

Review article

Pregnancy after 35

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Abstract:

Advanced maternal age is associated with certain pregnancy-related risks. Being “at risk” causes anxiety and concern, which older pregnant women try to ease by being as well-informed as possible. This may be overwhelming to some women due to the large amount of information available. It is important for healthcare providers to be aware of the different feelings and experiences of older pregnant women in order to meet their individual needs within the maternity services.

Keywords: maternal age; risk; advanced maternal age

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Introduction

During last three decade, pregnancy in later in life is a common phenomenon in developed countries, such as Finland and Sweden¹. For example, in Finland in 1997, 8.3% of primigravida women were over 35 years old. By 2007, this had increased to 10.4%². The situation is same with Sweden, where, in 2007, 10% of primigravidas were 35 years of age or older . In 2007, 19.2% of all women giving birth in Finland were over 35 years old, whereas the figure in 1997 was 16.7%².

The risks related to pregnancy in those over 35 years old, especially primiparity, can be understood from two perspectives: first, the actual medical risks, and second, the acceptability of the risks as defined through social discourse among different groups within society³. Medical risks are related to an ageing reproductive system and an ageing body, whereas social discourse prescribes the way in which older pregnant women are regarded as mothers, and when it is “considered” that women “should have” children³. It has been said that pregnant women and healthcare providers understand the risks differently: pregnant women evaluate the risks subjectively, through their own experiences, whereas healthcare providers assess the risks in an apparently more objective way.

Advanced maternal age (AMA) is seen by patients and healthcare professionals, to be correlated with poorer outcomes to pregnancies because of the higher incidence of chronic medical conditions among older women. Pre-existing and pregnancy-related morbidity, combined with high maternal expectations, does put these women in greater need of intervention during pregnancy and birth⁴. Despite the perceptions of increased risks related to advanced maternal age, it has been suggested that the risks are manageable and positive outcomes can be expected⁵. In recent years, several reviews concerning pregnant women aged 35 years or older have been conducted, which have focused on: the risks associated with Advanced maternal age ; the relationship between advanced maternal age and pregnancy outcomes^{5,6} ; the evidence of risks faced by women of advanced maternal age⁷; and the association between maternal age and still-birth⁸. Fewer studies have focused on women’s own experiences of later childbearing and age-related pregnancy risks. As women reach their thirties, they experience a decline in fertility. Furthermore, complications during pregnancy are more common when women reach age 35. Age-related decline in fertility may be due, in part, to the following:

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- A decrease in the number and health of the eggs to be ovulated.
- Changes in the hormones resulting in altered ovulation.
- Fewer number of eggs.
- A decrease in sperm counts.
- A decrease in the frequency of intercourse.
- The presence of other medical and gynecologic conditions, such as endometriosis, which may interfere with conception.

The purpose of the present review article is to provide an overview of how previous research has described pregnant women aged over 35, and what the pregnancy risks related to advanced maternal age are.

Data and methods

Research articles for this review were retrieved from searches of the Cinahl, PubMed, Medic and Cochrane Library databases. Keywords used in the search were “Maternal age 35 and over” and “advanced maternal age”. The assistance of an information specialist librarian was used to confirm the adequacy of keywords used in the search terms. We searched for original research articles reporting studies conducted using qualitative or quantitative methods, and which had been published in English. Other review articles were omitted from the present review. Studies focusing on both primi- and multiparous women were included.

Searching Cinahl with the keywords “maternal age 35 and over” returned 66 references; searching PubMed with “maternal age over 35” returned 209, and with “advanced maternal age” 375 references. Searching the Medic and Cochrane Library databases provided no relevant references. Following retrieval, the first phase of the review process involved reading through the titles of all 607 references, in order to delete references from the selection, based on the exclusion criteria listed below. In the second phase, abstracts of all the remaining, non-excluded references were read through.

The exclusion criteria were:

- 1) the topic was irrelevant to the objective of this study;
- 2) there was no abstract available;
- 3) the study was focused on only a particular medical problem related to pregnancy in older women, for example genetic screening, amniocentesis, trisomies, foetal abnormalities, different medical conditions, or developmental disorder with the foetus;
- 4) the study referred to postpartum and maternity issues; and
- 5) the full research article was unobtainable with reasonable effort.

