Effect of Grand Multiparity on Pregnancy Outcomes in Women Under 35 Years of Age: a Comparative Study

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ABSTRACT

Introduction: It is known for many years, that grand multiparity is associated with poor pregnancy outcome with or without considering increasing maternal age. Aim: To examine the impact of grand multiparity on pregnancy outcome in young women aged 18–34 years (Young grand multiparas). Material and Methods: A prospective comparative cross-sectional study conducted at Omdurman Maternity Hospital, Sudan from January to September 2018. A standard questionnaire was used to gather data on pregnancy outcome in the low-risk group, grand multiparas age < 35 years and grand multiparas age ≥ 35 years. The association between variables was tested with Chi-square test. Results: Young grand multiparas have a significant risk of PPH and increased length of hospital stay ≥ 3 days and babies born to young grand multiparas women were more likely of low birth weight and have a higher rate of admission to NICU. Young grand multiparas were similar in their maternal and fetal complication to low-risk pregnancies and significantly less in several complications when compared to older grand multiparas women. Conclusion: Young grand multiparas are less likely to develop several pregnancy complications compared to older grand multiparas women. The occurrences of intra-partum complications match that in low-risk pregnancy.

Keywords: grand multiparity, neonatal complications, maternal complications, parity outcome, maternal age.

1. INTRODUCTION

The concept of grand multiparity was introduced during the last century. Numerous studies have described grand multiparity as an independent risk for many maternal and fetal complications (1, 2, 3). Grand multiparity is defined delivery of > four births after fetal viability (3, 4).

The incidence of grand multiparity is very high in developing countries compared to developed countries due to many factors and it varies between 2-4% in developed countries whereas in developing countries it is as high as 18.5% (5). Numerous studies have explored the impact of grand multiparity on a fetal and maternal outcome. Results of these studies were mixed. Some studies concluded that grand multiparity is a great risk for many fetal and maternal complications including abnormal placentation, abruption placenta, malpresentation, and interventional delivery, and postpartum hemorrhage, prematurity, and neonatal and maternal admission to intensive care unit admission (6, 7).

On the other hand, other studies demonstrated only a few of these complications among high parity (8, 9).

A previous literature concluded that grand multiparity is a risk factor for negative pregnancy outcomes without considering the increasing maternal age which was investigated in other studies and found to be an independent risk factor for poor outcome (10). Maternal age is an important variable that influences both the dependent variable and independent variable when assessing parity. In many regions particularly Arab countries in which one in seven girls marries before her 18th birthday. This may contribute to the increasing prevalence of high parity at younger age group.

2. AIM

The aim of this study was to investigate pregnancy outcome in grand multiparas women < 35 years of age by comparing pregnancy outcome to grand multiparas age ≥ 35 years and low parity (parity 1).
3. PATIENTS AND METHODS

This is a prospective comparative cross-sectional study conducted at Omdurman Maternity Hospital, Sudan from January to September 2018. The study was approved by Sudanese specialization board for obstetrics and Gynecology and Omdurman maternity Hospital Omdurman, Sudan.

Ethical considerations: The study was approved by the Ethics committees of the Sudanese specialization board and the Omdurman Maternity Hospital. Informed verbal consent to participate in the study was obtained from each woman.

Inclusion/exclusion criteria were: all singleton low parity (Para I), grand multiparity age < 35 and grand multiparity age ≥ 35 years. The exclusion criteria were patients with multiple gestations, medical problems such as diabetes and hypertension, previous interventional delivery, women younger than 18 years and patients who were not willing to participate. Grandmultiparity is defined delivery of more than five births after fetal viability (3).

Literature defined advanced maternal age often as maternal age ≥ 35 years because of increased many pregnancy complications. Low parity is defined as parity 1-4 (the delivery of the second to the fourth baby) (11). In the present study, we used parity 1, as a reference category.

The sample size was computed using OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version. www.OpenEpi.com, updated 2013/04/06, accessed 2018/12/04. The incidence in a neighboring country was 8%, to avoid having smaller sample size we used a previously published data that quoted an incidence of 15%.

The Minimum required sample size was 196 with 10% non-responding rate making the desired sample size of 216.

Demographic data including age, parity, occupation, education booking and regularity of the antenatal care were recorded. The outcomes variables of interest were fetal and maternal complications. Maternal complications we assessed included the mode of delivery, PPH, infection, hysterectomy, ruptured uterus, abruption placenta, premature delivery, cord prolapse, genital tract injury, admission to ICU, blood transfusion, maternal death, and hospital stay ≥ 3 days. Fetal complications assessed were Apgar score < 7 at five minutes, birth weight, FSB, fetal distress, birth trauma, congenital anomalies, and fetal macrosomia.

