

A Review of Pregnancy in Women Over 35 Years of Age

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Abstract: The objective of the present paper is to review how pregnant women over 35 years have been described in previous research, and to review the risks associated with pregnancy in those of advanced maternal age. Computerized searches of the Cinahl, PubMed, Medic and Cochrane Library databases were undertaken. Research articles in scientific journals, relevant to the objective, and published in English between 2000 and 2008, were included. Data were extracted based on the aims, sample, authors, year and results.

Results: 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.

Conclusions: 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.

INTRODUCTION

In developed countries, such as Finland and Sweden, childbearing later in life is a phenomenon which has become increasingly evident in the last three decades [1]. 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 closely comparable with Sweden, where, in 2007, 10% of primigravidas were 35 years of age or older [3]. 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 society [4]. 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” children [4]. 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 [5].

Advanced maternal age (AMA) is seen by patients and healthcare professionals, to be correlated with poorer outcomes to pregnancies. This is largely because of the higher incidence of chronic medical conditions among older women. Women of AMA are often treated as if they are in need of the level of care necessary for any high-risk

pregnancy; and they are treated differently even if there is no scientific basis for different treatment and there are no medical problems evident [6]. However, pre-existing and pregnancy-related morbidity, combined with high maternal expectations, does put these women in greater need of intervention during pregnancy and birth [6]. Despite the perceptions of increased risks related to AMA, it has been suggested that the risks are manageable and positive outcomes can be expected [7].

In recent years, several reviews concerning pregnant women aged 35 years or older have been conducted, which have focused on: the risks associated with AMA [8]; the relationship between AMA and pregnancy outcomes [7, 9]; the evidence of risks faced by women of AMA [10]; and the association between maternal age and still-birth [11]. Fewer studies have focused on women’s own experiences of later childbearing and age-related pregnancy risks. 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 AMA 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. The search was limited to the period between 2000 and 2008, in order to focus on the most recent information available. 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.

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Searching Cinahl with the keywords “maternal age 35 and over” returned 66 references; searching PubMed with “maternal age over 35” returned 316, and with “advanced maternal age” 425 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 807 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. A further manual search of cited references in the selected research articles was also made, using the same exclusion criteria mentioned above. This provided two more articles for inclusion in the present review. PubMed produced five and Cinahl eight relevant research articles, so that finally, a further 15 articles were included in the analysis (Table 1).

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 AMA, and which had been analysed statistically, were analysed in the present review by collating common subject areas, and grouping them together thematically with the articles from the papers describing qualitative studies.

RESULTS

Women’s Knowledge of Pregnancy-related Risks and their Decisions concerning the Timing of Childbearing

The knowledgability of older pregnant women concerning pregnancy-related issues has not been the focus of many studies: we found only three 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 motherhood [12-14]. These studies revealed that women were well aware of the age related decline in fertility [12-14], but they relied on the expectation of the assistance of reproductive technology being available if needed [12, 13]. 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 [13, 14] and of there being a greater risk of miscarriage, and having high blood pressure [13]. However, the probabilities of needing to deliver by Caesarean section [13, 14], having a premature or low-birth-weight baby, stillbirth [14] or of

multiple births, were not as well identified [13, 14]. 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 infants [14]. Moreover, both men and women lack knowledge concerning conception, pregnancy complications, and infant outcomes as related to delayed childbearing [14]. In general, both men and women should be much better informed about the complications and declining fertility associated with a first pregnancy at an AMA [15].

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 life [12]. A stable relationship, education and developing a career before having a family, influenced women’s decisions concerning the timing of childbearing [12]. Financial security and their partner’s suitability to be a parent were also important factors [12, 14]. In addition, women described having a feeling of “a biological clock ticking away”, which affected their decisions concerning the timing of motherhood [12].

Information Gathering and Women’s Preparation for Pregnancy

Issues related to a woman’s preparation for pregnancy were described in five studies [4, 13, 16, 17, 18]. 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 miscarriage [16].

Prior to conception older women also prepared themselves for pregnancy both mentally and physically. Such preparation often meant losing weight, going on diets and taking exercise [17]. Some women visited specialist doctors to discuss existing health issues, such as blood pressure [17]. 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 hospitals [17]. 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 status [16].