In the third phase, when the final selection of articles had been made, all available full-text versions of the selected articles were read through.

Qualitative studies were examined using content analysis. This inductive analysis revealed certain themes and subjects within the selected articles, which addressed the research questions, and which could finally be grouped together thematically. Quantitative studies, which were mainly focused on the medical risks associated with advanced maternal age, and which had been analyzed statistically, were analyzed in the present review by collating common subject areas, and grouping them together thematically with the articles from the papers describing qualitative studies.

Results

The knowledge ability of older pregnant women concerning pregnancy-related issues has not been the focus of many studies: we found only few research articles that described women’s knowledge of pregnancy risks related to delayed childbearing, and their knowledge base for making decisions about the timing of motherhood⁹. These studies revealed that women were well aware of the age related decline in fertility⁹ but they relied on the expectation of the assistance of reproductive technology being available if needed^{9, 10}. Some researchers found that women recognized there to be a higher likelihood of an older mother giving birth to a baby with Down’s syndrome^{10,11} and of there being a greater risk of miscarriage, and having high blood pressure¹¹. However, the probabilities of needing to deliver by Caesarean section^{10,11} having a premature or low-birth-weight baby, stillbirth¹¹ or of multiple births, were not as well identified^{10,11}. It has been suggested that neither women nor men fully recognize the link between increased maternal age and the developmental and health related risks of low birth weight or pre-term infants¹¹. Moreover, both men and women lack knowledge concerning conception, pregnancy complications, and infant outcomes as related to delayed childbearing¹¹. In general, both men and women should be much better informed about the complications and declining fertility associated with a first pregnancy at an advanced maternal age¹². Few studies discussed the timing of childbearing. Maheswhari *et al.* (2008) found that sub-fertile women thought 40 and 45 years more acceptable as an age at which to become a first-time mother, than pregnant women did. Another study revealed that, while most women were satisfied with their decisions of postponing childbearing, women of 35 years

of age and older would, in retrospect, have started having children earlier in life⁹. A stable relationship, education and developing a career before having a family, influenced women's decisions concerning the timing of childbearing⁹. Financial security and their partner's suitability to be a parent were also important factors^{9,11}. In addition, women described having a feeling of "a biological clock ticking away", which affected their decisions concerning the timing of motherhood⁹.

Issues related to a woman's preparation for pregnancy were described in few studies^{10,13,14,15}. These indicated that being well-prepared for pregnancy seemed to be a characteristic more typical of older pregnant women. Being considered "at risk" causes women anxiety, which they try to ease by preparing themselves for pregnancy and seeking information. Carolan (2007a) showed that women aged over 35 years approached pregnancy as a project which should be preceded by a stage of careful planning. These women described their main health concerns as the likelihood of foetal genetic problems or maternal complications during pregnancy e.g. gestational diabetes, postpartum depression, multiple births or miscarriage¹³.

Prior to conception older women also prepared themselves for pregnancy by losing weight, going on diets and taking exercise. Few women visited specialist doctors to discuss existing health issues, such as blood pressure. Choosing hospitals and birth-care options was another way in which women prepared for pregnancy, and being aware of the increased risks associated with their age, they especially valued the availability of emergency services at hospitals¹⁶. Having become pregnant, women adopted a different range of health promoting activities in response to their concerns and needs in relation to their pregnancy. These activities included following a healthy lifestyle and taking special care of their nutritional status¹⁵.

Carolan (2007a & b) found that career-oriented, educated women, preferred information written for a medical and midwifery audience, rather than popular reading material such as magazine articles. Carolan (2007b) also found that pregnant women over 35 years old sometimes felt they had too much information concerning age-related pregnancy risk and foetal disorders, which made them anxious and made it difficult for them to focus on positive outcomes. However, these women still wanted to be as fully-informed as possible^{3,15}.

In one study, Carolan (2007b) found that healthcare

providers gave a lot of medically-oriented information to pregnant women aged over 35, presuming that this was what these older, educated women needed and wanted. However, the recipients found such information to be more overwhelming than empowering, and midwives, and maternal and child health nurses found it quite challenging to provide the right level and type of advice to these women¹⁵. However, although these women felt themselves to be over-informed, which increased their concerns¹⁵, they still thought that information about the risks and benefits of delayed childbearing should be provided, and that the ideal time would have been at an age when they were in their early 20s¹⁰.

