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The Obstetric and Perinatal Outcomes of Adolescent Pregnancies in a Developed Cosmopolitan Middle Eastern Country: A Retrospective Pearl-Peristat Registry

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Abstract

Background: Early marriage is prevalent in Middle Eastern culture. The objective of this study was to investigate the pregnancy outcomes of married pregnant adolescents in a prosperous and highly developed Middle Eastern society, when they receive sufficient prenatal care and social assistance. Methods: A retrospective analysis was performed on the Peristat-based Maternal-Newborn registry utilizing hospital data acquired from four main governmental hospitals in Qatar. The study analyzed the pregnancy outcomes of young adults [ages 20 - 24) who experienced their first pregnancy and compared them to the pregnancy outcomes of adolescents aged 15 to 19 years old. Results: The study comprised a cohort of 3152 pregnant married women. This cohort included 2674 women between the ages of 20 and 24, as well as 478 adolescents aged 15 to 19 years old. In comparison to the young adult group, the non-Qatari population in the adolescent group was significantly higher (78.6% (376/478) vs. 71.5% (1914/2674), p-value = 0.003). Other Arab nationalities accounted for more than half of the adolescent population. All the mothers were married, did not use alcohol, and were nonsmokers. There were no documented mothers under the age of 15. Attending antenatal clinics was significantly higher in the adolescent group ($p < 0.001$). There was no significant difference in the mean gestational age at birth between adolescents and young adults (38.5 ± 2.3 weeks vs. 38.7 ± 2.1 weeks, $p = 0.06$). Furthermore, adolescent mothers had a higher rate of low birth weight (13.6% vs. 10.4%, $p < 0.001$) than young mothers. There was a non-statistically significant rise in pre-eclampsia incidence. Other unfavorable pregnancy outcomes were less common among them, such as diabetes, operative vaginal delivery,

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caesarean section, stillbirth, NICU hospitalization, and an Apgar score of less than 7 at five minutes. There were no maternal deaths; however, there was a comparable rate of neonatal in-hospital mortality. Conclusion: Pregnancy during adolescence may not relate to significant problems in a well-tolerant culture that ensures dedicated antenatal and social support.

Keywords

Adolescent, Neonatal, Obstetric Outcome, Qatar, Pregnancy, Pearl-Peristat

1. Introduction

"Adolescent pregnancy" refers to pregnancies that occur in girls between the ages of 10 and 19 years of age. Approximately 11% of births worldwide are experienced by adolescents between the ages of 15 and 19, and over 90% of these instances occur in low- and middle-income countries [1]. The estimated global adolescent birth rate stood at 44 births per 1000 girls aged 15 to 19. The regions with the highest rates were West and Central Africa (115 births), the Middle East and North Africa (40 per 1000 births), while in Qatar it is as low as 10 births per 1000 births [2]. Such adverse pregnancy outcomes were caused by their biological.

Nevertheless, global adolescent pregnancy rates have declined during the past two decades [2]. This decline has been attributed, in part, to the greater utilization of contraception and the enhanced knowledge/education of reproductive health matters among younger individuals [3]. However, there is a notable prevalence of teenage pregnancies in many regions of the world due to societal, and cultural norms that promote early marriage and childbirth [4] [5]. It should be noted that sexual assault can also play a role in some instances of early pregnancy. Adolescent pregnancies in low-income countries are typically not intended, as indicated by previous research [6]-[8]. Also, it has been found that teenagers with mental health issues have a higher likelihood of becoming pregnant [9] [10]. Currently, numerous governments worldwide have implemented a prohibition on marriages involving individuals under the age of 15 including the state of Qatar. Nevertheless, numerous countries continue to permit these practices. A significant number of countries in the Arab world continue to allow adolescent marriages. Between 2000 and 2011, the Arab World had a marriage rate of 54% before the age of 20 - 24 with no education, and 17% for those with only secondary school. Early marriages are mostly driven by factors such as limited access to education, poverty, and a misinterpretation of religious beliefs prevalent in rural regions [11] [12]. Adolescents are more prone to experiencing maternal and perinatal issues such as preeclampsia, fetal, development restriction, preterm birth, cephalopelvic disproportion, and infant and maternal death [2] [13]-[21]. From 2018 to 2019, the average number of deliveries in the state of Qatar was approximately 25,000 each year. The objective of this study was to

examine and contrast the pregnancy outcomes in first-time pregnant adolescent mothers with those in young adult mothers, under the condition of receiving sufficient healthcare.

