Full Length Research Paper

Maternal age as a risk factor for pregnancy outcomes: Maternal, fetal and neonatal complication

Azar Aghamohammadi[1]* and Maryam Nooritajer[2]

[1]Department of Midwifery, Islamic Azad University, Sari Branch-Iran.
[2]Islamic Azad University, Islamshahr Branch-Iran.

It has been widely documented that maternal age in pregnancy is increasing in the world. Nowadays, many women delay their pregnancy even up to the 40th year of their life because of different reasons, such as occupational, educational and economical. Therefore, complete awareness of pregnancy outcomes in these ages for the midwives and gynecologists is needed to protect the health of the mother and infant. This research, which is a descriptive comparative study, is performed to compare the pregnancy outcomes of women aged over 35 years. The inputs contained 1021 pregnant women, and their pregnancy outcomes were compared in 4 groups of primiparous and multiparous women over and below the age of 35. To analyze the inputs using SPSS software, the χ^2 test, Fisher, and Odss-ratio were used. In primiparous women, there is a statistically significant relation between the age of over 35 and preeclampsia, gestational diabetes, preterm labor, malpresentation, cesarean and low birth weight, while in multiparous women, there is a significant relation between the age of over 35 and preeclampsia and low birth weight. In the women of over 35 years old, parity is effective on the measure of preeclampsia and cesarean delivery, only. However, the mother`s high age can be an independent factor for pregnancy outcomes, in that the primiparous women are exposed to more effectivity of age. It is a fact that the aged women can have a natural pregnancy with a term infant; as such, over-age must not be a contraindication for pregnancy.

Key words: Primiparous, multiparous, pregnancy outcomes.

INTRODUCTION

In recent years, couples in industrialized nations have chosen to postpone marriage and childbearing (Schoen and Rosen, 2009). The reflex of a woman to pregnancy is influenced by various factors, through which women`s age at pregnancy time can be known as the most important factor that has undeniable effect on pregnancy process and labor (Sadrimehr, 1993). Nowadays, women delay their pregnancy up to the 4th or even 5th decade of their life because of different reasons, such as delay in marriage, educational and professional reasons (Gilbert et al., 1999). Many of them experience pregnancy unwillingly because of negligence of using contraceptive

method (Obed et al., 1995). At the moment, almost 10% of pregnancies occur at the age of over 35 (Cunningham et al., 2005). According to the report of Iran's statistic center, the average age of first marriage was increased to 4.7 years from 1957 to 2002. Paying attention to this, the average age of the first pregnancy was also increased. It has been widely documented that advanced maternal age confers risk to both mother and child's death (Schoen and Rosen, 2009). In aged women, who are suffering from chronical diseases or who have weak physical position, the probability of these risks is more. In one study in a private hospital, the chance of preterm labor, growth limitation and prenatal death was not increased in the ages of over 35, but the chance of gestational diabetes, preeclampsia and cesarean delivery was a little increased, although in public hospitals, the risk rate was more. The reason for this difference is the

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*Corresponding author. E-mail: azareaghamohamady@yahoo. com.

socio-economic position that makes the hygienic case limited to get. Researchers demonstrated that both age and parity have effect on diabetes rate, labor disorders and cesarean rate (Cunningham et al., 2005).

Delbaere et al. (2007) reported the measure of breech presentation with an increase in the age of women (Delbaere et al., 2007). Generally speaking, although pregnancy outcomes increased in aged women, more danger was seen in them than in the multiparous aged women (Gilbert et al., 1999). The research result of Ezra et al. (1995) has shown that in primiparous women of over 35 years, the cesarean rate is 2 times more than the multiparous women of above 35 (Ezra et al., 1995). Hoffman et al. (2007) have shown the relation between the increasing rate of perinatal death risk, low birth weight and very low birth weight in aged women. They have discussed the high age of mothers as an independent risk factor for perinatal death (Hoffman et al., 2007). The William`s research indicates that the average birth weight of the aged primiparous women is lower than that of the young women in comparison with Gilbert et al. (1999).

