Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2023, 13, 108-120
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Obstetric Outcomes in Advanced Maternal Age among Women at King Abdulaziz University Hospital

Rawan A. Gari[1*], Ghaday M. Alrefaei[2], Shatha A. Alsuwaida[2], Zahra M. Alalwan[2], Zahraa H. Aljeshi[2], Amenah H. Al Jumah[2]

[1]Department of Obstetrics and Gynecology, King Abdulaziz University Hospital, Jeddah, Saudi Arabia
[2]Faculty of medicine, King Abdulaziz University, Jeddah, Saudi Arabia
Email: *rgari@kau.edu.sa, ghadyalrefaie17@gmail.com, Shathaalsuwaida@gmail.com, Zahraamoayed24@gmail.com, Zahraa.h.aljishi@gmail.com, amenahaljumah@gmail.com

How to cite this paper: Gari, R.A., Alrefaei, G.M., Alsuwaida, S.A., Alalwan, Z.M., Aljeshi, Z.H. and Al Jumah, A.H. (2023) Obstetric Outcomes in Advanced Maternal Age among Women at King Abdulaziz University Hospital. *Open Journal of Obstetrics and Gynecology*, **13**, 108-120.
https://doi.org/10.4236/ojog.2023.131013

Received: December 19, 2022
Accepted: January 28, 2023
Published: January 31, 2023

Abstract

Background: Advanced maternal age, over 35 years, is a well-known risk factor for poor pregnancy outcomes. It is commonly associated with various pregnancy complications, such as spontaneous miscarriage, preeclampsia/toxemia, gestational diabetes mellitus, preterm labor, stillbirth, chromosomal abnormalities, and cesarean delivery. **Objectives:** This study assessed obstetric and neonatal complications associated with advanced maternal age. **Methods:** We reviewed the medical records of 199 pregnant women over 35 years old at King Abdulaziz University Hospital in Jeddah, Saudi Arabia, from January to June 2022. We gathered data on age, nationality, number of antenatal visits, results of ultrasound scans for dating and viability, nuchal translucency and anatomy surveys, medications and multivitamins taken during pregnancy, smoking status, pregnancy, and fetal complications, and mode of delivery. Results: The prevalence of obstetric complications was 71.4% (preeclampsia/toxemia, 4.5%; antepartum hemorrhage, 4%; postpartum hemorrhage, 1%; and gestational diabetes, 23.1%). The most frequent complication was preterm labor between 34 and 36 weeks (48%), and only 12.6% of all deliveries were associated with fetal and neonatal complications such as congenital anomalies and neonatal jaundice. The prevalence of anemia during pregnancy was 10.1%, 21.1%, and 28.6% in the first, second, and third trimesters, respectively, and pregnancies complicated with antepartum or postpartum hemorrhage were associated with higher rates of anemia in the second trimester. A significant relationship was found between mean maternal age (38.84 ± 2.75 years) and the development of maternal complications ($p < 0.05$). Newborns with neonatal complications were much more likely to

be born to mothers with a history of antepartum hemorrhage and anemia in the second trimester. **Conclusion:** Our findings confirm that pregnancy at an advanced maternal age is associated with increased overall maternal complications. The most frequent complication was preterm labor (48%). Other complications, such as preeclampsia/toxemia, antepartum hemorrhage, postpartum hemorrhage, gestational diabetes, and anemia, were less frequent in the sample we reviewed.

Keywords

Advanced Maternal Age, Preeclampsia/Toxemia, Pregnancy Outcomes, Complications, KAUH, Jeddah

1. Introduction

Despite variations in definition, advanced maternal age is widely defined as maternal age exceeding 35 years [1]. Nowadays, women tend to delay motherhood for various biopsychosocial reasons, including the availability of effective contraception and modern fertility treatment options, as well as delaying marriage and focusing on career and career development [2]. It is well known that both mother and fetus are prone to various obstetric and neonatal complications when pregnancy occurs after age 35, such as spontaneous miscarriage, preterm labor, gestational diabetes mellitus (GDM), gestational hypertension, and preeclampsia/toxemia (PET), stillbirth, and cesarean section (CS) delivery [3] [4]. Therefore, women over 35 should be counseled about possible maternal and neonatal risks and complications associated with pregnancy at advanced maternal age.

