]

Выводы. По проведенному обзору можно сделать вывод, что основные инструменты конфиденциального аудита, такие, как выявление субоптимальных помощей, предотвратимых факторов риска и экспертная оценка, достаточно эффективно применяются в различных странах. По данным мета-анализа и систематического обзора можно увидеть снижение перинатальной смертности во время проведения аудита, как в развитых странах, так и в развивающих. Следует продолжать проводить обзоры перинатальной смертности для более точного понимания эффективности аудита.

Ключевые слова: *перинатальный аудит, перинатальная смертность, субстандартные помощи, субоптимальная помощь, инструменты конфиденциального аудита перинатальной смертности.*

Түйіндеме

ПЕРИНАТАЛДЫҚ ӨЛІМ-ЖІТІМНІҢ ҚҰПИЯ АУДИТІНІҢ НЕГІЗГІ ҚҰРАЛДАРЫ: ӘДЕБИ ШОЛУ

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Кіріспе. Перинаталдық өлім-жітімнің аудиттері мен шолулары өлімнің туындауына ықпал еткен алдын алуға болатын факторларды анықтау, медициналық қызметтердегі әлсіз жерлерді анықтау және жаңа туған нәрестелерге күтім жасау сапасын жақсарту бойынша ұсыныстар жасау үшін жүргізіледі.

Мақсат. Бұл жұмыстың мақсаты болып перинаталдық өлім-жітімнің құпия аудитін жүргізудің тиімділігін әртүрлі елдерде құпия аудит құралдарын пайдалану туралы контент анализ жасау арқылы бағалау болып табылады.

Іздеу стратегиясы. Scopus, Cohrane Library, PubMed, Embase сияқты медициналық базаларда деректерді іздеу жүргізілді. Осы тақырып бойынша 50 өзекті мақала таңдалды, сондай-ақ ДДҰ және ЮНИСЕФ нұсқаулықтары мен есептемелерінен алынған мәліметтер.

Нәтижесі. Құпия аудиттің негізгі әдістері ауызша және әлеуметтік аутопсия, тарих пен клиникалық жағдайларды талдау және сараптамалық бағалау, оңтайлы емес көмек түрлерін жіктеу және осы әдістерді біріктіру болып табылады. Өлім-жітімнің субстандартты факторларын анықтау көптеген елдерде кеңінен және тиімді қолданылады. Баласы шетінеген ата-аналарды аудит процесіне тарту ата-аналар мен медицина қызметкерлері үшін пайдалы және құнды болып табылады және кейбір елдерде аудит процесіне біртіндеп енгізіле бастады.

Нидерланды елінде аудит жүргізу барысында 2010-2012 жылдары перинаталдық өлім-жітім 2,3-тен 2,0/1000 дейін (P<0,00001) төмендеуі байқалады [15]. Сондай-ақ 7 зерттеудің мета-талдауы табысы төмен және орташа елдерде жүргізілген перинаталдық аудиттер бойынша перинаталдық өлім-жітімнің төмендеуі орта есеппен 30% - ға (95% сенімділік аралығы, 21-ден 38% - ға дейін) келгенін көрсетті [42]. Уганда елінде перинаталдық өлім-жітім 2007 жылы 1000 босануға шаққанда 52,8, ал аудит енгізілгеннен кейін 2008 жылы 1000 босануға шаққанда 47,9 өлімді құрады [37].

Қорытынды. Зерттеуге сәйкес, оңтайлы емес көмекті анықтау, субстандартты факторларды және сараптамалық бағалау сияқты құпия аудиттің негізгі құралдары әртүрлі елдерде тиімді қолданылады деген қорытынды жасауға болады. Мета-талдау және жүйелі шолу деректері бойынша дамыған елдерде де, дамушы елдерде де аудит жүргізу кезінде перинаталдық өлім-жітімнің төмендегенін көруге болады. Аудиттің тиімділігін дәлірек түсіну үшін перинаталдық өлім-жітімге шолулар жүргізуді жалғастыру керек.