It has been shown that advanced maternal age increases pregnancy-related risks and the probability of obstetric complications. Few studies described the risks, complications and obstetric outcomes related to pregnancy in women aged over 35 years¹⁶.

Compared to younger women, the types of complications that women over 35 years are at increased risk of during pregnancy include gestational diabetes, placenta praevia¹⁷, pre-eclampsia¹⁷, miscarriage¹⁸ and pregnancy-induced hypertension as well as Caesarean sections¹⁷. Induction of labour¹⁶, augmentation with primiparae and assisted deliveries are also associated with women of advanced maternal age¹⁶. Perinatal mortality, perinatal and neonatal death, and intra-uterine foetal death also increase with increasing age. Older women are also more likely to have been diagnosed with conditions such as hypertensive disorders, diabetes mellitus and other chronic diseases, for which they are already taking medication¹⁶. These chronic medical conditions may further complicate their pregnancies.

However, some risks should be interpreted with caution¹⁹. Bell *et al.* (2001) found that age-related increased intervention rates were independent of maternal complications during pregnancy, complications during labour, a history of infertility, and other confounding factors. Age alone was not responsible for gestational hypertensive disorders, although chronic hypertension was found to be more common among women of advanced maternal age. Adverse outcome rates were in fact higher among older women, even when there were no complications in their pregnancies. Interestingly, the increased occurrence of pre-existing diagnoses or complications among older women was not related to the increased risk of an adverse perinatal outcome. Despite the fact that increased risk with increasing age has been clearly demonstrated, studies suggest

that, overall, pregnancy outcomes are favourable because perinatal death is such a rare event, even with advanced maternal age mothers¹⁷.

Being “at risk” is not always obvious to pregnant advanced maternal age women. Carolan and Nelson (2007) showed that advanced maternal age women who were in good health during pregnancy, were surprised to learn that they were in fact, classified in a high risk category due to their age. As already stated, knowing themselves to be in a high risk group can have a negative impact on older pregnant women, causing them additional concern and leading them to seek higher levels of health monitoring during pregnancy. Zasloff *et al.* (2007) found that women over 35 years were more worried about the baby compared with younger women. However, knowing themselves to be “at risk” does not necessarily prevent the natural positive feelings of pregnancy from being experienced, although older women do seem to need to be reassured more often that everything is well³. Pregnant women 35 years of age or older often wanted additional ultrasonic scans and genetic testing to be assured that nothing was wrong³. Robb *et al.* (2005) found no correlation between maternal age and emotional distress in primigravidas when comparing pregnant women aged 35 and over to those aged 20-30 years. Feelings during pregnancy were mainly positive or anxious, described using phrases such as being ‘delighted’, ‘overjoyed’ and ‘extremely lucky’ or ‘worried’ about the baby¹⁹. Advanced maternal age women also appreciated the support received from healthcare providers during the genetic testing process¹³. Carolan and Nelson (2007) found that although advanced maternal age women were generally pleased with the care received, they considered healthcare providers’ attitudes towards their concerns to be somewhat insensitive and dismissive. Older pregnant women also expressed a need for more time for discussion during maternity care visits¹⁹. Robb *et al.* (2005) again highlighted the importance of healthcare providers being aware how the concept of risk is assimilated by AMA mothers, since the apparent over-concern of health care professionals towards maternal and foetal well-being, can increase the stress levels of pregnant women. Older pregnant women also benefit from being given some favourable or positive information related to delayed childbearing and motherhood as the reassurance derived from this decreases stress³. Women over 35 years did not generally have negative feelings about the forthcoming birth of their children, but they did find childbirth a more difficult

experience compared with younger women¹²

Discussion

In the Western world, the average age at which first time mothers give birth is continually rising¹². Complications and risks associated with pregnancy among women of advanced maternal age have been addressed in numerous studies from different viewpoints, mostly focusing on the medical risks associated with higher maternal age. The purpose of this review was to profile how women over 35 years and the associated pregnancy-related risks have been described in previous research.