2. Methods

This is a descriptive retrospective cohort study from Perinatal registry database (The Pearl-Peristat Registry). The study aims to evaluate the pregnancy outcome of adolescent pregnancy for both the mother and her newborn and compare it with those young mothers aged between 20 to 24 years of age. This study used typically acquired maternal and neonatal hospital data from Qatar's four main government-run hospitals to conduct a retrospective data analysis of the population-based Pearl-Peristat birth registry over a period of 2 years (2018-2019).

Excluded from the registry is the private sector in Qatar due to its low contribution of fewer than 15% of births and the lack of compatibility with the electronic health record system used. Most of the registry data came from Cerner® shared electronic medical records [EMR], which connects all four government hospitals. We did not include unmarried pregnant women due to socio-religious convictions and the secretive character of such situations, which hinders follow-up. In addition, a social data questionnaire was employed to collect socioeconomic and demographic health information about the participating women's socioeconomic standing (employment, income, education, smoking, alcohol consumption, housing…etc.). The collected data was examined and saved in software built by the Dendrite® database solution, and it was analyzed using both Dendrite® and SPSS® version 21. The Pearl-Peristat Registry has received ethical approval from Hamad Medical Corporation's medical research Centre. For participant recruitment, no formal consent was necessary. Before receiving social data, subjects verbally agreed and were given patient information brochures. The study compared primarily the perinatal outcome of singleton pregnancies in primigravida adolescents' mothers aged 15 to 19 years to singleton pregnancies in primigravida young mothers aged 20 to 24.

The variables of the analyzed mothers included age at delivery, nationality (Qatari, other Arabs, and other ethnicities), mother's height, estimated body mass index (BMI) prior to or during early pregnancy and at the time of delivery, number of visits to antenatal clinics, and visits companion (husband, mothers, or family members). Other binary outcomes were pre-gestational diabetes (diabetes mellitus before getting pregnant) or gestational diabetes (high blood glucose that develops during pregnancy and usually disappears after giving birth), pre-eclampsia (pregnancy induced hypertension and proteinuria] and/or eclampsia (pre-eclampsia associated with seizures), chorioamnionitis (an infection of the placenta and the amniotic fluid), vaginal birth with vacuum or forceps, cesarean birth, postpartum hemorrhage (excessive vaginal bleeding with an estimated blood loss of 500 mL after vaginal birth or 1000 mL after a cesarean section within 24 hours of delivery was characterised as postpartum hemorrhage) and maternal mortality. Neonatal outcome variables included birth weight and

gestational age at birth. At term, a birth weight of less than 2.5 kg was deemed low. Preterm birth is the delivery of a viable fetus before 37 weeks of gestation. Stillbirths [macerated or fresh], admission to a newborn intensive care unit (NICU), an Apgar score of less than 7 at five minutes of age, and in-hospital death.

The study focused on testing the population extrapolated from the register, rather than using a predefined sample size of adolescent mother. The statistical analysis was conducted using IBM SPSS 22, with a significant threshold set at 0.05. To summarize the distribution of the variables, we employed numerical values and percentages. Alternatively, where applicable, we used the mean and standard deviation. The Data are presented as standard deviation, frequency distribution, percentage or mean. Frequencies were analyzed using the chi-square test. An Independent T-test was used for the continuous variables. It is used to analyze whether significant differences exist in the basic data.

3. Results

Out of 30,700 total deliveries recorded in the registry over a period of 2 years, a total of 3152 singletons born to primigravida mothers aged between 15 and 24 years of age were examined at or after 24 weeks of gestation. This cohort consisted of 2674 women aged 20 - 24 and 478 adolescents aged 15 - 19 which make rate of adolescent pregnancy equal to 478/30,700 1.6%. Significantly higher proportions of non-Qataris were found in the adolescent group (78.6%; 376/478) than in the young adult group (71.5%; 1914/2674) and ($p = 0.001$). As shown in Table 1 and Figure 1, 42% of the adolescent population belonged to other Arab nationalities. Pregnancy below the age of 15 years has not been reported. Antenatal care visits more than 2 times were observed to be higher among adolescent group with rate of 94.5% vs 75% in young adult group and P value < 0.0001. A comparison was not found to be statistically significant in terms of pre-pregnancy or early-pregnancy body mass index (BMI) between the two cohorts (158 adolescents and 1016 young adults; 23.9 ± 4.8 kg/m^2 versus 24.5 ± 4.8 kg/m$^{2)}$. A statistically significant difference was observed in the mean BMI at delivery between the two groups (28.0.5 kg/m^2 versus 29.4 5.3 kg/m^2; $p < 0.001$). Each adolescent mother was married, supported by extended family members, abstinent from alcohol, and a nonsmoker. The prevalence of pre-eclampsia was not significantly higher among the adolescent cohorts. Diabetes, instrumental vaginal delivery, and cesarean section (Table 1). There was no statistically significant difference in the mean gestational age at birth (38.5 ± 2.3 weeks vs. 38.7 ± 2.1 weeks, $p = 0.06$) between adolescents and young adults however, in comparison, the mean birth weight was lower 2990 ± 537 grams vs 3088 ± 541 grams in young adult group ($p < 0.001$). The prevalence of LBW was higher among adolescent mothers compared to young mothers (13.6 versus 10 percent, $p < 0.001$). Stillbirth, NICU admission, and Apgar less than 7 at five minutes all showed no significant difference. In hospitals, neonatal mortality was comparable in frequency, where-

