

MATERNAL AND PERINATAL COMPLICATIONS ACCORDING TO MATERNAL AGE : A SYSTEMATIC REVIEW

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Abstract

Background: Maternal age of 40 years or more is associated with medical complications and more operative deliveries. Furthermore, very advanced maternal age is significantly associated with adverse perinatal outcome

The aim: This study aims to show incidence, complications of advanced maternal age for maternal and perinatal

Methods: By comparing itself to the standards set by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. So, the experts were able to make sure that the study was as up-to-date as it was possible to be. For this search approach, publications that came out between 2013 and 2023 were taken into account. Several different online reference sources, like Pubmed and SagePub, were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.

Result: In the PubMed database, the results of our search brought up 667 articles, whereas the results of our search on SagePub brought up 252 articles. The results of the search conducted for the last year of 2013 yielded a total 21 articles for PubMed and 7 articles for GoogleScholar. In the end, we compiled a total of 5 papers, 4 of which came from PubMed and 1 of which came from SagePub. We included five research that met the criteria.

Conclusion: Understanding the incidence, complications of advanced maternal age for maternal and perinatal

Keyword: Advanced maternal age, maternal mortality, ART, pregnancy

INTRODUCTION

The mean age of women giving birth to their first child has increased, from 24.3 in 1970 to 31.2 years in 2017. Women who gave birth after the age of 30 years used to be of high parity and low socio-economic status; this trend has conversely changed to low parity and high socio-economic status. The availability of safe, effective, and reversible contraception, has allowed women to decide if, and when, they will have children. Assisted reproductive technologies (ART), such as in vitro fertilization, intracytoplasmic sperm injection, and oocyte donation, make the possibilities for older women more successful and therefore more common. Pregnancy in perimenopause is therefore not only possible, it is also more common.¹

The worldwide increase in the use of obstetric interventions since the 1970s is a present cause of concern as interventions may not only reduce morbidity and mortality but also impose risks of adverse events or further interventions.²

Advanced maternal age continues to be associated with a range of adverse pregnancy outcomes including low birth weight, pre-term birth, stillbirth and unexplained fetal death and increased rates of Caesarean section. However, whilst the volume of literature in this area is impressive, with the majority of studies suggesting an increased risk of adverse pregnancy outcome in advanced age women, some studies have yielded inconsistent conclusions about both the specific outcomes adversely affected by maternal age and the strength of the association. In addition, there is limited consensus among studies as to the precise maternal age when the increase in the risk of adverse pregnancy outcome becomes clinically important.³

From obstetric and perinatal perspectives, it should be considered that advanced maternal age (AMA): >35 years at time of giving birth, very advanced maternal age: >45 years at time of giving birth, and extremely advanced maternal age: >50 years at time of giving birth, are associated with a variety of adverse maternal and perinatal outcomes. Examples of such outcomes are pregnancy-induced hypertension, preeclampsia, gestational diabetes, maternal mortality, stillbirth, preterm birth, and low birthweight. Other factors that may influence these outcomes negatively, such as multiple pregnancies and parity, that is "the maternal profile", are often not considered.⁴

Advanced maternal age, traditionally referred to pregnant women aged 35 years or older at the time of delivery, is associated with an increased risk of maternal and perinatal complications among singleton and multiple gestations. The risk seems even higher in women aged 40 years or older, but the literature is inconsistent and limited to retrospective data.³

A number of studies have demonstrated that pregnancy among women of advanced age is associated with increased risk of pregnancy complications and adverse perinatal outcomes, such as gestational diabetes mellitus, preeclampsia, placenta previa, cesarean section, preterm birth, low birthweight, maternal mortality, and perinatal mortality. However, most studies have focused on adverse outcomes among women aged ≥ 35 , or ≥ 40 , and the few which have studied birth outcomes of pregnancies of older women (i.e., over 45 years of age) suffer from limitations.⁵

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

Criteria for Eligibility

For the purpose of this literature review, we compare and contrast the incidence, complications of advanced maternal age for maternal and perinatal. This is done to provide an explanation and improve the handling of complications of maternal and perinatal. As the main purpose of this paper, to show the relevance of the difficulties that have been identified as a whole.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2013, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