Studies examined in this review have shown an increased likelihood of certain medical complications among women of advanced maternal age. However, when exploring the risks associated with advanced maternal age, it is important to consider the influence of confounding variables such as marital status, economic status, smoking, parity, BMI, pre-existing diagnoses, history of using medications before conception, and previous adverse prenatal outcome¹⁷. While the experiences and knowledge of the older pregnant woman are described in the present review, the role of a father and family is not covered. Although it was not in the search terms for this review, it appears to be a subject area that has not been well addressed in the literature; thus, how fathers experience later childbearing is not well-known. Most studies reviewed here focused on the association between advanced maternal age and its related risks, while only a few focused on the experiences of pregnancy in general.

In summary, during pregnancy, women over 35 years prepare for pregnancy, gather information, receive information from healthcare providers, and worry about their pregnancy and their status of being “at risk”. Nevertheless, these women also experience positive feelings. One of the major difficulties to address is that while these women want to be as well-informed and prepared as possible, the information they receive can cause more anxiety rather than alleviate their concerns^{3,14,15,19}. There are, therefore, challenges for maternity care workers to understand the importance of a holistic approach, which takes into consideration the individual, physical, emotional, and social needs of older childbearing women⁷.

Included in the present review are studies that were conducted using both qualitative and quantitative methods. The original data varied from responses to small qualitative interviews, to large data sets obtained from birth certificates or other archived records. The majority of the studies reviewed here

were carried out in the USA, Canada, UK and Australia; but interestingly, among these, the number conducted in nursing science was relatively small. Although the phenomenon of later childbearing is common in developed countries, an analysis of the experiences of pregnant women in Europe is still needed in order to determine the most suitable ways in which maternity care should be structured to meet the individual needs of advanced maternal age women.

This review is limited to the small number of relevant studies that the literature search, which focused on advanced maternal age, was able to retrieve. Although advanced maternal age is associated with increased pregnancy-related risks and other complications, by excluding these and other specific search terms, the search results may have been constrained. However, the principal aim was to gather information specifically on older pregnant women, for which purpose the terms used in the search were relevant, and verified by a specialist librarian. The search terms used should have returned literature that encompassed the specific risk issues related to advanced maternal age; but they may not necessarily have done so.

As already stated, the number of studies included in this review was quite small. This was partly due to the fact that all studies relating to either postnatal issues, or to specific medical problems associated with pregnancy in older women, were excluded. Any literature not published in English would also have been excluded from the search. It may be fair to criticise the exclusion criteria used for the present review, however, the studies that were finally included formed quite a diverse selection, and the overall breadth of issues covered in them means that the conclusions that can be drawn from the present review are valuable, relevant and usable.

It is important to remember that most women of advanced maternal age give birth, at term, without experiencing adverse maternal or prenatal outcomes¹⁷. Furthermore, the fact that absolute rates of prenatal mortality/morbidity are low, suggests that the majority of older women do have a desirable outcome to their pregnancy. The level of information provided to an advanced maternal age

woman, concerning the risks that similar women might experience during pregnancy, and the manner in which such information is given during maternity care, should depend on her health status, her existing knowledge, and her need for information. This requires careful judgement by a sensitive,

communicative healthcare professional, who is able to develop a good patient-provider interaction, and who can allow and make available sufficient time for discussion. Older pregnant women must be made aware of the risks related to later childbearing, in order that they might be able to make informed decisions about whether or not to become pregnant; but they should also be made aware of the probability of successfully reach full term and of having a completely problem-free pregnancy and birth.

Overall, the risks faced by women over 35 during pregnancy have been exaggerated. Most pregnancies for women in this age group are uneventful and have a good outcome. Many recent well-designed studies have shown that in healthy women, the absolute risks of delaying pregnancy are low, even though being over 35 is associated with an increased risk of certain pregnancy complications. This is partly because it's not just your age that matters; your health before you conceive matters too. That's good news, because it's something you can control.

There is good evidence that older women *are* more likely to have or develop certain medical conditions during pregnancy, such as diabetes, high blood pressure, and placenta. These conditions may have serious consequences for your pregnancy and require closer monitoring.

But even with the risk of such problems, which increases the older you are, these and other studies of pregnancy in women over 35 find that the outcome for the mother and baby is still good in the majority of cases; the risks of stillbirth *are* higher for older women but the absolute rates are still very, very low. This is because the complications common to older women are ones which modern maternity hospitals can take in their stride. By working with your doctor and taking steps, such as controlling your diet if you are diabetic or overweight, you can help reduce the risks for yourself and your baby.