Hoffman et al. (2007) considered the mother`s high age as an indirect factor for low birth weight (Hoffman et al., 2007). Karatas et al. (2005) came to this result in their researches that there would not be any significant difference in birth weight as regards aged and young women.

Pasupathy et al. (2007) concluded that the prenatal death rate is 2 fold more in aged women at labor time. To study the two essays in two different populations that studied the relation between fetal death and age increase, Karen et al. (2008) concluded that fetal death rate was under the effect of economical and social factors and life condition more than age. According to available contradictory statistics, there are a lot of ambiguous issues about this matter, in which the pregnancy outcome is under the effect of mother`s increasing age and how parity can have an effect on this matter. The present research is done with the aim of comparing the pregnancy outcome in primiparous and multiparous women over and below 35.

MATERIALS AND METHODS

This study was a descriptive and comparative one that was done after getting the license from the moral committee of Iran Nursing and Midwifery University. Sampling was done in a continuous method. It means that the available files in archive were studied. The samples were studied according to the excluded criteria. When the sample size was completed in each group, the sample was given up there. According to the available information in files, the arranged registration card was filled, which included pregnancy outcomes like cesarean, gestational diabetes, preterm labor, preeclampsia, placenta previa and low birth weight. Then the achieved information was entered into the SPSS software and the measurement of these outcomes were compared in the groups of primiparous women over and under the age of 35, multiparous women over and under the age of 35 and the group of primiparous women over 35 with multiparous women over 35.

The excluded criteria of the samples included these cases: all the women under 20 years, cesarean records, the record about suffering from urinal- genital infections in the present pregnancy, smoking and addicted women, the records of five gravida and more, pregnancy with the reproductive aid methods, multigravida in present pregnancy, suffering from known physical and mental diseases including the heart, kidney and immune diseases, all kinds of cancers, hepatitis, evident diabetes, sexually transferred diseases, etc. The number of required samples was estimated in each group with the certainty measurement of 45% and an evaluation power of 80%, where PO-PI = 0/1 and PO = 0/5 of 250 people. Thus, 1000 people were estimated in the required samples.

FINDINGS

Once the research was concluded, 1021 files were studied by paying attention to the acceptance and omission standard. Among these files, there were 250 primiparouos women over the age of 35, 254 primiparous women under the age of 35, 257 multiparous women over the age of 35 and 255 multiparous women under the age of 35. The age group of 20 to 24 had the greatest supply in the first primiparous group under the age of 35 and their average age was 24.02 years with the standard declination of 3.385. The age group of 35 to 39 had the greatest supply in the multiparous group of over 35 and their average age was 36.35 years with the standard declination of 1.739. The age group of 25 to 29 had the greatest supply in the multiparous group under the age of 35 and their average age was 26.71 with the standard declination of 3.761. The age group of 35 to 39 had the greatest supply in the multiparous group over the age of 35 and the average age was 36.81 with the standard declination of 2.319 (Tables 1 to 3). In primiparous women, there is a statistically significant relation between the age of over 35 and preeclampsia, gestational diabetes, preterm labor, malpresentation, cesarean and low birth weight (Table 1), while in multiparous women, there is a significant relation between the age of over 35 and preeclampsia and low birth weight (Table 2). However, in the women over the age of 35 years old, parity is effective on the measure of preeclampsia and cesarean delivery, only (Table 3).

DISCUSSION AND CONCLUSION

The research findings showed that 20.8% of primiparous women over the age of 35 had preeclampsia, while this number was estimated as 5.8% in the people under the age of 35. χ^2 test showed that there would be a significant relation between the age of persons over 35 and those suffering from preeclampsia in primiparous women (R<0.000), and OR showed that pregnancy in persons over 35 increased the risk of preeclampsia in primiparous women for 4.272 fold. Chan et al. (2008) reported that nulliparous women aged 40 or above 40 years had an increased incidence of preeclampsia (2.0 vs. 0.3; P = 0.001) when compared with nulliparous women that under 40 years.

Table 1. Pregnancy outcomes in primiparous women above and under the age of 35.