In 2020, an 18-year-long retrospective study conducted in Jeddah, Saudi Arabia among 79,095 women concluded that the risk of adverse maternal and obstetric complications such as antepartum hemorrhage (APH), postpartum hemorrhage (PPH), GDM, hypertension, premature rupture of membranes (PROM), and CS delivery increased with maternal age, as did fetal and neonatal complications such as low birth weight, macrosomia, admission to the neonatal intensive care unit, congenital anomalies, and low Apgar score [2].

In general, studies on pregnancy outcomes associated with advanced maternal age are scarce in Saudi Arabia. Therefore, this study aims to determine the most common maternal and neonatal complications among women above 35 years in our facility.

2. Subjects and Methods

This retrospective, record-based study included 199 women over the age of 35 years. It was conducted at King Abdulaziz University Hospital (KAUH) in Jeddah, Saudi Arabia, from January to June 2022, after approval of the institution's ethical committee board was granted (Reference No. 350-22). We reviewed out-

patient clinic records of pregnant women attending antenatal visits at KAUH who were older than 35 years. Any woman, primigravida or multigravida, who had undergone spontaneous or induced delivery was included in this study. Women aged above 51 and those with pregestational chronic medical illnesses such as diabetes, hypertension, bleeding disorders, hemolytic diseases, immunological diseases, or ectopic pregnancy were excluded. We drafted a checklist to guide the collection of demographic data, number of antenatal visits, ultrasound findings, medications and multivitamins taken during the current pregnancy, smoking status, mode of delivery, pregnancy complications, and neonatal outcomes. Patients' medical records were reviewed using the Phoenix database at KAUH.

3. Data analysis

We performed statistical analysis on the collected data using IBM SPSS Statistics (Version 26). The chi-square test (χ^2) was applied to qualitative data, expressed as numbers and percentages, to examine the relationship between variables. The Kruskal Wallis and Mann-Whitney tests were used to analyze the relationship between quantitative nonparametric variables, expressed as mean ± standard deviation (SD).

4. Results

The mean age of patients was 38.13 ± 2.68 years. The majority were nonsmokers (98.5%), and 79.9% were of Saudi nationality. Among the patients, 70.9%, 1.5%, and 15.6% had dating and viability scans, nuchal translucency scans, and anatomy scans done, respectively. Moreover, 46.7% had growth scans performed during the second trimester and 41.7% during the third trimester. Most patients (64.3%) were taking medications during pregnancy, including tocolytic agents, progesterone, insulin, oral hypoglycemic agents, anticoagulants, antibiotics, glucocorticoids, opioids, proton pump inhibitors, beta-blockers, antihypertensive medications, and thyroid hormone replacement. Approximately 31.2% took folic acid, and 68.8% took multivitamin supplements (Table 1).

The overall prevalence of obstetric complications was 71.4%. Specifically, the prevalence of PET, APH, PPH, and GDM was 4.5%, 4%, 1%, and 23.1%, respectively. Only 12.6% had fetal complications, with preterm labor being the most common complication (48%). Among the patients, 10.1% developed anemia in the first trimester, 21.1% in the second, and 28.6% in the third. About half of the patients (45.7%) were delivered by CS, and only 2% had multiple gestations (Table 2).

More than half of the patients (59.8%) underwent routine screening for GDM at 24 to 28 weeks gestation: 24.1% had a confirmed diagnosis of GDM, and 40.2% of participants did not document the GDM status. For 15.6% of the women, pregnancy continued beyond 40 weeks, and for most participants (66.3%), gestational age was based on their last menstrual period (Table 2). It was considered missed/unknown for our study.

Table 1. Demographic data and key variables of included women (N = 199).

Variable	No.	%
Age (years ± SD)	38.13 ± 2.68	
Nationality		
Missing data	1	0.5
Saudi	159	79.9
Non-Saudi	39	19.6
Taking folic acid?		
Missing data	128	64.3
Yes	62	31.2
No	9	4.5
Taking vitamin supplements?		
Missing data	54	27.2
Yes	137	68.8
No	8	4
Smoking status		
Missing data	1	0.5
Smoker	2	1
Nonsmoker	196	98.5
US for dating and viability done?		
Missing data	45	22.6
Yes	141	70.9
No	13	6.5
US for nuchal translucency done?		
Missing data	191	96
Yes	3	1.5
No	5	2.5
US anatomy scan done?		
Missing data	149	74.9
Yes	31	15.6
No	19	9.5
Growth scan in 2nd trimester done?		
Missing data	77	38.7
Yes	93	46.7
No	29	14.6
Growth scan in the 3ed trimester done?		
Missing data	79	39.7
Yes	83	41.7
No	37	18.6
Taking medications during current pregnancy?		
Missing data	21	10.6
Yes	128	64.3
No	5	25.1

US, ultrasonography.