as maternal fatalities were non-existent (Table 1 & Table 2 and Figure 2).

Table 1. Maternal characteristics and pregnancy outcomes.

	Total [n = 3152]		Comparison groups				p-value
			≤19 years [n = 478]		20 - 24 years [n = 2674]		
Qatari	862	27.3%	102	21.3%	760	28.4%	0.003
Other arabs	1497	47.5%	255	42.4%	1242	29.3%	
Other Nationalities	793	25.2%	121	36.3%	672	42.3%	
Height	158.7 ± 6.1		157.9 ± 5.6		158.8 ± 6.2		0.002
Pre-pregnancy BMI*	24.2 ± 3.2		23.9 ± 4.8		24.5 ± 4.8		0.232
Delivery *BMI kg/m^2	29.2 ± 5.3		28 ± 5		29.4 ± 5.3		<0.001
Antenatal care [>two visit]	2452	78%	452	94.5%	2000	75%	<0.0001
Caesarean section	629	20%	83	17.4%	546	20.4%	0.124
Gestational diabetes	600	19%	78	16.3%	522	19.5%	0.113
PET/Eclampsia	73	2.3%	13	2.7%	60	2.2%	0.524
Post-partum hemorrhage	214	6.8%	29	6.1%	185	6.9%	0.645
Chorioamnionitis	79	2.05%	10	2.1%	69	2.5%	0.530
Forceps/Vacuum†	326	12.9%	42	10.6%	284	13.3%	0.140

Data reported as counts and % or mean and standard deviation. †Vaginal births only. *Data for pre: or early-pregnancy Body mass indix (BMI) were available for 158 women in the adolescent group and 1016 women in the young adults.

Table 2. Neonatal outcome.

	Total [n = 3152]		Comparison groups				p-value
			≤19 years [n = 478]		20 - 24 years [n = 2674]		
Mean gestational age [weeks]	38.7 ± 2.1		38.5 ± 2.3		38.7 ± 2.1		0.067
24 - 36 weeks	264	8.4%	49	10.3%	215	8%	0.108
≥37 weeks	2888	91.6%	429	89.7%	2459	92%	0.110
NICU admission	512	16.4%	75	15.8%	437	16.5%	0.716
Apgar < 7 at 5 mins	10	0.3%	1	0.2%	9	0.3%	0.538
Birth weight > 2500 grams	3073 ± 542		2990 ± 537		3088 ± 541		<0.001
LBW < 2500 grams	114	3.6%	26	5.4%	88	3.3%	<0.001
Stillborn	21	0.7%	3	0.6%	18	0.7%	0.603
In-hospital mortality (newborn)	10	0.3%	2	0.4%	8	0.3%	0.462

