



Utilization of Antenatal Care and Pregnancy Outcomes of Women in Advanced Maternal Age at a Tertiary care Hospital in Sri Lanka

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ABSTRACT

Introduction: Childbearing in latter part of reproductive age is challenging. Adverse pregnancy outcomes increase with advanced (>35 years) maternal age (AMA) and comprehensive antenatal care (ANC) usage by AMA women improves their pregnancy outcomes. However, no recent local data are available on the AMA and pregnancy outcomes.

Objectives: To describe utilization of ANC and pregnancy outcomes of AMA women delivering at North Colombo Teaching Hospital and assessed the association between utilization of ANC services and selected pregnancy outcomes.

Methods: A descriptive cross-sectional study was conducted among 216 women aged >35 years delivered at Colombo North Teaching Hospital selected using a non-probability consecutive sampling method. Women were interviewed within 7 days postpartum inward using an interviewer-administered questionnaire. Selected data were extracted from clinical records. Key elements of ANC (booking visit, type, frequency, services etc.) were scored and their association with pregnancy outcomes were assessed.

Results: A total of 216 AMA postpartum women (age range 35–45 years, mean 37.8 (SD=2.4)) were recruited (response rate 100%). Majority (91.7%, n=198) were multiparous. The current pregnancy was planned in 77.8% (n=168) and 52.7% (n=114) experienced antenatal morbidities. Adverse maternal (8.3%, n=18) and newborn (37%, n=80) outcomes were noted. Majority (75.9%, n=164) optimally utilized ANC. Sinhalese (OR=2.98, 95%CI 1.29–6.87, p=0.008), Buddhist (OR=2.53, 95%CI 1.33–4.80, p=0.004) women with intended pregnancies (OR=5.67, 95%CI 2.81–11.43, p<0.001) well utilized ANC. Women educated <10 years of formal education (OR=0.4, 95%CI 1.33–4.80, p=0.027), had contraceptive issues (OR=0.27, 95%CI 0.10–0.74, p=0.007) and had adverse newborn outcomes (OR=0.32, 95%CI 0.16–0.61, p=0.001) reported low tendency to utilize ANC.

Conclusions: Many AMA women are multiparous and with planned pregnancies. Presence of adverse maternal & newborn outcomes is substantial. Majority well utilized ANC and it reduced adverse pregnancy outcomes. Effective strategies should be formulated to promote well-planned pregnancies in early reproductive ages of women.

KEY WORDS: Advanced maternal age pregnancy, Adverse pregnancy outcomes of AMA, Contributory factors of AMA, Utilization of antenatal care services.

INTRODUCTION

The Advanced maternal age has been defined as 35 years or above by the International Federation of Gynecology and Obstetrics (FIGO) in 1958 and this limit was recommended to accept as the international standard. The first time pregnant women of 35 years or above considered as elderly prime para and subsequent pregnancies of that age were considered as elderly multipara. The World Health Organization (WHO) also use the cut-off age of FIGO as the definition for “advanced maternal age”.

A clear trend of delaying childbirth to later reproductive years is phenomenal among women in both higher and lower income countries (Laopaiboon *et al.*, 2014). The prevalence of AMA is ever increasing, and a significant proportion of women are even delaying childbirth until their forties (Grotegut *et al.*, 2014, Laopaiboon *et al.*, 2014). As a result the global prevalence of advanced maternal age is round 12.3%. Among western countries the prevalence is 18.2% in the UK. A wide variation of the prevalence of AMA is noted among Asian countries. The AMA prevalence is very low as 2.8% in Nepal and in India it is 3%. The same prevalence of 9% has detected in both China and Pakistan but in Japan it is high as 31.1% (Laopaiboon *et al.*, 2014).