Table 2. Pregnancy, fetal complications, and mode of delivery among the studied women (N = 199).

Variable	No.	%
Maternal complications during the current pregnancy		
Yes	142	71.4
No	57	28.6
Type of complication		
Antepartum hemorrhage	8	4
Preeclampsia/toxemia	9	4.5
Postpartum hemorrhage	2	1
GDM	46	23.1
Fetal complications		
Missing data	93	46.7
Yes	25	12.6
No	81	40.7
Type of fetal complication (No. 25)		
PPROM	5	20
Preterm labor	9	48
Chromosomal anomalies	1	4
Congenital anomalies	3	12
Intrauterine fetal death	1	4
Neonatal jaundice	3	12
Anemia		
First trimester	20	10.1
Second trimester	42	21.1
Third trimester	57	28.6
Mode of delivery		
Missing data	2	1
Spontaneous vaginal delivery	106	53.3
Cesarean section	91	45.7
Maternal Rh factor		
Missing data	2	1
Positive	180	90.5
Negative	17	8.50
Type of pregnancy		
Missing data	5	2.5
Single	190	95.5
Multiple	4	2

Continued

GDM screening at 24 - 28 weeks		
Missing data	80	40.2
Normal	71	35.7
Gestational diabetes	48	24.1
Postdate pregnancy (>40 weeks)		
Missing data	24	12
Yes	31	15.6
No	144	72.4
Gestational age calculation method		
Missing data	46	23.1
Last menstrual period	132	66.3
First trimester US	21	10.6

GDM, gestational diabetes mellitus; PPROM, preterm premature rupture of membranes; US, ultrasonography.

Results from the Mann-Whitney test showed a significant relationship between maternal age and the use of folic acid ($p \leq 0.05$). However, a nonsignificant relationship was found between mean maternal age and smoking status, medication use, and postdate pregnancy ($p \geq 0.05$), as shown in Table 3.

A significant relationship was found between mean maternal age (38.84 ± 2.75 years) and the development of maternal complications compared with those who did not develop complications (37.84 ± 2.6 years; $p \leq 0.05$). However, a nonsignificant relationship was found between mean maternal age and all fetal complications ($p \geq 0.05$) (Table 4).

The percentage of fetal complications was significantly higher among mothers who developed APH and anemia in the second trimester ($p \leq 0.05$). However, a nonsignificant relationship was found between fetal complications and postdate pregnancy ($p \geq 0.05$) (Table 5). In addition, mothers who developed APH or PPH had a higher percentage of anemia in the second trimester ($p \leq 0.05$). However, a nonsignificant relationship was found between PET and GDM with anemia in all pregnancy trimesters (Table 6).

5. Discussion

This study assessed the obstetrical outcomes of advanced maternal age among pregnant women in the hospital's facility. The result shows that the overall obstetric and maternal complications were statistically associated with mean maternal age. In addition, the prevalence of obstetric complications related to advanced maternal age was 71.4%. This percentage is higher than previously recorded in another study performed in 2020 in Ethiopia among 398 women, in which the authors conclude that 64.6% of women aged 35 and above had significantly higher adverse pregnancy outcomes [5].

Table 3. The relationship between mean maternal age and supplement use, smoking, current medications, and postdate pregnancy (N = 199).

Variable	Maternal age (mean ± SD)	Mann-Whitney test	P value
Taking folic acid			
Yes	38.18 ± 2.62	3.03	**0.041**
No	36.33 ± 1.11		
Taking vitamin supplements			
Yes	38.18 ± 2.62	0.89	0.372
No	37.13 ± 2.03		
Smoking status			
Smoker	35.5 ± 0.7	1.5	0.152
Nonsmoker	38.15 ± 2.68		
Medications during current pregnancy			
Yes	37.92 ± 2.59	5	0.616
No	38.18 ± 2.78		
Postdate pregnancy (>40 weeks)			
Yes	37.61 ± 2.34	2	0.556
No	38.24 ± 2.74		
Missing data	38.08 ± 2.73		

Table 4. Relationship between mean maternal age and fetal and maternal complications (N = 199).