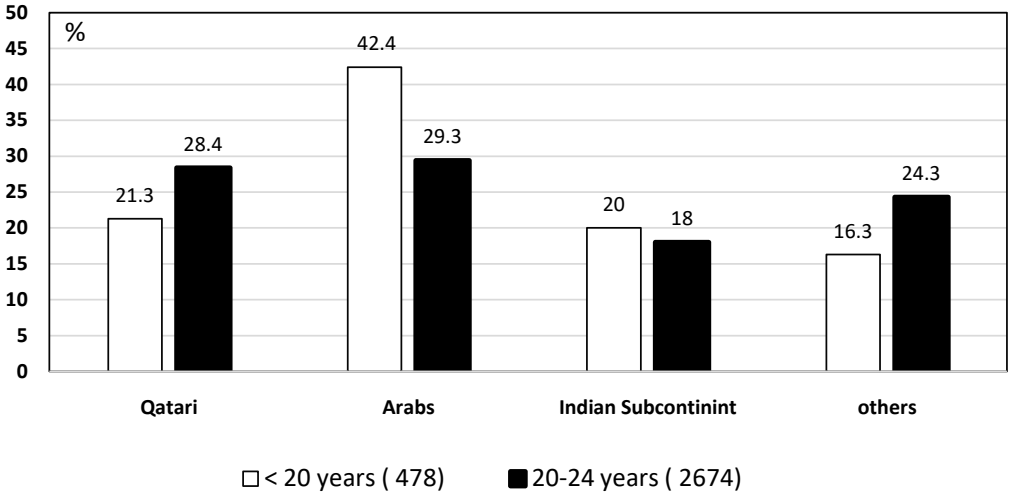
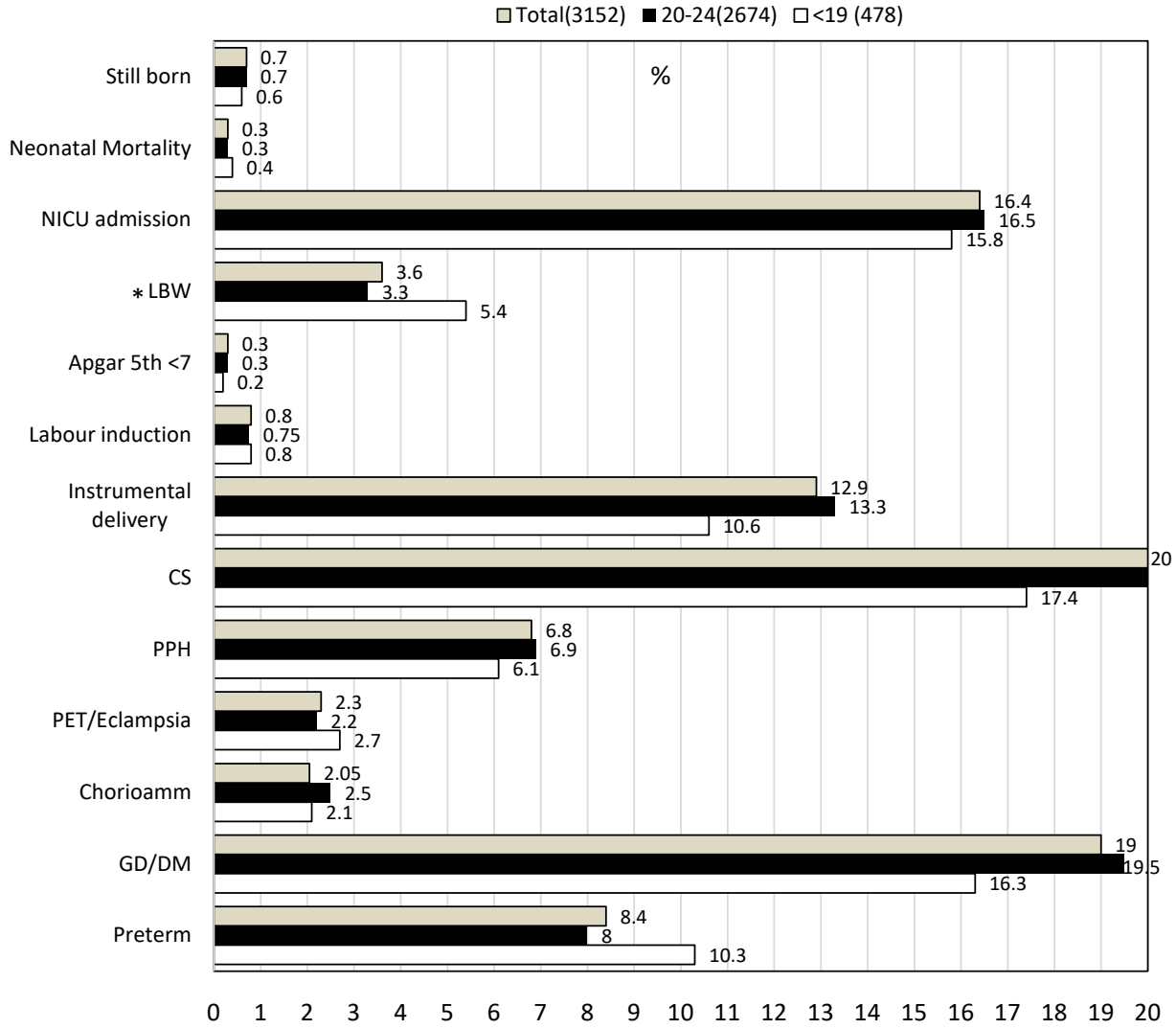


Figure 1. Percentage of adolescent pregnancy per region of origin.



*significance p value < 0.05. LBW = low birth weight. PPH = post-partum haemorrhage CS = Caesarean section

Figure 2. Overall outcome of adolescent & young adult pregnancy.