Түйін сөздер: *перинаталдық аудит, перинаталдық өлім, құпия аудит, жаңа туған нәрестелер, неонаталды өлім.*

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Introduction

The confidential audit, with a similar methodology to the current audit, began in the early 20th century. The United Kingdom began a confidential audit of maternal mortality in 1928, and the study was extended to a national level in 1985. The most famous audit was conducted in this country in 1998, after which the country experienced a significant reduction in maternal mortality. The development of perinatal audit began after the introduction of maternal mortality audit.

In the Republic of Kazakhstan (RK), a confidential national audit of maternal mortality and an audit of critical cases in obstetric practice have been conducted since 2009. The perinatal audit in the RK started in 2016 on the initiative of the Ministry of Healthcare and Social Development of the RK and with the support of the United Nations Children's Fund (UNICEF). On 4 October 2016, the Ministry of Healthcare and Social Development of the RK approved the Order № 124-4 "Measures for organizing a confidential audit of maternal and perinatal mortality, critical cases in obstetric practice". In 2017, the perinatal audit began in 6 pilot institutions of the country with a large number of births - in cities such as Astana, Shymkent, Aktobe, Taraz, Karaganda and Pavlodar [2]. Since 2018, the audit has been gradually implemented in other regions. The first confidential perinatal audit in our country covered cases of ante-, intrapartum, and early neonatal mortality of newborns with a birth weight of 2500 grams and above, as well as 37 weeks and above gestational age. [4].

At present, the introduction of confidential audit of neonatal mortality is being carried out separately from perinatal audit, covering all regions of Kazakhstan. On 28 October 2020, the Order of the Minister of Healthcare of the Republic of Kazakhstan № RK DSM-164/2020 "On Approval of the Rules of Confidential Audit in Medical Organizations" was adopted [1]. The principles and approaches outlined in the manual «Making every baby count: audit and review of stillbirths and neonatal deaths» by the World Health Organization (WHO) (Geneva, Switzerland, 2016) are followed when conducting a confidential audit [30].

Other nations, such as the Republic of South Africa, have also conducted neonatal audits separately from perinatal mortality audits, as in our country. [31].

A significant reduction in child mortality, including neonatal mortality, is possible, but only if each country successfully makes active efforts to ensure coverage of activities under the WHO plans to reduce under-five and neonatal mortality [48]. In the Republic of Kazakhstan, there are still sufficient reserves to reduce neonatal mortality by improving the quality of newborn care [5].

This study **aimed** to evaluate the effectiveness of confidential audit of perinatal mortality by analyzing the use of different confidential audit tools in different countries.

Research Strategy.

This article conducted a content analysis of the use of confidential perinatal mortality audit tools and their effectiveness in various countries. Data were searched in medical databases such as Scopus, Web of Science, Cochrane Library, PubMed, and Embase. Reference lists of included articles were also searched. Various guidelines and manuals have been used to find the definition and standards of auditing. There were «Making every baby count: audit and review of stillbirths and neonatal deaths» (WHO, 2016) [30], «Neonatal and perinatal mortality: country, regional and global estimates» (WHO, 2006) [49] and «Standards for improving quality of maternal and newborn care in health facilities» (WHO, 2016) [44]. Information from the following reports has been used for statistical data such as «The first report on the results of perinatal audit in pilot institutions of the Republic of Kazakhstan» (UNICEF, 2018) [2], «Levels and trends in child mortality» (WHO, 2022, 2023) [29], and data from the Republican Centre for Electronic Health (2023) [3]. 50 relevant articles on the topic from 2000 to 2024 and manuals were selected, most of which (36) were articles from the last ten years. The number of eligible articles is determined by the lack of confidential audits worldwide, especially in low-income countries [33]. However, the largest proportion of neonatal mortality worldwide occurs in sub-Saharan Africa [29]. The search strategy included searching for different combinations of keywords: «perinatal audit», «confidential audit of perinatal mortality», «perinatal mortality», «substandard factors of perinatal death», «clinical audit».

Results of the study

A confidential audit of perinatal deaths is an anonymous, systematic, and multidisciplinary study that identifies causes of death and its preventable factors [2]. It is the process of assessing factors leading to perinatal losses and identifying reserves to reduce mortality in the perinatal period, which includes fetal or neonatal deaths between the 22nd week of gestation and 7 days after birth (early neonatal period). [49].