Variable	Maternal age (mean ± SD)	Test	P value
Fetal complications			
Yes	38.96 ± 3.33	1.33*	0.181
No	37.77 ± 2.22		
Type of complication			
PPROM	37.4 ± 3.28	1**	0.18
Preterm labor	37.11 ± 2.42		
Chromosomal anomalies	44 ± 0.01		
Congenital anomalies	41.67 ± 3.05		
IUFD	37 ± 0.001		
Neonatal jaundice	42.67 ± 2.51		
Complications during the current pregnancy			
Yes	38.84 ± 2.75	2.37*	**0.017**
No	37.84 ± 2.6		
Type of complication			

Continued

Antepartum hemorrhage			
Yes	38.38 ± 2.2	0.64*	0.518
No	38.02 ± 2.71		
Preeclampsia/toxemia			
Yes	39.44 ± 3.2	1.37*	0.17
No	38.06 ± 2.66		
Postpartum hemorrhage			
Yes	40 ± 1.41	1.18*	0.276
No	38.17± 2.72		
Gestational diabetes mellitus			
Yes	38.67 ± 2.79	1.83*	0.067
No	37.9 ± 2.61		
Anemia (first trimester)			
Yes	38.85 ± 3.15	1.68*	0.093
No	37.44 ± 2.07		
Anemia (second trimester)			
Yes	38.6 ± 2.98	0.97*	0.331
No	37.91 ± 2.35		
Anemia (third trimester)			
Yes	38.07 ± 2.84	0.16*	0.867
No	38.05 ± 2.63		
Postdate pregnancy (>40 weeks)			
Yes	37.61 ± 2.34	2**	0.556
No	38.24 ± 2.75		
Missing	38.08 ± 2.73		
Mode of delivery			
Missing	36.5 ± 2.12	1**	0.107
Spontaneous vaginal delivery	37.88 ± 2.65		
Cesarean section	38.45 ± 2.7		

PPROM, preterm premature rupture of membranes; IUFD, intrauterine fetal death. * Mann Whitney test. ** Kruskal Wallis test.

Preterm labor was the most significant obstetric complication in our study, reaching a prevalence of 48%. This result is higher than a Saudi Arabian cohort study done in 2017 among 3415 women, which reported a percentage of 26.7% [6]. In addition, these results are higher than a prospective study conducted in India in 2014 among 1263 women, which found a percentage of 17.5% [7].

Table 5. Relationship between fetal complications and maternal complications and post-date pregnancy (N = 199).

Variable	Fetal complications		χ^2	P value
	Yes No. (%)	No No. (%)		
Antepartum hemorrhage				
Yes	5 (20)	2 (2.5)	21.83	**<0.001**
No	16 (64)	71 (87.7)		
Preeclampsia/toxemia				
Yes	2 (8)	4 (4.9)	1.45	0.835
No	22 (88)	72 (88.9)		
Postpartum hemorrhage				
Yes	0 (0.0)	1 (1.2)	7.4	0.116
No	25 (100)	78 (96.3)		
Gestational diabetes mellitus				
Yes	9 (36)	18 (22.2)	4.74	0.315
No	16 (64)	60 (74.1)		
Anemia (first trimester)				
Yes	4 (16)	10 (12.3)	7.86	0.097
No	7 (28)	29 (35.8)		
Anemia (second trimester)				
Yes	6 (24)	19 (23.5)	10.61	**0.031**
No	9 (36)	34 (42)		
Anemia (third trimester)				
Yes	11 (44)	20 (24.7)	4.19	0.38
No	13 (52)	57 (70.4)		
Postdate pregnancy (>40 weeks)				
Yes	1 (4)	13 (16)	6.89	0.142
No	21 (84)	54 (66.7)		
Missing data	3 (12)	14 (17.3)		

Pre-eclampsia/toxemia (PET) is the typical hypertensive disorder linked to advanced maternal age [8]. Our study found a prevalence of 4.5%, which is comparable to a previous retrospective study conducted in our facility published in 2020. This study included 3942 singleton deliveries found that advanced maternal age was a statistically significant factor for developing PET during pregnancy, with a prevalence of 4.2% [9]. These results reflect those of Nunes et al. (2020), which included 301 pregnant women and showed a slightly higher prevalence of PET (6%) [10].

Table 6. Relationship between maternal complications and anemia in each trimester of pregnancy (N = 199).