4. Discussion

Socio-religious beliefs have an impact on the prevalence of adolescent marriages and pregnancies in various countries and cultures worldwide. Early age pregnancy increases the likelihood of health difficulties for both the mother and newborn due to the woman's restricted ability to offer sufficient care, stemming from her own lack of knowledge and resources. Governments aim to decrease adolescent-age pregnancies and enhance the health outcomes of this age group by advocating for comprehensive sexuality education, raising awareness about the risks of adolescent-age marriages, offering support systems, ensuring access to education and sustainable healthcare, and promoting legislation against early marriages. Investigating teenage pregnancy uncovers a range of challenges and possibilities. This study investigated the perinatal clinical outcomes of both the mother and the newborn in a rich, conservative, cosmopolitan society with adequate social and health care support [22] [23]. A relatively adequate number of participants were used in this study to examine the pregnancy features and outcomes of young adult and primigravida adolescent women who had singleton pregnancies and are primigravida. In this study we excluded pregnancy outside marriage for medicolegal complexity and the secretive nature of this unwanted and even unexpected event. Such pregnancies are usually treated outside the normal health care services and difficult to trace. Women in adolescent pregnancy were far more eager to attend prenatal clinics than women in the young adult group (p value = 0.001). As well, it was acknowledged yet challenging to document that during the antenatal and newborn clinics mothers were accompanied by an adult close relative like a mother, a sister or a husband. The pregnancy outcomes differed slightly between the two cohorts. Height and body mass index (BMI) were comparable. Adolescents had an increased rate of low-birth-weight infants, which is consistent with earlier research. Our findings revealed that adolescent mothers were more likely to have vaginal deliveries and were less likely to require caesarean sections. There were no reports of maternal mortality in both groups. Research studies have shown that when adolescent mothers receive enough prenatal care, the chances of them and their infants experiencing pregnancy complications are reduced [23]-[28]. Furthermore, it is revealed that the risk of maternal mortality is comparable to that of mothers between the ages of 20 and 24. In contrast to earlier studies suggesting a higher likelihood of neonatal mortality, our research findings reveal that the overall rate of neonatal deaths in our study group was 0.3%. The main contributing factor to this outcome was the insignificant occurrence of preterm births among adolescent mothers [2] [25]. All the adolescent mothers in our sample were married, lived in a stable socioeconomic environment, and had satisfactory family support (extended family). It is worth mentioning that practically all mothers (94.5%) in this category received care in health care facilities, which can be attributed to the implementation of a national antenatal care program designed specifically for young new mothers. This program has the potential to play a role

in the improved outcomes observed in our research. The literature contains a wealth of information on the various consequences associated with adolescent pregnancy. Several Middle Eastern nations actively encourage the practice of early marriage especially in rural regions, yet in many locations worldwide, adolescent women often find themselves in a state of unmarried and unexpected unwanted pregnancy. The incidence of adverse pregnancy outcomes varies among countries. According to recent research, there have been positive outcomes in perinatal cases [23]. In our study, apart from the increased rate of LBW, we observed in our cohort's findings that may contradict previous research, with no significant variation in prenatal outcomes between primigravida adolescent and primigravida young adult women. In fact, A recent study showed that rate of cesarean section in adolescent age group is lower than young adults. In order to gain insight into the demographic characteristics of adolescent and young mothers, we conducted an analysis of a relatively large and representative cohort from this population. The study provides valuable insights into the quality of care received, as it utilizes data that represents routine patient care and professional practice. However, it is important to consider four notable disadvantages. The study omitted pregnancies that occurred outside of marriage, as these are considered inappropriate in Middle Eastern societies due to the difficulties involved in accurately tracking such cases. Additionally, it is important to note that previous studies with a larger sample size included pregnancy outcomes among adolescent ages aged 15 and below [29]-[31] which was not reported in this current study. Last of all, the existing report lacked enough information regarding the academic performance of the groups being examined and focused mainly on the perinatal outcome. This study seeks to initiate a discourse on the importance of antenatal care for adolescent mothers who marry at a young age and whether customized antenatal follow-up programs should be established to provide medical and social support to both young parents and their families.

5. Conclusion

We can conclude that when societies provide sufficient medical and social assistance for adolescent females aged 15 and above who are in lawful marriages, and when there is adequate provision of antenatal care support, there is no significant difference observed in the outcomes for both the mother and newborn compared to those of older women. The authors advocate for more health education, actively implementing structured health care programs targeting married adolescent women that involve extended family while adopting awareness through social media campaigns to encourage women's education and discourage early marriage.

Conflicts of Interest

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

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