P-value	χ2	Odds-ratio (95% CI)	20-34		≥35		Group pregnancy outcome
			%	Number	%	Number	
<0.0001	25.069	(7.817, 2.335) 4.272	5.8	15	20.8	52	Preeclampsia
0.045	4.031	(6.090, 0.995) 2.462	2.7	7	6.4	16	Gestational diabetes
0.209	*	(37.795, 0.466) 4.195	0.4	1	1.6	4	Placenta previa
0.030	4.699	(2.652, 1.047) 1.677	13.9	36	21.2	53	Preterm labor
2.905	6.135	(1.206, 6.997) 2.905	2.8	**7**	8	20	Malpresentation
< 0.0001	14.74	(1.402, 2.855) 2.000	47.5	123	64.4	161	Cesarean
0.001	12.005	(3.729, 1.426) 2.306	11.6	30	23.2	58	Low birth weight

Table 2. Pregnancy outcomes in multiparous women above and under the age of 35.

Odds-ratio (95% CI)	χ2	P-value	20-34		≥35		Group pregnancy outcome
			%	Number	%	Number	
2.398 (1.878, 4.846)	6.183	0.013	10.5	27	4.7	12	Preeclampsia
1.192 (0.524, 2.712)	0/167	0.683	5.1	13	4.3	11	Gestational diabetes
4.896 (0.434, 54.901)	*	0.061	2	5	0	0	Placenta previa
2.103 (1.229, 3.601)	7.481	0.006	17.2	24	9	23	Preterm labor
1.903 (0.747, 4.851)	1.849	0.174	5.1	13	2.7	7	Malpresentation
1.205 (0.825, 1.752)	1.060	0.303	32.4	83	28.2	72	Cesarean
2.046 (1.195, 3.509)	6.870	0.009	16.8	43	9	23	Low birth weight

Table 3. Comparison of the pregnancy outcomes of nulliparous and multiparous women above the age of 35.

χ2	Odds-ratio (95% CI)	P-value	20-34		≥35		Group pregnancy outcome
			%	Number	%	Number	
10.092	2.218(1.342, 3.665)	0.001	10.5	27	20.8	52	Preeclampsia
0.409	1.273(0.599, 2.704)	0.522	5.1	13	6.4	16	Gestational diabetes
*	0.813(0.217, 3.076)	1.000	2	5	1.6	4	Placenta previa
1.314	1.290(0.827, 2.012)	0.252	17.2	24	21.2	53	Preterm labor
1.729	0.536(0.211, 1.367)	0.189	5.1	13	8	20	Malpresentation
51.802	3.771(2.609, 5.448)	<0.0001	32.4	83	64.4	161	Cesarean
3.246	1.489(0.959, 2.313)	0.072	16.8	43	23.2	58	Low birth weight

*Fisher test.

In this study, there was significant relation between the mother's age≥35 and preeclampsia in multiparous women (P = 0.013). However, the amount of OR (OR = 2.389) shows that pregnancy in persons over the age of 35 increases the risk of suffering from preeclampsia 2.398 times in multiparous women. Jacobsson et al. (2004) understood that severe preeclampsia increased with an increase in age, but the measure of mild preeclampsia decreased. The reason for this contradiction was unknown, and the basic reason for increasing the preeclampsia measure in elderly women was still unknown. Some studies discuss that the probability of aged women's infection has a relationship with a lot of pathogens that stimulate their immune system for rousing and increasing the probability of preeclampsia in them (Stuziniski et al., 2004). Also, there is this theory, which stipulates that in aged women, preeclampsia distinction happens sooner as a result of more accurate control. Consequently, the blood pressure they had before pregnancy would be distinguished for the first time, and it is not separable with preeclampsia (Gilbert et al., 1999). This research findings show that 6.4% of primiparous women over the age of 35 suffer from diabetes, although this number is 2.7 in primiparous women under the age of 35. The χ^2 test shows that there is a statistically significant relation between the age of over 35 and gestational diabetes in primiparous women. There are a lot of reasons, which explain the increase of gestational diabetes with an increase in the age of women. Destruction of the inter blood vessels of cells is one of them (Ziade et al., 2001). In the present research, gestational diabetes rate in multiparous women over the

