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Research Article

Impact of Maternal Age on Pregnancy in Madinah Region

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Abstract

Objective: To assess impact of maternal age on obstetric and neonatal outcomes in Al-Madinah region.

Methods: This retrospective cohort study derived from database of the medical records of Madinah Maternal and Children Hospital (MMCH) from January 2017 to December 2017 after gaining the ethical approval from MMCH.

The targeted maternal age divided into three groups: women younger than 20 years, women 20-35 years, and women over 35 years.

Result: 849 pregnancy cases collected. Women aged ≥ 35 years accounted for a 47% of abortion cases, 66.3% of gestational diabetes mellitus (GDM), 59% of Caesarian section (LSCS), 71.5% stillbirth and a 55.8% of neonatal intensive care unit (NICU) admissions.

Conclusion: Maternal age has an impact on obstetric and neonatal outcomes.

Advanced maternal age is a risk factor for miscarriage, GDM, CS, stillbirth and NICU admission. Adolescent mothers are more likely to have other complications as well. Maternal age is one significant factor that could affect obstetric and neonatal outcomes hence, the need for education of women about the safe age for planning a pregnancy and importance of antenatal care.

Keywords: *Pregnancy; Maternal Age; Impact; Outcome*

Introduction

Maternal age plays an important role in the course of pregnancy, delivery, and neonatal outcomes [1]. Effects of mother age on pregnancy was the object of many studies under different settings [2]. Delaying pregnancy until advanced ages became a trend in many communities around world [3]. A huge number of women in Europe and the US voluntarily choose to delay pregnancy [4,5]. The recent reports showed that this delay as high as 9.1% in the United States (US), and 28.1% in Japan. Such increase in average maternal age has been observed in many other parts of Asia, such as Korea, China, and Taiwan [6]. This may be related to perusing education, better career, and good financial or social status [4,6].

Similarly, in Kingdom of Saudi Arabia (KSA) and other countries in the Middle East, women are encouraged by the financial status of the family to delay pregnancy later in life. On top of that, the tendency for having large families in these communities encourage them to continue having children after the age of 35 [7].

However, maternal age of 35 years or older, found to have high risks of adverse outcomes on the mother and the child such as, high rates of LSCS, GDM, stillbirth, preeclampsia, placenta previa, preterm delivery, and increased perinatal mortality [8].

Pregnant mothers of advanced age have higher risk of developing diabetes mellitus (DM) and hypertension (HTN) later on compared to women of the same age who never became pregnant [8,9].

Adolescent pregnancy is another worldwide issue that affects rich and poor countries [9]. It is defined as a pregnancy in girls aged less than 20 years. It is estimated that 16 million 15-to-19- year-old women give birth every year, representing 11% of all births worldwide [10]. Poverty, poor school performance, low future expectations, social exclusion, having an adolescent mother and belonging to non-conjugal family have all been associated with adolescent pregnancy and child bearing [10,11]. Around the globe, adolescent mothers between the ages of 10 to 19 have increased risks of puerperal endometritis, and systemic infections than mothers aged 20 to 24 years [12,13]. Very young maternal age considered a high risk in relation to adverse pregnancy outcomes. Babies born to mothers under 20 years of age face higher risks of low birth weight, preterm delivery, and severe neonatal conditions [12]. On top of that, there are 3.9 million unsafe abortions in pregnancies where the mother is aged 15 to 19, which can lead to the death of the mother or developing chronic diseases [10,13].

In Saudi Arabia, some studies had evaluated the impact of maternal age on obstetrics and neonatal outcomes, most of these studies come from Riyadh region, while there is no previous studies in Al-Madinah region [7]. Previous studies in Saudi Arabia found that maternal age over 35 was a risk factor for GDM, preeclampsia, abruption, preterm birth, placenta previa, postpartum hemorrhage (PPH), LSCS and adverse neonatal outcomes specifically still birth, neonatal death, low birth weight and NICU admissions [5,7]. On the other hand, pregnant adolescents had increased risk of anemia, episiotomy, preterm delivery, low birth weight, and stillbirth [14].

Objective of the Study

The objective of this study is to assess the impact of maternal age on obstetric and neonatal outcomes in A-Madinah region.

Methods

This is a retrospective cohort study conducted by reviewing the medical records for booked women for maternal care in Madinah Maternal and Children Hospital (MMCH), 1 January 2017 to 31 December 2017. Data collection done during May 2018 to August 2018.

MMCH is a tertiary government hospital where medical care is free of charge. It covers the whole region of Madinah, 151,990 km2 (58,680 mi2), with a total multi-ethnic population of 1,977,933. MMCH lies in city of Madinah, which is the capital of the region and the second holiest city in Islam [15]. MMCH average number of deliveries is 15,000 per year, and caesarian section rate is 21%.

All women booked for maternal care during the study period are included in the study. Women with chronic illnesses unrelated to pregnancy including renal, hepatic and cardiac problems were excluded. In addition, pregnant women who develop acute illnesses unrelated to pregnancy, e.g. chest infection or traffic accidents were excluded. Enrolled women divided into three groups according to maternal age: less than 20 years, 20 to 35 years and older than 35 years.