Another problem is that the odds of having a baby with a genetic defect increase as you get older. Statistics from 2005, show that the risk of having a baby with a genetic abnormality such as Down's syndrome rises from 2 per 1,000 births at ages 35-39 years, to 4 per 1,000 at age 40-44 years up to 14 per 1,000 at age 45 years or over. If you're almost, or over 40, you should strongly consider genetic testing because the risk of genetic problems increases significantly.

Because chromosomal abnormalities are the most common reason for miscarriage, the risk of miscarriage also increases with age. It has also been suggested that higher rates of stillbirth

for women over 35 could also be attributable in some part to chromosomal abnormalities. Lastly, an increased incidence of induction of labour, instrumental delivery and delivery by caesarean section has been found for women over 35 all over the world, though the exact reasons for this are not clear. It could be due to lower threshold for intervention on the part of obstetricians. It's a good idea for any woman considering getting pregnant to meet with her doctor for a thorough preconception consultation. A detailed medical and family history of both prospective parents can identify conditions that might affect the health of mother and baby. Plus it's an opportunity to check out your physical readiness for pregnancy and get some blood tests, such as for anaemia, rubella immunity, and screening tests, such as a cervical smear, carried out before you get pregnant. Then you can take any steps necessary, as a result of the tests, to get yourself in the best of health before you conceive. Unfortunately, the biggest obstacle for women over the age of 35 may be getting pregnant. A woman hits her peak fertility between the ages of 20 and 24. In women aged 35 to 39, fertility is at least one quarter less. The Human Fertilisation and Embryology Authority's *Your guide to infertility* states: "Figures suggest that 94 per cent of women aged 35 years and 77 per cent of women aged 38 years will conceive after three years of trying". Even with infertility treatments such as in vitro fertilisation, women have more problems conceiving as they age. It's advisable to seek help sooner rather than later if you're over 35 and having problems conceiving. Once you've considered these issues, you can concentrate on the same things that should accompany a healthy pregnancy at any age: good antenatal care, a well-balanced diet, emotional and financial preparation for the child you'll care for over the next 18 years. Many women who have delayed pregnancy until they're over 35 are surprised to find that, given generally good health, they're not much more likely than younger women to have serious complications, and the vast majority end up having healthy babies.

Various necessary tests:

Because women over age 35 are more likely to have certain problems during pregnancy, the following tests may be recommended. These tests can help detect disorders before, during, and after your pregnancy. Some of these tests require appropriate genetic counseling, including a detailed discussion

regarding the risks and benefits of the procedure(s).

Ultrasound: a test in which high-frequency sound waves are used to produce an image of your baby. Ultrasound is used early in pregnancy to determine viability (if the baby is in the uterus and if the baby's heart is beating), the presence of more than one fetus, and to determine your baby's due date or gestational age (the age of the fetus). Later in pregnancy, ultrasound may be used to see how the baby is doing, to determine placenta location and the amount of amniotic fluid around the baby.

Quad Marker Screen: a blood test in which substances in the blood sample are measured to screen for problems in the development of the fetus' brain, spinal cord, and other neural tissues of the central nervous system (neural tube) such as spina bifida or anencephaly. Neural tube defects occur in 1 or 2 out of every 1,000 births. The quad marker screen can detect approximately 75-80% of open neural tube defects.

The quad marker screen can also detect genetic disorders such as Down syndrome, a chromosomal abnormality. The quad marker screen can detect approximately 75% of Down syndrome cases in women under age 35 and over 80% of Down syndrome cases in women age 35 years and older. It is important to note that a "positive" result from this blood test is not definitive for a birth defect. Usually, the next step is to offer the mother an amniocentesis to evaluate the baby's chromosomes as well as an ultrasound to evaluate the baby's body for signs of birth defects.

The quad marker screen may be performed between the 15th and 20th weeks of pregnancy.

First Trimester Screen: A newer test done between weeks 10-14 detects the presence of 2 markers in a blood sample in conjunction with an ultrasound to measure the thickness of the back of the fetus' neck. It tests for chromosomal abnormalities, like Down syndrome. It is essentially as accurate as the quad marker screen but results can be obtained earlier in the pregnancy.