Search Strategy

We used "abdominal penetrating trauma"; "abdominal trauma" as keywords. The search for studies to be included in the systematic review was carried out using the PubMed and SagePub databases by inputting the words: (*"maternal and perinatal complications"[MeSH Subheading] OR "maternal perinatal complications"[All Fields] OR "maternal age"[All Fields]*) AND (*"maternal age"[All Fields] OR "maternal and perinatal complications"[All Fields]*) AND (*"maternal age"[MeSH Terms] OR "maternal age"[All Fields] OR "maternal and perinatal complications"[All Fields]*) AND (*"maternal adverse"[All Fields] OR "maternal age"[All Fields] OR "maternal perinatal complications"[All Fields]*)

OR ("incidence maternal perinatal complications"[All Fields]) AND "complications of maternal and perinatal"[All Fields]) AND ("incidence"[All Fields]) AND (clinicaltrial[Filter])) used in searching the literature.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and can't have been seen anywhere else.

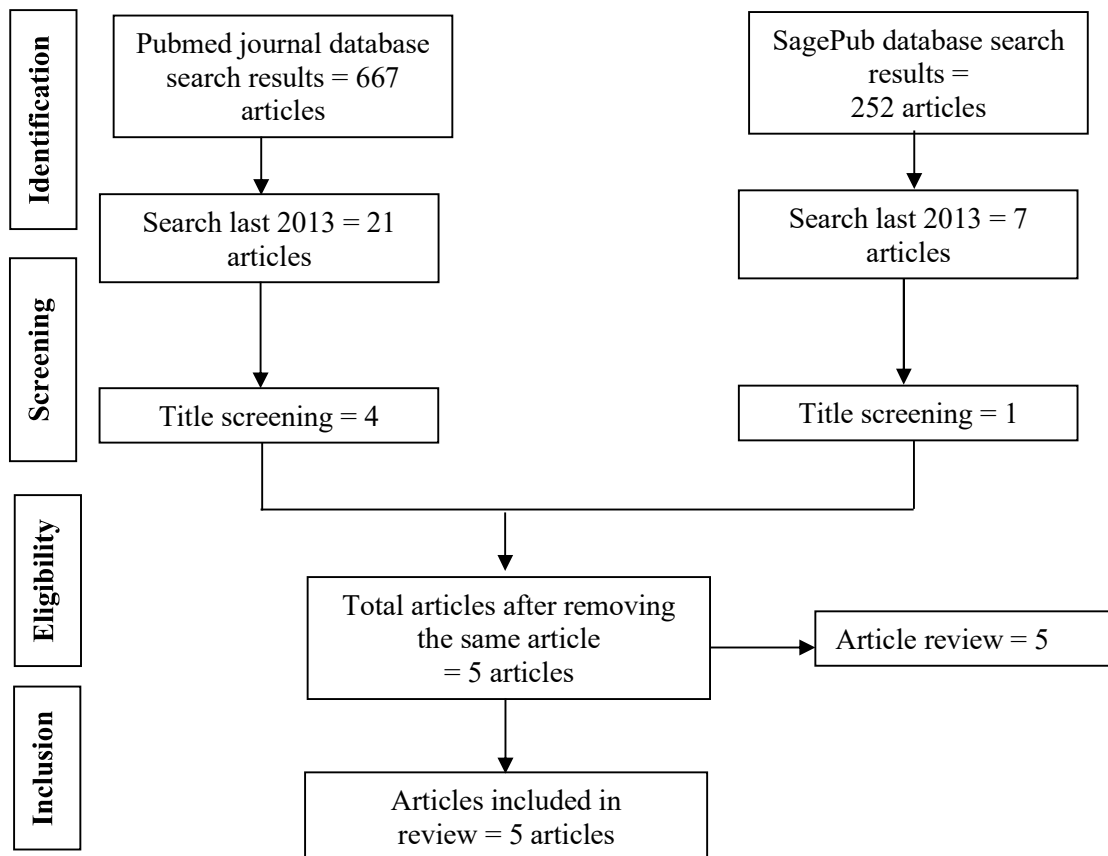


Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. In order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

In the PubMed database, the results of our search brought up 667 articles, whereas the results of our search on SagePub brought up 252 articles. The results of the search conducted for the last year of 2013 yielded a total 21 articles for PubMed and 7 articles for SagePub. In the end, we compiled a total of 5 papers, 4 of which came from PubMed and 1 of which came from SagePub. We included five research that met the criteria.