Data collected from the Medical Record Department in MMCH. Paper records collected and validated by a trained team in the Medical Records Department. An electronic form was used to enter the collected data.

Data collected focused on:

- Maternal age, gravidity, parity and general health of the mother.
- Pregnancy complications such as miscarriage, GDM, stillbirth and preterm delivery.
- Mode of delivery, spontaneous vaginal delivery (SVD), LSCS or assisted delivery.

- Pregnancy outcome, the gestational period, birth weight and Apgar score.
- NICU admission and causes of admission.

Age of mother defined from personal identification information in the file and it is her age at time of booking visit. Also, her health status, any complications during the pregnancy and labor information. The information related to the pregnancy outcome collected from neonatal form. Low birth weight defined as < 2500g, preterm delivery defined as ≤ 37 weeks of gestation, and Apgar score collected at five minutes.

Local Ethics Committees of the General Directorate of Health Affairs in MMCH, and Taibah University reviewed and approved this study in accordance with World Health Organization [10] and International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use-Good Clinical Practice (ICH-GCP) guidelines.

Statistical analysis was performed using Statistical Package for the Social Sciences 16 software for Windows [16] and statistical significance at $P < 0.05$.

Baseline characteristics described using mean ± standard deviation for continuous data and frequency (%) for categorical data. Mann-Whitney U, the paired-sample t and analysis of variance (ANOVA) tests used for comparing continuous variables, while the Chi2 or Fisher's exact probability test were applied for categorical data.

Result

849 women enrolled in the study, included 27 women (3.18%) of aged ≤ 20 years, 497 women (58.5%) 20 - 35 years and 290 women (34.15%) ≥ 35 years (Table 1).

Characteristics N (849)	< 20 years N (27)%	20 - 35 years N (497)%	> 35 years N (290)%	P
Miscarriages (N 76)	2.4%	50%	47.6%	0.36
Stillbirths (N 13)	4.8%	23.8%	71.4%	0.87
SVD (N 763)	4.1%	69.3%	26.6%	0.0001
LSCS (N 763)	1.2%	39.6%	59.2%	0.0001
GDM (N 763)	1.1%	31.5%	66.4%	0.0001
Twins (N 14)	0%	0%	100%	0.97
Abnormal APGAR Scores (N 71)	3.4%	22.9%	73.7%	0.31
NICU admissions (N 92)	1.6%	35.3%	55.8%	0.0001

Table 1: *Obstetric, maternal and neonatal outcome data.*

Obstetric complications

Of 42 miscarriage cases, 2.4% women younger than 20 years, 50% mothers between 20 to 35 years and 47% women older than 35 years. 21 cases of stillbirth, 4.8% younger than 20, while 23.8% between 20 and 35 years and 71.5% mothers aged 35 and older.

There was 537 SVD, 4.1% ≤ 20 years, 69.3% between 20 to 35 years and only 26.6% women over 35.

Regarding LSCS, there were 249 cases, 1.2% were women ≤ 20 years, 39.6% were between 20 and 35 of age and 59% of women older than 35 years.

Maternal complications

There was 89 cases of GDM, 1.1% mothers younger than 20 years, 31.5% mothers between 20 and 35 years and 66.3% mothers older than 35 years.

Neonatal outcomes

Out of 763 deliveries, there were 14 twins sets; as we found from and they were all of mothers older than 35 years. On top of that, 3.42% of the deliveries had abnormal Apgar scores, no abnormal Apgar scores found among neonates of mothers younger than 20 years, while, 22.9% were of mothers between 20 and 35 years and 76.9% were mothers older than 35 years. On the other hand, 1.6% of NICU admissions were for babies of mothers younger than 20 years, 35.3% babies of mothers aged between 20 and 35 years and 55.8% babies of mothers older than 35 years.

Discussion

This study focused on the impact of the maternal age on obstetric and neonatal outcomes with the consideration for the extremes of maternal age (older than 35 years and younger than 20 years of age). Results of this study indicated that the incidence of miscarriage was highest among women between 20 and 35 years, followed by women older than 35 years, while, those less than 20 years had a very low rate. Nevertheless, this result did not reach significance. In comparison, a study in Denmark showed an increased risk of miscarriage in women with increasing maternal age, regardless of parity or number of previous spontaneous abortions. The risk of miscarriage varied from 8.7% at 22 years to 84.1% at 48 years or older [17]. Another study in multiple cities in Europe supported the findings of this study. It stated that "there was a significant increase in the risk of miscarriage if the woman was 30 - 34 years of age and the man was 40 - 64 years of age, or if the woman was 35 - 44 years of age, whatever the age of the man" [18]. Another Italian study described the trend in the risk of miscarriage as 50% in women aged between 25 and 34 years, while, the risk was minimum among women aged 20 - 24 years and increased with advancing age [19].