Women also approached pregnancy by searching for information from multiple sources, which they sometimes found offered contradictory advice [16, 17]. Women searched for information from the internet, journal articles, childbirth educators, and hospital telephone information

Table 1. Studies of Older Pregnant Women and Risks Related to Advanced Maternal Age

Authors/Year/ Location	Purpose	Design/Sample	Results
Bell <i>et al.</i> 2001 UK	To determine whether the higher levels of obstetric intervention and maternity service use among older women can be explained by obstetric complications.	A retrospective analysis, N= 28484 deliveries.	Levels of amniocentesis, cesarean section, assisted delivery, induction and augmentation were all higher among older women. Maternity service use also increases significantly with age.
Benzies <i>et al.</i> , 2006 Canada	To examine the factors that influence women's decisions about timing of motherhood from a life span perspective.	Qualitative design, N= 45 women aged 20-48 years.	Independence, a stable relationship, and declining fertility influenced women's decisions about timing of motherhood.
Carolan & Nelson, 2007 Australia	To question the association of maternal age and pregnancy risk.	Longitudinal, qualitative study, N=22 women over 35 years.	Four risk-related themes: realizing the status "at risk", hoping for reassurance, dealing with uncertainty, and getting through it/negotiating risk.
Carolan, 2007a Australia	To evaluate the experiences of a group of first-time mothers aged over 35 years.	In depth interviews, N=22 women.	Percentage of mothers approached childbearing as a major project in their lives. Project progressed through clearly defined stages of: information gathering, planning and preparing and finishing up tasks prior to the birth.
Carolan, 2007b Australia	To highlight the information based dilemmas of first-time mothers over 35 years.	In-depth interviews, N= 22 first-time mothers over 35 years.	Mothers were found to have access to large volumes of health information. Midwives and maternal and child health nurses revealed a tendency to provide older first-time mothers with considerable health information of a medical orientation, understanding that this is what the women required.
Cleary-Goldman <i>et al.</i> 2005 USA	To estimate the effect of maternal age on obstetric outcomes.	Analysis of data, N=36056.	Increasing age was significantly associated with miscarriage, chromosomal abnormalities, congenital anomalies, gestational diabetes, placenta previa and c-section.
Jacobsson <i>et al.</i> 2004 Sweden	To investigate the influence of maternal age on perinatal and obstetric outcome in women aged 40-44 years and those 45 years or older, and to estimate whether adverse outcome was related to intercurrent illness and pregnancy complications.	A population-based cohort study, N= 1 566313 deliveries.	Perinatal death, intrauterine fetal death, and neonatal death increased with age. Also intercurrent illnesses and pregnancy complications increase with increasing age.
Jolly <i>et al.</i> , 2000 UK	To find out if older maternal age is associated with increased risk of adverse outcomes for mother and baby.	Analysis of data, N=385120 singleton pregnancies.	Pregnant women aged 35 or older are at increased risk of complications in pregnancy compared with younger women.
Joseph <i>et al.</i> 2005 Canada	To determine if the rates of pregnancy complications, preterm birth, small for gestational age, perinatal mortality and serious neonatal morbidity are higher among mothers aged 35-39 years or 40 years or older, compared with mothers 20-24 years.	A population-based study, N= 157 445 singleton pregnancies.	Older women were more likely to have hypertension, diabetes mellitus, placental abruption, or placenta previa, but they were less likely to be nulliparous and to smoke. Also preterm birth and small for gestational age rates were higher.
Maheshwari <i>et al.</i> 2008 UK	To explore women's awareness of issues associated with delayed childbearing, including its social and medical implications and the limitations of available treatment.	Questionnaire, N=360 women (subfertility clinic) and 362 pregnant women.	Despite awareness of the impact of age on fertility, 85% of the subfertile group expected IVF to overcome the effects of age compared with 77% of the pregnant population. Knowledge about age-related obstetric risks, such as trisomy 21, was similar in both groups (86.3% vs 85%). Almost all participants (94.5%) believed that women should be informed about the implications of delaying childbearing at an early age.
Ozalp <i>et al.</i> 2003 Turkey	To describe health risks for early (19 or under) and late (35 or over) childbearing.	Birth records and patients files, N=447.	This study emphasises the increased maternal and fetal risks for pregnancies at these extreme age groups in a retrospective way.
Robb <i>et al.</i> 2005 UK	To describe if older primigravidas differ from younger primigravidas in their emotional experience of pregnancy.	Case-control study, Questionnaires N= 30 women (case groups aged 35 or older and control aged 20-30) Qualitative data obtained from an open-ended question.	Older primigravidas took more time in antenatal consultations. No significant difference was found between the groups of women, although a small number in both groups were very anxious.