Amniocentesis: Amniocentesis, also called an amnio, is a procedure in which a small amount of amniotic fluid is removed from the sac surrounding the fetus and tested for birth defects. While it does not detect all birth defects, it can be used to detect sickle cell disease, cystic fibrosis, muscular dystrophy, Tay-Sachs disease, or Down syndrome if the parents have a significant genetic risk.

Amniocentesis can also detect certain neural tube defects (where the spinal cord or brain don't develop

normally) such as spina bifida and anencephaly. Because ultrasound is performed at the time of amniocentesis, it may detect birth defects that are not detected by amniocentesis (such as cleft palate, cleft lip, club foot, or heart defects). There are some birth defects, however, that will not be detected by either amniocentesis or ultrasound.

Chorionic Villus Sampling (CVS): a test in which a small sample of cells (called chorionic villi) is taken from the placenta where it attaches to the wall of the uterus. Chorionic villi are tiny parts of the placenta that are formed from the fertilized egg, so they have the same genes as the fetus. If you have certain risk factors, you may be offered CVS as a way to detect birth defects during early pregnancy. CVS requires appropriate genetic counseling, including a detailed discussion regarding the risks and benefits of the procedure.

How to Increase Chances of Having a Healthy Baby?

Good health prior and during pregnancy will help you reduce your risk of complications. Here are some general recommendations.

- Be sure to get enough folic acid in your diet. The current recommendation for women of childbearing age is to take a daily supplement containing at least 0.4 mg. of folic acid, in addition to consuming foods naturally rich in folic acid. Folic acid is naturally contained in leafy green vegetables, dried beans, liver and some citrus fruits.
- Limit your caffeine consumption. Do not have more than 300 mg. of caffeine per day. The caffeine content in various drinks depends on the beans or leaves used and how it is prepared. An 8-ounce cup of coffee has about 150 mg on average while black tea has about 80 mg of caffeine. A 12-ounce glass of caffeinated soda contains anywhere from 30-60 mg of caffeine. Remember, chocolate contains caffeine -- the amount of caffeine in a chocolate bar is equal to 1/4 cup of coffee.
- Maintain a healthy, well-balanced diet and eat a variety of foods to get all the nutrients you need. Choose foods high in starch and fiber. Make sure you are getting enough vitamins and minerals in your daily diet. Eat and drink at least 4 servings of dairy products and calcium-rich foods a day, choose at least one source each of Vitamin C, Vitamin A and folic acid every day.
- Exercise regularly. Review your exercise program with your health care provider. Generally, you may continue your normal exercise routine throughout pregnancy unless you are instructed to decrease or modify your activities.

- Don't drink alcohol during pregnancy and don't use any medications unless recommended by your doctor.

- Don't smoke during pregnancy.

In addition, be sure to obtain prenatal care, especially early in your pregnancy. The first eight weeks are especially critical in your baby's development. Early and regular prenatal care (health care during pregnancy) can increase your chances of having a healthy baby.

Regular appointments with your health care provider throughout your pregnancy are important to monitor your health and prevent or control any problems that develop during pregnancy. In addition to medical care, prenatal care includes education on pregnancy and childbirth, plus counseling and support.

Conclusion

This review illustrates the importance of the nature of available information, and how it is given to older pregnant women. Older pregnant women have a desire for knowledge and they are active information seekers. Information given by healthcare providers is, therefore, important for older pregnant women during their process of becoming mothers. It is especially important that each woman of advanced maternal age

should be treated as an individual, and not simply as a member of a certain group. Being aware of the diverse experiences of older pregnant women can help healthcare providers to understand better the needs of these women. Such awareness can also help health care providers to realize that it is important to offer advanced maternal age

women not only risk-oriented information, but favorable information concerning later childbearing as well. In order to be a successful healthcare provider, they should consider their own, personal and individual way of approaching older pregnant women, as well as being up-to-date and well informed of all the risks related to advanced maternal age.

More studies, involving larger samples are needed in order to define the actual risks during pregnancy, and the age to which the term "advanced maternal age" could properly be used. It has been shown that there is an inconsistency in the literature between the definition of, and the risk assessment of, the older pregnant woman²⁰. In addition, healthcare providers' perceptions and experiences of caring for women of advanced maternal age, would also be an invaluable resource if it were to be documented. Healthcare providers would then be able to find out how other members of their profession have managed the wide

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