Statistical analysis

Data were analyzed using Statistical Package for Social Science (SPSS, version 20.3) software. The categorical variables association was calculated using chi-square. A p value of less than 0.05 was considered statistically significant.

4. RESULT

Overall, 623 participants were recruited and divided into 3 groups according to their age and parity, 1) Group1 comprised 216 participants all were Para 1 as low-risk group (reference category), 2) Group composed of 210 participants and all were grand multiparas under 35 years of age and 3) Group 3, composed of 197 participants and were grand multiparas ≥ 35 years of age. Some selected demographic factors, intrapartum fetal

| characteristics | G1 (n=216) | G2 (n=210) | G3 (n=197) | p value G1 vs. G2 | G1 vs. G3 | G2 vs. G3 |
|-----------------|-----------|-----------|-----------|------------------|---------|---------|
| education       |           |           |           |                  |         |         |
| Illiterate      | 12(5.6)   | 13(6.2)   | 51(25.9)  | 0.9545           | 0.0001  | 0.0001  |
| Primary         | 53(24.5)  | 47(22.4)  | 66(33.5)  | 0.6814           | 0.3611  | 0.016   |
| Secondary       | 68(31.5)  | 61(29.)   | 61(31.0)  | 0.6591           | 0.6591  | 0.753   |
| University      | 75(34.7)  | 77(36.7)  | 19(9.6)   | 0.7507           | <0.001  | <0.0001 |
| graduates       | 8(3.7)    | 12(5.7)   | 0(0.0)    | 0.4522           | 0.01777 | 0.01777 |
| occupation      |           |           |           |                  |         |         |
| Housewife       | 155(71.8) | 141(67.1) | 140(71.1) | 0.3528           | 0.9627  | 0.2492  |
| Self-employed   | 26(12.0)  | 34(16.2)  | 24(12.2)  | 0.3290           | 0.9158  | 0.3126  |
| Free business   | 13(6.0)   | 12(5.7)   | 11(5.6)   | 0.942            | 0.9825  | 0.8746  |
| Laborer         | 22(10.2)  | 22(10.2)  | 22(11.2)  | 0.8034           | 0.6361  | 0.9484  |
| Booking         |           |           |           |                  |         |         |
| booked          | 194(89.8) | 178(84.8) | 139(70.6) | <0.001           | <0.001  | P <.001 |
| unbooked        | 22(10.2)  | 32(15.2)  | 58(29.4)  | 0.1553           | P <.001 | P <.001 |
| Antenatal care  (at least one visit) | | | | | |
| yes             | 166(85.6) | 141(79.2) | 111(79.9) | 0.034            | 0.0001  | 0.03238 |
| NO              | 28(14.4)  | 37(20.8)  | 28(20.1)  | 0.2302           | 0.9758  | 0.4226  |
| Gestational age |           |           |           |                  |         |         |
| <37 weeks       | 2(0.9)    | 2(0.95)   | 5(2)      | 0.6354           | 0.3756  | 0.3963  |
| 37-39 weeks     | 204(73.6) | 185(73.6) | 175(73.6) | 0.03121          | 0.05833 | 0.9383  |
| > 41 weeks      | 107(73.6) | 23(73.6)  | 17(73.6)  | 0.02386          | 0.1491  | 0.5352  |

Table 1. Distribution of basic characteristics between groups by Parity and Age. Values are given as number (percentage). Abbreviations: G1, Para 1; G2, Grand multipara < 35 years; G3, Grand multipara ≥35 years, Statistical significant at p-value <0.05
and maternal complications were compared between these three groups.

There were no significant differences between the three groups in occupation and gestational age at delivery, and the incidence of preterm labor (p>0.05). Compared to low-risk multiparas, young grand multiparas aged (< 35 years), were less likely to be booked and inadequately attended the antenatal care and to have prolonged pregnancy (p<0.05). When older grand multiparas aged (≥35 years) were compared to low-risk they were more likely to be illiterate and less likely to go to college in their education, booked and inadequately attended the antenatal care (p<0.05) (Table 1).

With regards to intrapartum maternal complications, the rate of cesarean delivery and assisted vaginal delivery were significantly higher among older grand multiparas women, while the rate of this complication was similar in both younger grand multiparas and women of lower parity. The rate of many complications including infection, hysterectomy, ruptured uterus, abortion placenta, premature delivery, cord prolapsed and maternal death were all similar among all groups.