Anemia	Antepartum hemorrhage		χ^2	P value
	Yes No. (%)	No No. (%)		
First trimester				
Yes	4 (16)	10 (12.3)	7.86	0.097
No	7 (28)	29 (35.8)		
Second trimester				
Yes	6 (24)	19 (23.5)	10.61	**0.031**
No	9 (36)	34 (42)		
Third trimester				
Yes	11 (44)	20 (24.7)	4.19	0.38
No	13 (52)	57 (70.4)		
Preeclampsia/toxemia				
First trimester				
Yes	1 (11.1)	19 (10.7)	8.81	0.066
No	3 (33.3)	54 (30.5)		
Second trimester				
Yes	1 (11.1)	41 (23.2)	17.12	0.002
No	3 (33.3)	62 (35)		
Third trimester				
Yes	2 (22.2)	51 (28.8)	3.1	0.541
No	7 (77.8)			
Postpartum hemorrhage				
First trimester				
Yes	0 (0.0)	20 (10.8)	6.45	0.168
No	0 (0.0)	56 (30.3)		
Second trimester				
Yes	1 (50)	41 (22.2)	12.18	**0.016**
No	0 (0.0)	64 (34.6)		
Third trimester				
Yes	1 (50)	54 (29.2)	1.41	0.841
No	1 (50)	120 (64.9)		
Gestational diabetes mellitus				
First trimester				
Yes	6 (13)	14 (9.4)	2.21	0.696
No	10 (21.7)	46 (30.9)		

Continued

Second trimester				
Yes	11 (23.9)	31 (20.8)	3.54	0.471
No	18 (39.1)	46 (30.9)		
Third trimester				
Yes	17 (37)	39 (26.2)	2.44	0.654
No	26 (56.5)	101 (67.8)		

The prevalence of GDM in our study was 23.1%, a finding supported by a larger sample size cohort study conducted on 3415 participants in 2017 in Riyadh, Saudi Arabia, showing a high prevalence of GDM among women ≥ 35 years (64.3%) [6]. In addition, a study in Jeddah in 2021 showed a prevalence of 32% [11]. Moreover, a more recent study documented a prevalence of 18.2% [2].

Concerning APH, the prevalence in our study was 4%, which is comparable to a study conducted by Pawde *et al.* in 2015, showing a prevalence of 6.4% [7]. Furthermore, another study conducted in 2020 in Ethiopia on 398 participants reported that advanced maternal age > 35 years correlates with a 16% increase in APH [5]. However, the prevalence of PPH was only 1%. This finding contrasts a study done in Jeddah in 2022 on 1586 women, which demonstrated a significant relationship between PPH and advanced maternal age, with a prevalence of 43% [11].

Almost half of the women in our study delivered via a cesarean section (45.7%), confirming the correlation between advanced maternal age and CS delivery. Similarly, a study conducted in Jeddah, Saudi Arabia, in 2021 found a significant association between AMA and the prevalence of CS delivery (43.6%) [11]. In addition, a study conducted in 2020 in Ethiopia reported a two-fold increase in the rate of cesarean delivery associated with advanced maternal age [5].

Among this study's participants, 10.1%, 21.1%, and 28.6% had anemia in the first, second, and third trimesters, respectively. This outcome is comparable to a previous study conducted in the Northern region of Saudi, where 16.8% of the women were of advanced maternal age, 17.1% had anemia on their first visit to the GP, and 45.2% were found to have anemia later in the pregnancy [12] [13].

Finally, this study found that the prevalence of post-date pregnancy was 31%. However, a different study conducted in the Netherlands in 2020 found a correlation between AMA and post-date pregnancy, with a smaller percentage of 13.1%.

6. Limitations and Areas for Future Research

This study was limited to a single center and only 199 patients. Consequently, it is possible that our findings do not necessarily reflect the complications in other distinct and larger populations. Furthermore, using a retrospective study design hinders the generalizability of our study's findings. Other limitations include missing data from some of the patients' records. Nevertheless, these limitations

pave the way for future research opportunities, as the findings of this study can give greater validity and credibility using alternative methods, a larger sample size, different populations, and a multicenter approach.

7. Conclusion

Our findings confirm that pregnancy at an advanced maternal age increases the risk of developing several obstetric and neonatal complications, as reported in the literature. However, the most frequent complication we found was preterm labor. Other complications, such as PET, APH, PPH, GDM, and anemia during pregnancy were less frequent.