age of 35 is 5.1 versus 4.3% in women under the age of 35. However, the χ2 test showed that despite the increasing rate of gestational diabetes in multiparous women with an increase in their age, this increase was not statistically significant. The result of Goldman et al. (2005) research indicates that there is no statistically significant relation between the age and gestational diabetes of women aged 35 to 40 in proportion to women aged 20 to 29, but this relationship in women over 40 years of age is proportional to women aged 20 to 29 and is statistically significant. The present research is in agreement with Goldman et al., perhaps because of having been the most abundant of the group that is over 35 and the group that comprised women of 35 to 40 years.

The research result of Delbaere et al. (2007) showed that gestational diabetes and blood pressure are the only pregnancy outcomes seen with an increase under the influence of age, in spite of the exact control in high ages. Namavar et al. (2008) showed that a higher incidence of maternal medical diseases, such as hypertensive disorders and diabetes was seen among the advanced aged mothers than among the young mothers.

A study in this field shows that there is a decrease in the function of B cells of pancreas and cell sensitivity to insulin with age increase (Al-Turki et al., 2003). The function and structure of hemoglobulin and the means of glaciations is changed with the increase in age and it can be one of the reasons for increasing gestational diabetes under the influence of age (Jacobsson et al., 2004), since the prevalence of glucose intolerance in aged primiparous women is as high as that in multiparous women. On the other hand, in different studies, aged primiparous women showed more proportion of glucose intolerance to young primiparous women. So, it can be concluded that age has more influence on the number of pregnancy in making glucose intolerance (Obed et al., 1995). The findings of this research show that primiparous women over the age of 35 have 1.6% placenta previa, in which the measure for women under the age of 35 is 0.4%. Fisher test shows that there is no meaningful relation between women over the age of 35 and primiparous women with placenta previa. In their research results, Goldman et al. (2005) found that there is a statistical significant relation between placenta previa and the age of above 35, but this relation must be explained more cautiously because the risk level is not very high according to the clinical point of view. The findings of this study showed that the measure of placenta previa in multiparous women above 35 was 20% when this number was zero in multiparous women under the age of 35. To study whether or not the relation between the age of above 35 and placenta previa was statistically significant, the fisher test was used and was shown statistically. Thus, there would be no relation between the mother's high age and placenta previa in multiparous women.

In their researches, Sheiner et al. (2003) discussed the increase in rate of placenta previa with an increase in age. Michael et al. (2006) did not find any meaningful difference as regards suffering from placenta previa in aged multiparous women when compared with young women. In the results of their studies, they claimed that despite the existence of risky factors, such as over age of the mother and mulitparousity for suffering from placenta previa, there was no clear reason to explain this contradiction.

The findings of this research showed that 17.2% of multiparous women over the age of 35 had preterm labors, since this measure was 9% in multiparous women under the age of 35. χ^2 test shows that there is a statistical significant relation between the age of above 35 and preterm labor (p = 0.006), while the volume of OR shows that pregnancy in the ages of under 35, increases the risk of preterm labor in 2.103 fold. This finding is supported by other reports (Diejomaoh, 2006; Miller, 2005; Joseph, 2005). The research results of Temmerman et al. (2004) indicate that there is a meaningful relation between the increasing mother's age and preterm labor. The findings of this research show that the rate of malpresentation in primiparous women over and under the age of 35 is 8 and 2.8%, respectively.

The χ^2 test shows that there is a statistically significant relation between mother's age of over 35 years and mal presentation in primiparous women (p=0.013), although the measure of OR shows that pregnancy in ages of over 35 would increase the risk of having malpresentation in primiparous women for 2.905 fold. In their results, Gilbert et al. (1999) reported the malpresentation in aged and young primiparous women as 11 and 6%, respectively, and concluded that it was significant.