Rademaker, et al¹ (2021) showed the association between advanced maternal age (40 years old) and adverse maternal and perinatal pregnancy outcomes. Complications such as maternal mortality increased for women >50 years old and perinatal

Table 1. The literature include in this study

Author	Origin	Method	Sample	Result
Rademaker et al, 2021¹	Netherlands	Retrospective cohort study	700.326 patients	Of all samples, maternal mortality was rare in all groups, but significantly higher in multigravid women over 50 years old. Perinatal mortality was significantly higher in all pregnancies of women over 40 years old, but not for primigravida over 50 years old. The most notable results with the steepest increase were in maternal complications. Both primigravida and multigravida over 40 years old were at a two times higher risk of perinatal mortality, cesarean section, gestational diabetes, hypertensive disorders, and a low Apgar score after 5 minutes.
Frederiksen et al, 2018⁶	Denmark	Prospective cohort study	369.516 patients	Among the pregnant women aged 40 years or older, 10.82% experienced one or more of the selected adverse pregnancy outcomes compared with 5.46% of pregnant women aged 20-34 years. When pregnant women 40 years or older were compared with women aged 20-34 years, they had a higher risk of chromosomal abnormalities, miscarriage, and birth before 34 weeks of gestation, but no increased risk of congenital malformations and stillbirth.
Ogawa et al, 2017⁷	Japan	Cross sectional study	365.417 patients	Compared with women aged 30–34 years, women aged 45 or older had higher risk of emergency cesarean delivery, preeclampsia, severe preeclampsia, placenta previa, and preterm birth. The effect of older age on risk of emergency cesarean section, preeclampsia, and preterm birth were significantly greater among those who conceived naturally compared to those who conceived by ART.
Marozio et al, 2019⁸	Italy	Cross sectional study	56.211 patients	Maternal age was an independent risk factor for gestational diabetes and early-onset preeclampsia. The risk for placenta praevia was higher in the women aged 40-44 years. Neonatal outcomes were similar among groups, except for the rate of birth weight less than 2500 g, which was higher in women aged 40-44 years.
Baser et al, 2013⁹	Turkey	Retrospective cohort study	11.587 patients	Mean maternal age in the study and control groups was 43±2.2 and 24±2.8 years, respectively. In women ≥40 years old, all of the investigated obstetric and neonatal complications except postpartum haemorrhage and foetal malformations were higher when compared to younger controls. In the nulliparous ≥40 year old group, the most significant complications were preterm delivery (45.3%), low 5-minute Apgar score (15.2%), and neonatal intensive care unit admission (15.2%).

mortality is occur in women over 40 years old. To reduce the risks there is a need for effective strategies with a clear protocol on how to take care of pregnant women in these age groups, taking into account their obstetric history. Awareness of the risks with pregnant women and their caregivers, and caution in situations where normally you might bide some time, should be on caregivers’ minds at all times.

Frederiksen, et al⁶ (2018) showed women who are older than 40 years have higher risk of chromosomal abnormalities, miscarriage and birth before 34 weeks of gestation than women with younger age. No increased risk was observed for stillbirth and other congenital malformations. Several factors increase the risk of adverse pregnancy outcomes, but advanced maternal age drives a high proportion of the total risk score.

Ogawa, et al⁷ (2017) showed women with advanced age especially mother with age more than 45 years have an elevated risk of dverse outcomes such as cesarean section, preeclampsia, placenta previa, preterm birth, and low birthweight.

However, the magnitude of association between age and adverse outcomes differed by parity and conception method. Such findings should be taken into account when conducting antenatal counseling in clinical settings for women with very advanced women.

Marozio, et al⁸ (2019) showed maternal age over 40 years old is the independent risk factor for adverse pregnancy outcomes, particularly for the mother. Pregnancies in women over 40 years should be considered at risk and carefully monitored with individualized care protocols.

Baser, et al⁹ (2013) showed that advanced maternal age increasing the risk of perinatal complications and adverse pregnancy outcomes when compared to younger women. These risks of advanced age begin to increase after the age of 35 years, and significantly accelerate after the age of 40. In this study also found that preeclampsia, gestational diabetes mellitus, placenta previa, foetal demise, abruptio placentae, preterm delivery, and IUGR were higher in the women aged ≥ 40 years, when compared to controls.