Perinatal mortality audits and reviews are conducted to identify factors contributing to suboptimal care, identify weaknesses in health services, and make recommendations to improve the quality of neonatal care.

These reviews can be conducted in a variety of ways at local, national, and international levels, involving clinicians, experts, and more recently, bereaved parents.

Key tools for conducting perinatal audits

The main methods of confidential audit are verbal and social autopsy, analysis and expert assessment of history and clinical cases, identification of substandard/suboptimal care, identification of preventable mortality factors, and combinations of these methods. Verbal and social autopsies can be conducted with families who have lost a child or with health professionals involved in the care of a deceased child. In addition, there are various categorizations and classifications of levels of care, a nosology of death, and others. For example, the International Classification of Diseases (ICD-10), Wigglesworth or Nordic Baltic ('when'), ReCoDe ('what') and Tulip ('why'), and others [20]. An important confidential audit tool widely used in different countries is the identification of preventable mortality factors and substandard care factors. According to the Groningen Classification, substandard or preventable mortality factors have been categorized as: equipment and supplies, medicines, additional examinations, transport, documentation, communication, medical practice, other and unclassified [45]. When conducting an audit, national experts select the most appropriate confidential audit methods for their country. In developed countries, peer review is most commonly used in consilience meetings where a large number of doctors and health professionals are present. In Kazakhstan, peer review is conducted by independent experts through online confidential audit sessions involving neonatologists, heads of departments, and residents from all regions of Kazakhstan.

In many countries, external audits are most often used. External audits are carried out by independent experts from other healthcare institutions to provide an objective assessment of performance. In the Northern Region of the Netherlands, an internal method of auditing perinatal mortality based on the organizations where the deaths occurred has been used effectively. An internal audit of perinatal mortality was conducted in 15 perinatal centres in the Northern Region of the Netherlands. The audit was carried out at the hospitals where the deaths had occurred [46].

Preventable mortality factors identified during the confidential audit of perinatal death

In the Netherlands audit mentioned above, a total of 677 professionals involved in the management of 112 perinatal deaths were present at various meetings: obstetricians, neonatologists, nurses, midwives, hospital management, and others. 163 substandard mortality factors were identified. The study found that 31% of neonatal care did not follow protocols (guidelines), 23% did not follow standard practice, 28% had documentation errors and 13% had inadequate communication between people involved in care. In order to identify substandard factors, this study used a questionnaire with 6 'what' questions. For example: "What happened?", "What should be done to prevent substandard factors further?" and others [46].

While the Netherlands initially had a nationwide perinatal mortality audit that included both preterm and full-term infants, the Netherlands has recently conducted audits on specific issues. For example, a mortality audit of late preterm newborns was conducted in the Netherlands in 2017-2019 [7]. In recent years, an audit has been undertaken to identify suboptimal factors in the care of refugee mothers and their newborns, which is relevant to the current policy situation [47], [18]. An audit of refugees identified 29 suboptimal care related to help-seeking, availability of services, or quality of care [47]. In the audit of late preterm newborns, 52 factors contributing to improved care were identified. The most important factors in this audit were inappropriate organization of neonatal care, ambiguities in the distribution of responsibilities and procedures in the work, poor communication between health professionals, and inadequate fetal monitoring with cardiotocography (CTG) [7]. Inadequate CTG has been found in many other studies. For example, in a perinatal audit of term newborns, also conducted in the Netherlands [28]. In the Tanzanian audit, inadequate fetal heart rate monitoring was found in 40% of the deaths investigated [25]. In Belgium, a perinatal audit was conducted in 2012 aimed at one factor: the analysis of cases of intrauterine asphyxia [13]. In Addis Ababa, Ethiopia, a prospective audit of stillbirths and early neonatal deaths has been conducted, and quality improvement programs are being implemented, based on audit [11].

In our country, a current audit is also being conducted on a specific issue, namely the neonatal audit of premature infants below 37 weeks. Because 70% of mortality accounts for the share of premature deaths, despite the fact that in the general population of newborns, premature infants (with a body weight of less than 2500 grams) represent only about 5% (2023, Republican Centre for Electronic Health) [3].