When compared with women of lower parity, PPH was significantly higher among both young and older grand multiparas women.

Genital tract injury, admission to Intensive care unit and blood transfusion were significantly more common among older grand multiparas compared to both young grand multiparas and low-risk group, while there was no significant increased risk for such complication when a comparison was made between a low-risk group and young grand multiparas women. The significantly increased risks remained when low-risk mothers were compared with both young grand and older grand multiparas for the length of hospital stay for 3 days or more as shown in Table 2.

The overall neonatal complications were significantly increased among older grand multiparas women (P <.001). When compared to low-risk mothers, both young and older grand multiparas women were at a significantly increased risk of a low Apgar score < 7 at five

| Complications          | G1 (n=216) | G2 (n=210) | G3 (n=197) | p-value          |
|------------------------|------------|------------|------------|-----------------|
|                        |            |            |            | G1 vs. G2 | G1 vs. G3 | G2 vs. G3 |
| C/S                    | 39(18.1)   | 37(17.6)   | 93(47.2)   | 0.9929      | <0.0001   | <0.001   |
| Assisted VD            | 11(5.1)    | 19(9.5)    | 32(16.2)   | 0.1599      | P <.001   | 0.04119  |
| any maternal complications | 73(3.2)   | 20(9.5)    | 53(26.9)   | 0.01381     | P <.001   | <0.001   |
| PPH                    | 73(3.2)    | 18(8.6)    | 27(13.7)   | 0.03283     | P <.001   | 0.1873   |
| Infection              | 0(0.5)     | -          | 21(10.0)   | 0.5220      | 0.7086    | 0.7114   |
| Hysterectomy           | 0(0.5)     | 10(5.0)    | 10(5.0)    | 0.9887      | 0.9632    | 0.5068   |
| Rupture uterus         | 0(0.5)     | 2(1.0)     | 3(1.5)     | 0.4661      | 0.2153    | 0.9820   |
| Abruption placenta     | 1(0.5)     | 10(5.0)    | 6(3)       | 0.4909      | 0.09910   | 0.1072   |
| Premature delivery     | 1(0.5)     | 10(5.0)    | 6(3)       | 0.4909      | 0.1072    | 0.09910  |
| Cord prolapse          | 0          | 0          | 10(5.0)    | -           | 0.9764    | 0.7120   |
| Genital tract injury   | 1(0.5)     | 10(5.0)    | 8(4.1)     | 0.4909      | 0.03047   | 0.03397  |
| admission to ICU       | 2(0.9)     | 6(2.9)     | 13(6.6)    | 0.2676      | 0.004883  | 0.1204   |
| Blood transfusion      | 2(0.9)     | 6(3.8)     | 29(14.7)   | 0.2676      | P <.001   | P <.001  |
| maternal death         | (5)        |            | 10(5.0)    | -           | -         | 0.7114   |
| hospital stay >= 3days | 6(2.8)     | 31(14.7)   | 48(24.4)   | P <.001     | P <.001   | 0.02020  |

Table 2. Comparison of Maternal Complications between Young, Older Grandmultiparity and Low Risk Women. Values are given as number (percentage). Abbreviations: G1, Para; G2, Grandmultipara < 35 years; G3, Grandmultipara ≥35 years, Statistical significant at p-value <0.05

| characteristics       | G1 (n=216) | G2 (n=210) | G3 (n=197) | p-value          |
|-----------------------|------------|------------|------------|-----------------|
|                        |            |            |            | G1 vs. G2 | G1 vs. G3 | G2 vs. G3 |
| Fetal complications    | 27(12.5)   | 34(16.2)   | 73(37.1)   | 0.7008      | P <.001   | P <.001  |
| Apgar Score< 7 at five minutes | 9(4.4)    | 20(9.5)    | 37(18.8)   | 0.04525     | P <.001   | 0.01088  |
| birth weight < 2.5 kg  | 8(3.7)     | 21(10)     | 37(18.8)   | 0.01698     | P <.001   | 0.01681  |
| FSB                   | 0(0)       | 1(0.5)     | 6(3)       | -           | 0.1072    | 0.1072   |
| Birth Fetal Distress  | 26(12)     | 28(13.3)   | 35(17.8)   | 0.7976      | 0.1336    | 0.2731   |
| Sizeable baby         | 0(0)       | 1(0.5)     | 12(6.1)    | 0.9887      | 0.008454  | 0.03397  |
| NICU                  | 11(5.1)    | 27(12.9)   | 44(22.3)   | 0.008268    | P <.001   | 0.01697  |