Sahu et al. (2007) did not find any statistically significant difference in malpresentation when the aged and young women were compared. The findings of this research showed that 5.1% of multiparous women over the age of 35 had malpresentation which was 2.7% in women under the age of 35. χ^2 test showed that, despite the increase in malpresentation in aged primiparous women, this increase was not statistically significant. The researches of Gilbert et al. (1999) have shown that the measure of malpresentation in multiparous women over the age of 40 is 6.9%, while in the group of 20 to 29 years, it is 3.7%. The inclined factors of breech presentation are chromosome anomalia, multigravidity and placenta previa, in which the increase in breech presentation may be secondary in aged women (Karen et al., 2008). The results of different studies indicated that the cells function declined with an increase in age, and it was the reason for the inclined increase in age. This is the reason for breech increase and bleeding after labor. However, this theory is reinforced because the basic reason of bleeding is atonia (Al-Turki et al., 2003).

The findings of this research showed that the measure of cesarean in primiparous women over the age of 35 has

been 64.4%, while in primiparous women under the age of 35, the measure was 47.5%. However, χ^2 test has shown that there is a statistically meaningful relation between the age of over 35 in primiparous women and cesarean (p<0.0001). Using the measure of OR has shown that pregnancy would increase the risk of cesarean twice in primiparous women over the age of 35. Seoud et al. (2002) found a statistically significant relation between the increasing rate of cesarean and the age of over 35. Michael et al. (2006) reported the increasing rate of cesarean in aged women and claimed that there would be many reasons for this, including basic diseases, obstetric troubles, neonatal problems and decrease of the function with the increasing age of women.

Bell et al. (2001) claimed, in their researches, that the aged women may have an increased risk for abnormal labor, which can be secondary to the old age physiology; although the mother's age by itself may be one of the factors which can have effect on the doctor's decision, patient's request or obstetric troubles. The findings of the present research showed that 32.4 and 28.2% of the multiparous women over and under the age of 35, respectively, have had cesarean. Despite the increase of cesarean in aged multiparous women, χ^2 test has shown that this increase is not statistically significant. The researches of Ziadeh et al. (2001) showed that the measure of cesarean in multiparous women over and under the age of 35 was 14 and 6%, respectively. Nonetheless, Sahu et al. (2002) did not find any meaningful relation in multiparous women.

The findings of the research showed that low birth weight in primiparous women above the age of 35 was 23.2%, while it was 11.6% in primiparous women under the age of 35. The χ^2 test showed that there was a statistically significant relation between low birth weight and the age of over 35 in primiparous women (p = 0.001), while the measure of OR showed that pregnancy in the ages of above 35 would increase the risk of low birth weight in 2/3.06 fold. In the research result of Ziadeh et al. (2001), a similar result was reported for the primiparous women of over 40 years and the women with cesarean. According to the studies and researches of Goldman et al. (2005), it was reported that there would be a statistically significant relation between low birth weight and the age of over 40, but the risk rate of suffering increased. They understood that mothers above 35 years would usually bear a term infant at the same weight of the control (sample) group.

The findings of this research showed that 16.8% of multiparous women over the age of 35 would have infants with low birth weight, although this number was 9% in multiparous women under the age of 35. The χ^2 test showed that there would be a statistically significant relation between mother's over age and low birth weight in multiparous women (p = 0.009). The measure of OR (OR = 2.046) showed that pregnancy in the ages of over 35 would increase the risk of low birth weight for 2.046 fold in multiparous women. Ziadeh et al. (2001) showed that

there was no difference between the averages of infant weight in aged multiparous women with young women. This report is not in agreement with the present research. Josef et al. (2005) found a statistically significant relation between the increased mother's age and low birth weight which justified that they can be secondary, as a result of the increase in diabetes, preeclampsia and placenta previa. Paying attention to the result of the present research, the number of pregnancy is effective only on the rate of preeclampsia (p = 0.001) and cesarean. As a matter of fact, primiparous labor increases the rate of preeclampsia in 2.227 fold and cesarean in 3.771 fold in aged women. As a result, the mother's high age can be an independent factor for pregnancy outcomes, although most women that are over-aged can have a normal labor with a term infant and without pregnancy outcomes. Nonetheless, overage must not be a contraindication for pregnancy.

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