In a systematic review of audits in low-income countries, a total of 31 preventable factors related to newborn care were identified in 36 selected articles. The preventable factors were categorized as follows:

1) Factors related to the provided care and errors of health care workers;

2) Administrative factors related to hospital management: financial, human resources, lack of drugs, etc.;

3) Patient-focused factors. From this review, the authors concluded that understanding and categorizing preventable factors in neonatal care is an effective strategy that can be acted upon quite effectively [40].

This method of classifying preventable factors was also used in a systematic review by *Merali H.S. et al.* [33]. The Republic of Kazakhstan also uses a similar categorization of mortality factors.

Another systematic review was conducted by selecting 44 studies and 6,205 maternal mortality audits to analyze and organize knowledge about preventable factors for maternal and perinatal deaths that have been identified through audits in low- and lower-middle-income countries, such as India, Pakistan, Nigeria, and others. Preventable factors were categorized into 4 groups:

1) Health worker-oriented (related to low-quality work of health workers) accounted for the majority - 66.7%;

2) Patient-oriented - 14.3%.

3) Administrative factors - 11.9%;

4) The least (7.1%) were attributed to transport of the woman in labor.

The study identified factors such as suboptimal performance of health workers, inadequate neonatal resuscitation, errors in diagnosis and treatment of neonatal infection, cultural views on treatment methods, unsanitary environment, lack of medicines, and inadequate medical equipment in hospitals [33]. In an audit conducted in rural India, the major causes of neonatal mortality were infections, congenital malformations, complications of prematurity, intrauterine complications, and unknown [34]. A study in Nepal found an association between perinatal mortality and maternal socio-economic and housing conditions. Women living in rural and mountainous areas, young mothers aged 15-18 years or 19-24 years, women who were uneducated, had more than 4 children less than 2 years apart, and had poor sanitary living conditions had higher perinatal mortality (95% CI) [17].

Sub-Saharan Africa has the highest neonatal mortality rate at 27 deaths per 1,000 live births (WHO) [19],[29]. Therefore, the introduction and implementation of perinatal audits in Africa are increasing, the most commonly used audit tool is the identification of preventable mortality factors.

The audit in Ghana identified 38 factors that contributed to early neonatal mortality a total of 254 times: 17 factors related to health care workers were observed 141 times (55.5%); 4 factors related to transport and communication occurred 43 times (16.9%), 7 factors related to the health facility occurred 31 times (12.2%) [50].

A perinatal audit in Lesotho, Africa, found that a significant number of perinatal deaths were due to avoidable factors, namely delay in seeking medical attention, inadequate response to antenatal haemorrhage and inadequate response to weak fetal movements. Also notable were factors related to medical staff, such as inappropriate use of the partograph, insufficient number of records, and other problems with medical staff. Lack of beds and ventilators in the intensive care unit and lack of resuscitation equipment were the most common administrative problems [38].

A perinatal audit in Ethiopia identified a low number of antenatal care visits, small for gestational age, low birth weight, low maternal hemoglobin level, and pregnancy-induced hypertension as independent factors that increased the risk of perinatal mortality [14].

Another perinatal audit conducted in Tanzania identified maternal factors that were likely to contribute to perinatal mortality: inadequate/late antenatal care visits and home deliveries. In 12% of cases, there was inadequate monitoring of labor, and as many as 62% had documentation errors, which the researchers believe may also have contributed to perinatal mortality [32]. This audit shows that there is a high probability of preventing intrauterine stillbirths and early neonatal deaths. Women should be encouraged to receive appropriate antenatal care, use health facilities during labor and improve maternal and neonatal care in health facilities. The importance of identifying preventable factors in perinatal mortality is aimed at developing further interventions to reduce or eliminate these factors. For example, previous studies that identified preventable factors such as lack of communication and communication between workers involved in maternal and perinatal deaths, this factor has been more or less eliminated in South Africa [27].

The method of categorization by level of care

Categorization by the level of care is also an effective method, but should be refined to be more specific about the problem [11]. A perinatal audit in Rwanda found that 37% of deaths in Rwanda were associated with problems of suboptimal care, i.e. inadequate volume or quality of care provided: inadequate diagnosis, inappropriate emergency management, and others [35]. In Uganda, more than half of the cases (53%) were found to have optimal care, while the remaining cases had varying levels of acceptability. The highest proportion of suboptimal care (11.8%) was in early neonatal mortality [36].