DISCUSSION

We showed pregnant women aged 45 years and older had a 1.5–2 fold greater risk of experiencing maternal morbidities compared to younger women (age 30–34), including risk of cesarean section, preeclampsia, severe preeclampsia, and placenta previa. The risk of neonatal outcomes such as preterm birth, low birthweight, SGA and low pH of umbilical cord artery were relatively smaller (3–20%) or even null. Furthermore, we found that the effect of advanced age differed by conception method and parity. The effect of age on increased pregnancy/birth outcome risks were generally smaller among women who conceived with ART than those without ART. Regarding parity, the effect of age on the risk of cesarean section and emergency cesarean section were significantly greater among primiparous women, while its effect on preeclampsia risk was significantly greater among multiparous women.

The rates of abortion, stillbirth, preterm delivery, low birth weight, and fetal growth restriction were significantly increased in very advanced maternal age group. Although some previous studies did not demonstrate the correlation between maternal age and abortion. The risk of stillbirth might be related to higher incidence of medical complications, which were associated with increased age. Many studies did not show statistical significance in the rate of low birth weight, but the present study showed a significant increase in the group of very advanced maternal age, probably reflecting higher rate of preterm birth and fetal growth restriction.

Within the present study group, age-related increase of pregnancy induced hypertension and gestational diabetes mellitus were noted, as reported in previous studies. Because of the vascular impairment, more commonly seen in mothers with advanced age, the study group mothers are susceptible to develop pregnancy-induced hypertension (PIH). Additionally, the prevalence of diabetes as well as obesity, which is associated with PIH, is higher among elderly mothers. Risk of GDM was also observed in the present study group. This may be due to an independent effect of age on the risk of GDM as demonstrated in the FASTER cohort.¹⁰

These adverse outcomes may be explained by the mal-adaptation to physiologic change during pregnancy, directly associated with advanced maternal age. Another reason that could explain why pregnancy at increased age has a higher risk is that these women tend to have pre-existing illnesses such as chronic hypertension, diabetes mellitus, or some subtle underlying vascular diseases.¹⁰

Because delayed child bearing is becoming a common event, the scope of maternal and fetal complications is important for decision management. As shown in the present study, as maternal age increases, the risk of adverse pregnancy outcome is accordingly elevated. This information should be given to women who plan late pregnancy. The elderly women should seek early antenatal care and be taken care by the appropriate multidisciplinary team to minimize the risk for mother and her infant.¹⁰

The effect of parity on rates of pregnancy outcomes in AMA is an important avenue to explore further. Existing literature is limited and therefore the small number of studies included in these analysis means that limited conclusions can be drawn. However, we did not see a consistent relationship between parity and adverse perinatal outcome. Thus, the findings of increased perinatal mortality in AMA mothers cannot be restricted to nulliparous or multiparous women.

The possibility that AMA is linked to stillbirth by another confounding factor must be considered. One such variable is advanced paternal age, which has received considerably less attention, but is commonly coupled with AMA. A study by Alio et al. found a 24% increase in rate of stillbirth with paternal age between 40 and 45 years old, and a 50% increase with paternal age ≥ 45 years, independent of maternal age. Further studies are needed which incorporate paternal age as a co-variate to determine its contribution to the increased risk of stillbirth in AMA mothers.¹¹

Although placental dysfunction has a key role in the aetiology of stillbirth, preeclampsia and FGR, it is complicated and incompletely understood. Furthermore, comparatively little is known about the relationship between AMA and placental function. Our recent studies of AMA pregnancies identified signs of accelerated placental ageing, altered nutrient transport and vascular function compared to a control group. Similar features were also detected in a mouse model of AMA, which

has a high rate of FGR and late fetal death. This observation agrees with the most commonly suggested explanation of adverse outcome in AMA pregnancy which relates to maternal vascular dysfunction, supported by evidence in a rat model of AMA.¹¹

The relationship between oocyte age and pregnancy outcome is difficult to investigate, as oocyte donation (with younger eggs) is an independent factor for adverse outcome.¹² However, animal models have found relationships between oocyte ageing and early placental development which may lead to altered placental function. Both theories provide a plausible link between AMA and adverse outcomes mediated by abnormal placental development, structure and function. The strong association between AMA and GDM is likely to be independent of placental function and therefore have an independent aetiology which should also be investigated further but may be related to increased BMI or use of assisted reproductive therapies in AMA pregnancies.¹³

CONCLUSION

Maternal age of 40 years or more is associated with medical complications and more operative deliveries. Furthermore, very advanced maternal age is significantly associated with adverse perinatal outcome

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