Table 3. Comparison of Neonatal Complications between Young, Older Grandmultiparity and Low Risk Women. Values are given as number (percentage). Abbreviations: G1, Para; G2, Grandmultipara < 35 years; G3, Grandmultipara ≥35 years, Statistical significant at p-value <0.05
minutes and birth weight < 2.5 kg (<0.001). There were no significant differences between low-risk, and young and older grand multiparas women in fresh stillborn babies and Apgar score of less than 7 at 5 minutes (p>0.05). Older grand multiparas women showed a significantly increased rate of birth trauma, congenital anomalies, and fetal macrosomia when compared with low-risk mothers and grand multiparas women no significant differences were obtained (p>0.05). In addition both young and older grand multiparas showed a significantly increased rate of neonatal admission to intensive care units compared to low-risk women (Table 3).

5. DISCUSSION

The findings of the present study indicate that young grand multiparas compared to low-risk women are similar in most neonatal and maternal complications except for PPH and hospital stay ≥ 3days, and Apgar score< 7 at five minutes, birth weight < 2.5 kg and admission to NICU. When older grand multiparas women were compared to low-risk group, they show significantly increased in most of these complications including interventional vaginal delivery gestational tract injury, admission to ICU, blood transfusion, maternal death, hospital stay => 3 days while most fetal complications that were significantly including fetal complications, Apgar Score< 7 at five minutes, birth weight < 2.5 kg, birth trauma, congenital anomalies, macrosomia, and NICU.

Many previous investigators compared the occurrence of various obstetric and neonatal complications between different parity groups. The results of these studies indicated that these complications increase significantly in a linear manner with increasing parity (12, 13). Pooja et al. (14), in their study examining the perinatal complications with increasing parity, reported that placenta praevia, intrauterine fetal growth restriction, the rate of labor induction, interventional delivery, post date pregnancy, abnormal CTG and shoulder dystocia showed increased occurrence with an increasing parity. These findings are consistent with our finding in older grand multiparas by inconsistent with young grand multiparas. In another study involving 512,733 singleton births in New South Wales, Australia indicates that parity 4 or the 5th baby is significantly associated with a negative impact on both fetal and maternal outcome (15). Our findings in older grand multiparas contradict other previous studies, which concluded that increase in parity does not result in increased risk for both fetal and maternal outcome (16, 17). Other few studies examining the effect of parity on pregnancy outcome reported that grand multiparity compared to the other parity groups have similar risks of maternal and neonatal complications and that grand multiparity should not be discouraged as long as women are provided with good prenatal care (18).

However, when young grand multiparas outcome women were compared to the low-risk group, they show similar maternal complications except for PPH and hospital stay ≥3 days and fetal complications specifically admission to NICU and birth weight less than 2.5 kg. Literature examining the obstetrical performance of young grand multiparity is scant and only one previous study was published by Simonsen et al in 2002. They found young grand multiparas at an increased risk of a preterm delivery and less likely having fetal distress, cesarean delivery, instrumented delivery, and any intrapartum complication compared to low parity and less likely to develop many fetal and maternal complications than older grand multiparity. The definitive increased obstetrics complications among older mother than young grand multiparas women is possibly due to the effect of progressive maternal age among older mothers. There are numerous studies focused on maternal age and pregnancy outcomes. More recent studies have focused on the pregnancies of ≥ 35 or more years due to changing trend to give birth. Advanced age was found to be associated with an elevated risk of adverse pregnancy furthermore; age was found as independent risk factors for many complications (19, 20). In addition to progressive maternal age, grand multiparas women are likely to be less educated, unemployed, and poor utilization of prenatal care (21, 22).

The shortcomings of this study are its relatively small sample size, lack of all parity, and gathering of data from a single center rather than multiple centers.

6. CONCLUSION

This study revealed that young grand multiparas women are not at increased risk of intrapartum complications when compared to multiparas women. While older grand multiparas women are at significant risk for poor maternal outcomes. Further studies are warranted to investigate pregnancy outcomes in young grand multiparas women since it is a problem in Arabs countries.

• Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms.
• Author’s contribution: Each author gave substantial contribution to the conception or design of the work and in the acquisition, analysis and interpretation of data for the work. Each author had role in drafting the work and revising it critically for important intellectual content. Each author gave final approval of the version to be published and they agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
• Financial support and sponsorship: Nil.
• Conflicts of interest: There are no conflicts of interest.

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