In India, in Karnataka state, an expert panel was formed as part of the ongoing perinatal audit system to identify mortality-related factors. This audit used a method of categorizing mortality: whether perinatal deaths were preventable, possibly preventable, or not preventable. Overall, the researchers concluded that the expert panels were quite effective in identifying substandard mortality factors and the level of quality of care provided, i.e., how preventable the death was [22].

In disadvantaged areas of France, experts identified suboptimal factors in 73.2% of perinatal deaths, and 33.9% of cases were considered probably preventable [43].

Measuring levels and causes of neonatal and fetal mortality is essential for understanding priority areas for intervention and monitoring interventions at global, national, regional and local levels [9], [44].

A systematic review (Pattinson et al.) found that the value of recording suboptimal care in reducing perinatal mortality is unknown. [41]. Further research is needed to explore the benefits of the level of care categorization method.

Effectiveness of confidential audit of perinatal mortality implementation

Significant international efforts are underway to reduce perinatal deaths and adverse events, including initiatives such as the WHO's Every Newborn Action Plan (ENAP) and Every Child Counts in the United Kingdom.

Maternal and perinatal mortality audits are widely recommended as a measure to reduce maternal and perinatal mortality as well as to improve the quality of care and may be a key to achieving the UN Sustainable Development Goals (WHO, 2013,2016).

A large confidential audit was conducted in the Netherlands, involving 645 analyses of neonatal death histories and sessions with 33 health professionals. During the audit, perinatal mortality decreased from 2.3 to 2.0/1000 births between 2010 and 2012 ($p<0.00001$) [15]. A meta-analysis of 7 studies also found that perinatal audits in low- and middle-income countries reduced perinatal mortality by an average of 30% (95% confidence interval, 21 to 38%) [42]. In Uganda, the perinatal mortality rate was 47.9 deaths per 1000 births in 2008 after the introduction of audits, compared with 52.8 per 1000 births in 2007 [37]. These studies demonstrate the effectiveness and role of confidential audits in reducing perinatal mortality in both developing and developed countries.

Based on the results of the above systematic review of randomized controlled trials (Pattinson et al.), more research is needed on the effectiveness of perinatal audits. However, the evidence clearly shows more benefits than harms. Maternal and perinatal mortality reviews should continue to be conducted to better understand the effectiveness of audits [41]. Confidential audits of perinatal mortality are important to identify factors contributing to mortality and develop recommendations to eliminate them [24].

Preventing avoidable deaths involves implementing and improving care strategies, increasing coverage of interventions, and covering the period before pregnancy, antenatal, intrapartum, and immediate postnatal periods, as well as neonatal and child health care. It is estimated that quality family and pregnancy planning can lead to a reduction in child mortality by 47 percent and stillbirths by 64 percent. Expanding intervention coverage of antenatal, prenatal, intrapartum, and postpartum interventions can prevent 71% of neonatal deaths by 2025 (1.9 million (range 1.6-2.1 million)), 33% of stillbirths (0.82 million (0.60-0.93 million)) and 51% of maternal deaths (0.16 million (0.14-0.17 million)) per year [6].

To achieve the goal of reducing perinatal mortality, it is essential that the audit cycle should end with the monitoring and subsequent reassessment of recommended changes; and the development, implementation, and monitoring of action plans to improve the quality of care [16], [21]. For example, as a result of the perinatal audit, the State of Louisiana implemented 9 public health programs based on the audit. In the Netherlands, a total of 603 recommendations were developed, most of which were implemented (75%) [21]. Perinatal audit researchers in the Western Cape Province of South Africa suggest four strategies for implementing and scaling up the program and recommend that, for more effective results, training of health workers should be conducted in parallel with perinatal audits. Also, national audit programs should be continuously expanded and developed, and functional structures should be established to oversee the implementation and enforcement of the recommendations [27].

Involvement of parents in perinatal mortality audits

The involvement of parents of deceased newborns in the process of analyzing perinatal mortality is important, and it is being gradually designed and developed in recent years [23].