(Table 1) contd.....

Authors/Year/ Location	Purpose	Design/Sample	Results
Tough <i>et al.</i> 2007 Canada	To determine the factors influencing the timing of childbearing for non parenting men and women, to determine knowledge among non parenting men and women about maternal age-related risks and to determine characteristics associated with limited knowledge of these risks.	Computer-assisted telephone interviews, N=1006 women and 500 men aged 20-45 years.	Factors that influenced timing of childbearing for men and women included: financial security and partner suitability to parent. Over 70% of men and women recognized the direct relationship between older maternal age and conception difficulties. Less than half knew advanced maternal age increased the risk of stillbirth, cesarean delivery, multiple birth and preterm delivery.
Viau <i>et al.</i> 2002 USA	To explore the specific health concerns and health promotion behaviours of childbearing women 35 years or older.	Semistructured interviews, N=50 women aged 35 or older.	Study-participants reported concerns reflecting both fetal well-being and maternal health related issues. The majority of childbearing women reported engaging in multiple health-promotion behaviors.
Zasloff <i>et al.</i> 2007 Sweden	To provide a comprehensive picture of the young to the old first time mother as she presents to the clinician in terms of background, expectations, experiences and outcome of labour.	A longitudinal cohort study, questionnaires, N=1302.	Expectations and experiences vary by maternal age. The youngest women had the most negative expectations of the upcoming birth but their experience of childbirth did not differ from the reference group. In contrast, the oldest women did not have negative feelings about the upcoming birth, but experienced childbirth overall as more difficult.

networks [16]. 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 [4, 18].

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 women [18]. However, although these women felt themselves to be over-informed, which increased their concerns [18], 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 20s [13].

Manifestation of Risks and Women's Experiences of Risks, Pregnancy and Care

It has been shown that AMA increases pregnancy-related risks and the probability of obstetric complications. Six studies described the risks, complications and obstetric outcomes related to pregnancy in women aged over 35 years [19-24].

Compared to younger women, the types of complications that women over 35 years are at increased risk of during pregnancy include gestational diabetes, placenta praevia [20-22], pre-eclampsia [21, 24], miscarriage [20] and pregnancy-induced hypertension [21] as well as Caesarean sections [20, 21, 23]. Induction of labour [19, 21, 23], augmentation with primiparae and assisted deliveries are also associated with women of AMA [19]. Perinatal mortality, perinatal and neonatal death, and intra-uterine foetal death also increase with increasing age [21]. 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 medication [19-21, 23]. These chronic medical conditions may further complicate their pregnancies [24].

However, some risks should be interpreted with caution [20]. 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 [20]. Adverse outcome rates were in fact higher among older women, even when there were no complications in their pregnancies [23]. 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 [21]. 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 AMA mothers [20, 21, 23].

Being "at risk" is not always obvious to pregnant AMA women. Carolan and Nelson (2007) showed that AMA 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 [4]. 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 well [4]. Pregnant women 35 years of age or older often wanted additional ultrasonic scans and genetic testing to be assured that nothing was wrong [4]. 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 baby [25]. AMA women also appreciated the support received from healthcare providers during the genetic testing process [16].

Carolan and Nelson (2007) found that although AMA 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 visits [25]. 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 stress [4]. 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 women [15].

DISCUSSION

In the Western world, the average age at which first time mothers give birth is continually rising [15]. Complications and risks associated with pregnancy among women of AMA 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 AMA. However, when exploring the risks associated with AMA, 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 outcome [20, 23].

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 AMA 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 [4, 17, 18, 25]. 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 women [10].

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 AMA 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 AMA 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 AMA; 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 AMA give birth, at term, without experiencing adverse maternal or prenatal outcomes [20]. 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 [23]. The level of information provided to an AMA 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.

CONCLUSION

Pregnant women over 35 years old, have issues and concerns to which healthcare providers must pay attention when in professional contact with these women. In order to meet the needs of older pregnant women, healthcare providers themselves, need more information concerning the experiences of older women during pregnancy, in order to increase their understanding and knowledge of age-related pregnancy risks. Healthcare providers should remember that pregnancy can evoke a broad range of feelings in women of advanced maternal age, which can vary from happiness to anxiety.

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 AMA 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 AMA women not only risk-oriented information, but favourable 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 AMA.

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 woman [26]. In addition, healthcare providers' perceptions and experiences of caring for women of AMA, 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 range of situations that occur when in contact with older pregnant women.

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