Acknowledgements

The authors gratefully acknowledge the cooperation of the administrative staff of the study setting.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Heazell, A.E., Newman, L., Lean, S.C. and Jones, R.L. (2018) Pregnancy Outcome in Mothers over the Age of 35. *Current Opinion in Obstetrics and Gynecology*, **30**, 337-343. https://doi.org/10.1097/GCO.0000000000000494

[2] AlJahdali, E.A. and AlSinani, N.S. (2022) Pregnancy Outcomes at Advanced Maternal Age in a Tertiary Hospital, Jeddah, Saudi Arabia. *Saudi Medical Journal*, **43**, 491-499. https://doi.org/10.15537/smj.2022.43.5.20220023

[3] Bayrampour, H., Heaman, M., Duncan, K.A. and Tough, S. (2012, September 19) Advanced Maternal Age and Risk Perception: A Qualitative Study. *BMC Pregnancy and Childbirth*, **12**, Article No. 100. https://doi.org/10.1186/1471-2393-12-100 https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/1471-2393-12-100

[4] Harrison, B.J., Hilton, T.N., Rivière, R.N., Ferraro, Z.M., Deonandan, R. and Walker, M.C. (2017) Advanced Maternal Age: Ethical and Medical Considerations for Assisted Reproductive Technology. *International Journal of Women's Health*, **9**, 561-570. https://doi.org/10.2147/IJWH.S139578

[5] Pawde, A.A., Kulkarni, M.P. and Unni, J. (2015). Pregnancy in Women Aged 35 Years and Above: A Prospective Observational Study. *Journal of Obstetrics and Gynaecology of India*, **65**, 93-96. https://doi.org/10.1007/s13224-014-0616-2

[6] Nunes, J.S., Ladeiras, R., Machado, L., Coelho, D., Duarte, C. and Furtado, J.M. (2020) A influência da pré-eclâmpsia, idade materna avançada e obesidade materna em desfechos neonatais entre mulheres com diabetes gestacional. *Revista brasileira de ginecologia e obstetricia*: *revista da Federacao Brasileira das Sociedades de Ginecologia e Obstetricia*, **42**, 607-613. https://doi.org/10.1055/s-0040-1710300

[7] El-Gilany, A.H. and Hammad, S. (2012) Obstetric Outcomes of Teenagers and Older Mothers: Experience from Saudi Arabia. *International Journal of Collaborative Research on Internal Medicine & Public Health*, **4**, 901-909.

[8] Asefa, U. and Ayele, W.M. (2020) Adverse Obstetrical and Perinatal Outcomes

among Advanced Age Pregnant Mothers in Northeast Ethiopia: A Comparative Cross-Sectional Study. *International Journal of Women's Health*, **12**, 1161-1169. https://doi.org/10.2147/IJWH.S284124

[9] Ananth, C.V. and Basso, O. (2010) Impact of Pregnancy-Induced Hypertension on Stillbirth and Neonatal Mortality. *Epidemiology*, **21**, 118-123. https://doi.org/10.1097/EDE.0b013e3181c297af

[10] Abu-Zaid, A., Alomari, M., Al-Hayani, M., Bazi, A., Almazmomy, A., Alsaegh, A., Alshawkani, H. and Radwan, A. (2020) Advanced Maternal Age and the Frequency of Pre-Eclampsia—A Single-Center Cross Sectional Study from Saudi Arabia. *Journal of Evolution of Medical and Dental Sciences*, **9**, 2726-2729. https://doi.org/10.14260/jemds/2020/592

[11] Shams, T., Gazzaz, T., Althobiti, K., Alghamdi, N., Bamarouf, W., Almarhoumi, L. and Alhashemi, H. (2021) Comparison of Pregnancy Outcomes Between Women of Advanced Maternal Age (≥35 years) Versus Younger Women in a Tertiary Care Center in Saudi Arabia. *Annals of Saudi Medicine*, **41**, 274-279. https://doi.org/10.5144/0256-4947.2021.274

[12] Fayed, A.A., Wahabi, H., Mamdouh, H., Kotb, R. and Esmaeil, S. (2017) Demographic Profile and Pregnancy Outcomes of Adolescents and Older Mothers in Saudi Arabia: Analysis from Riyadh Mother (RAHMA) and Baby Cohort Study. *BMJ Open*, **7**, e016501. https://doi.org/10.1136/bmjopen-2017-016501

[13] Kortekaas, J.C., Kazemier, B.M., Keulen, J.K.J., Bruinsma, A., Mol, B.W., Vandenbussche, F., Van Dillen, J. and De Miranda, E. (2020) Risk of Adverse Pregnancy Outcomes of Late- and Postterm Pregnancies in Advanced Maternal Age: A National Cohort Study. *Acta Obstetricia et Gynecologica Scandinavica*, **99**, 1022-1030. https://doi.org/10.1111/aogs.13828