In a systematic review of tools and programs for the analysis of perinatal mortality in middle- and high-income countries worldwide, parental involvement was one of the tools used in 4 audit programs out of 10 selected. The involvement of parents in the research process should be given due consideration by key stakeholders [39]. According to this review, parental involvement in perinatal audits improves the perinatal mortality audit system, so parental involvement is valuable and beneficial to both parents and auditors [8],[10].

In Australia and New Zealand, IMPROVE e-learning was launched in December 2019 to train health professionals who support families experiencing perinatal loss. The aims were to improve the delivery of respectful and supportive clinical care and to enhance the practice of perinatal death investigations [12].

In Ireland, the Parents 2 program was introduced, where parents who had experienced the death of a child were invited to a meeting with clinicians and advocates, where the parents' views and feedback were sought to understand the process fully. The researchers suggest that for the parents this helped with bereavement to some extent, as it was an opportunity to be heard and to get answers and plan for future pregnancies based on past mistakes. For the hospital, it is another way of obtaining relevant factual information. 55% of parents had no complaints or concerns about their child's care. Further research is needed to determine the benefits to parents and the hospital of parental participation in the audit [8],[10].

Discussion

Confidential audit of perinatal mortality is conducted to achieve better health care for patients, families, and the community at large, to educate doctors and health care providers, to introduce better practices/procedures and improve existing ones, to monitor and improve the use of health care resources, to identify reserves to reduce perinatal mortality and preventable factors of mortality. Confidential audit is a modern form of quality management in neonatology throughout the country. Confidential audit includes different tools and approaches in different countries.

Expert assessment in perinatal audit effectively identifies preventable mortality factors related to medical staff, transport and communication factors, family and maternal factors, and health facility administrative factors that contribute to perinatal death. Online or offline discussion of the peer review with specialists: neonatologists, obstetricians, midwives and managers, is valuable in educating health care providers and preventing recurrence of errors and preventable factors in the future. Effective implementation of audit-based recommendations and identified reserves to reduce perinatal mortality are essential to prevent likely preventable neonatal deaths.

A decrease in the percentage of suboptimal care where a case was probably/most likely preventable and an increase in the number of suboptimal care where a case was most likely not preventable should indicate an improvement in the quality of care provided.

The use of verbal autopsies (questionnaires) of health workers should be useful in identifying gaps and deficiencies in providing of drugs and medical equipment to perinatal centres, as well as shortages of specialists and health workers. These, in turn, may be factors that have contributed to neonatal deaths. Parental involvement in the audit process has recently been introduced in developed European countries. Research suggests that this tool has benefits for both parents and health professionals. In some countries, psychologists and lawyers are also involved in the process. It is an opportunity for parents to be heard and to be properly informed about the death of their child. It is also an opportunity to get answers to questions that have been bothering them. Educating parents about family or birth factors should help prevent their recurrence when planning future pregnancies. For example, late seeking medical care, not taking antenatal corticosteroid prophylaxis for neonatal respiratory distress syndrome, and others. For healthcare providers, involving parents in the audit helps to

get feedback and understand how satisfied the parents were with the care given to their child and medical advice.

To carry out and complete the perinatal audit effectively, it is important to develop strategies and recommendations based on the findings, put the recommendations into practice, and monitor the implementation of these recommendations.

It is important to acknowledge that there is not enough literature and research on the confidential audit of perinatal and neonatal mortality in extensive medical databases, which hinders the ability to conduct a more comprehensive analysis.

Conclusions

Based on the review, it can be concluded that the basic tools of confidential audit, such as the identification of suboptimal care, preventable risk factors and causes of perinatal mortality, are being used quite effectively in different countries. According to the meta-analysis and the systematic review, a decrease in perinatal mortality can be seen during the audit in both developed and developing countries. However, the role of identifying suboptimal care in reducing perinatal mortality is unclear and requires further research. Perinatal mortality audits are widely recommended as an intervention to reduce perinatal mortality. Studies have also shown that the benefits of conducting audits outweigh the losses. Maternal and perinatal mortality audits should continue to be conducted to understand the effectiveness of audits better.

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