This study reported that the higher percentage of 21 cases of stillbirth was in mothers aged older than 35 years. Similar to our findings, a systemic review and meta-analysis reported that the risk of stillbirth increase with advanced maternal age (odd ratio (OR) 1.75, 95% a confidence interval (CI) 1.62 to 1.89) with population attributable risk of 4.7%. None of included randomised clinical trials (RCT) distinguished between different causes of stillbirth [20]. Advanced maternal age is associated with many pregnancy complications including preeclampsia, fetal growth restriction (FGR), and placental abruption. Theses all could lead to placental dysfunction and in turn explain the increased rate of stillbirth and miscarriage among women of this age group [20]. On top of this, another systemic review supported these findings where in 24 cohort studies and 6 control studies of good quality, there was a significant association between advanced maternal age and stillbirth. Relative risk was 1.20 to 4.53 for older compared with young mothers [2].

Results of this study demonstrated that the highest incidence of GDM affected mothers older than 35 years. This finding is in agreement with Cleary-Goldman RCT which reported increased age significantly associated with GDM. (OR 1.8 and 2.4) [21]. Furthermore, another cohort study reported that maternal age is in correlation with the prevalence of GDM. The highest prevalence of GDM was among mothers older than 40 years (12.7%), and the lowest prevalence of GDM was among mothers aged younger than 20 years (1.7%), while the prevalence among mothers aged 20 to 29 years was 2.4% [7]. Likewise, an RCT found that there is a relation between GDM and maternal age. The prevalence of patients with a diagnosis of GDM was 2.5%, 12.5%, and 75.0% in those between 23 - 28, 29 - 34 and 34 - 39 years, respectively [22].

Regarding LSCS, results showed that the highest rate was for mothers aged 35 years and older, while the same group's rate of SVD was low compared to the same incidence for mothers aged younger than 35 years. However, mothers aged between 20 and 35 years old, had the highest rate of SVD, and those who were younger than 20 years had a rate of NSVD of 4.1%. Moreover, LSCS rates for both groups were much less. This result may indicate correlation between maternal age and route of delivery. In comparison to previous Saudi cohort study mothers younger than 20 years were more likely to have vaginal delivery (84.4%) and least likely to deliver by LSCS. Added to that, ma-

ternal age persisted as risk factor for LSCS in age 30 - 39 years and increased the odds for such delivery by more than two-folds in women ≥ 40 years, OR 2.9, 95% CI 2.3 to 3.7 [7]. As well as, another study in 2018, showed that the prevalence of LSCS in primiparas older than 35 years had been 64.4%, while in primiparas under 35, the prevalence was 47.5% [23]. Increased rate of CS among women of advanced age can be explained by uterine dysfunction [24]. Advancing age is associated with impaired uterine contractility as well as endothelial dysfunction, which could lead to impaired uterine and utero-placental function [25].

Fourteen sets of twins found in the present study, all of women older than 35 years old. This was also found in a population-based analysis of twin pregnancies in US. In that analysis probability of twin pregnancy increased with maternal age. Twins were accounting for 6.9% of neonates born to women 40 or over, versus 5.0% for women 35 to 39, 4.1% for women 30 to 34, 3.1% for women 25 to 29, 2.2% for women 18 to 24, and 1.3% for women 15 to 17 [26].

Incidents of abnormal Apgar score were highest among mothers older than 35 years, compared to much less rate among neonates of mothers between 20-35 years. On the other hand, there was no cases of abnormal Apgar score among neonates of mothers younger than 20 years. This result is in agreement with three studies showed that 5 minutes Apgar scores < 7, was higher among mothers with advanced maternal age [27-29]. Other studies, however, contradicted these Apgar score findings. This was explained there, by higher rates of antenatal visits, which could indicate that giving appropriate antenatal care improved pregnancy outcomes, however, in this study, there were no records of data for how antenatal care was received and if mothers were attending any [30-32].

The need for NICU admission for neonates increased with advanced maternal age. This can be explained by the fact that mothers 20 - 35 years and younger than 20 years have less maternal complications, and with normal neonatal outcomes. This result is in agreement with previous studies [29,33].

This study encountered only 3.18% mothers younger than 20 years and none had pregnancy complications or adverse neonatal outcome. This reflects increased rate of education in families and more Saudi females employment as published in WHO [7,34]. However, recent studies reported that pregnancy outcomes of mothers in early adolescent age was associated with higher risks of preterm delivery and low birth weight. Due to higher demand of nutrition and low socioeconomic status among families with adolescent mothers, and this was not the case in this study [12,35].

Conclusion

There is a negative impact of the advanced maternal age on obstetric and neonatal outcomes. Advanced maternal age is a risk factor for GDM, preeclampsia and increased incidence of complications during delivery particularly LSCS and NICU admission of the baby later on. Adolescent mothers are at high risk of maternal and child mortality as well, but this was not evident in this study.

Finally, maternal age is one significant factor that could affect obstetric and neonatal outcomes hence, the need for education of women about the safe age for planning a pregnancy and explaining the risk factors and complications associated with delaying pregnancy. On top of that, antenatal care presented to pregnant women with advanced maternal age should aim to minimize these risks.

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