There was no major difference in prevalence of advanced maternal age pregnancy in Sri Lanka compared with global trend and Asian trend. The proportion of childbirth to women 35 years and above was 11.38 in 1980 and it has increased to 15.61 by 2010 according to the data of Registrar General's Department in Sri Lanka (Department of Census and Statistics, 2013). WHO multicounty survey and the prevalence of advanced maternal age pregnancies in Sri Lanka has been reported as 15% (Laopaiboon *et al.*, 2014).

This trend of being pregnant in latter part of reproductive age is closely related with delayed marriage, increasing rates of divorce and remarriage, effective birth control, advances in assisted reproductive technology (ART), higher education and career advancement among women (Cleary-Goldman *et al.*, 2005).

The association of maternal age with severe maternal morbidity and mortality shows increasing with Maternal Comorbidity Index and age 40 to 44 years are associated with maternal mortality as an independent patient-level factor. The extremes of maternal age, especially those 45 years and more are associated with severe maternal morbidity and mortality compared with those aged 20 to 24 years (Aoyama *et al.*, 2019). Series of epidemiological studies reveal that fetal growth restriction, preeclampsia, placental abruption, preterm birth and stillbirth increase with AMA and importantly these increased risks appeared to be independent of maternal comorbidities. AMA is also associated with an increased risk of caesarean birth. Increasing rates of pre-existing hypertension and pregnancy complications, such as gestational diabetes mellitus, gestational hypertension and preeclampsia are noted among advanced maternal age pregnant women (Lean *et al.*, 2017). The incidence of multiple pregnancies also increases with advanced maternal age due to widespread use and availability of infertility treatments, in combination with the trend of childbearing at older ages (Luke and Brown, 2007).

Health care service utilization is a key proximate determinant of maternal and infant outcomes (Renolds, 2006). It is evident that well-timed antenatal care services utilization is an opportunity to prevent the direct cause of maternal and neonatal deaths related to obstetric complications and can improve certain outcomes of pregnancy complications (Renolds, 2006). Optimal utilization of antenatal care (ANC) services by women in AMA has shown to be effective (Nebek, 2015).

JUSTIFICATION

.Utilization of antenatal care services was significantly associated with adverse pregnancy outcomes. The considerable proportion of AMA women had antenatal complications. Approximately two fifth of participants had preexisting non communicable diseases. Comprehensive antenatal care (ANC) is a key strategy in prevention or early diagnosis of those complications and adhere to proper intervention leads to better outcomes.

. They pressurize the health systems with an additional load. A significant number may require relatively high frequency of inward hospital care.. In such a background and lack of recent data , an in-depth exploration in to pregnancies in advanced age and pregnancy outcomes is justified in local contexts

OBJECTIVES

Our aim is to describe the utilization of antenatal care services and pregnancy outcomes of advanced maternal age women delivering at Colombo North Teaching Hospital (CNTH). And to assess the association between the utilization of antenatal care services and the presence of pregnancy outcomes.

METHODS

Study Design

A hospital-based cross-sectional study was conducted during September 2020 to March 2021 in Colombo North Teaching Hospital (CNTH) which provides tertiary level health care for a wide range of pregnant population representing all main ethnic groups, cultural backgrounds and different social strata. Sample size was 216 Postpartum women and calculated using recently available proportion (Laopaiboon *et al.*, 2014)of AMA. The study population included women with documented and completed age of 35 years and above on time of gestation, the exclusion criteria were Women with multiple pregnancies, sick women who were in a condition not being able to actively participate in the study on the day of data collection and postpartum women who were transferred from other institutions. . The point at which they were captured was the post-partum period up to 7 days Non probability consecutive sampling method was used.



A pre tested interviewer administered questionnaire (IAQ) with close-ended questions and data extraction form were used. Socio demographic, socio economic, socio cultural, Obstetric, contraceptive history and utilization of antenatal care services were assessed using IAQ and pregnancy outcomes were extracted to data extraction form from Bed Head Tickets.

The ethical clearance was obtained from the Ethics Review Committee of Faculty of Medicine, University of Kelaniya Administration clearance was obtained from the Director of Colombo North Teaching Hospital and the relevant consultants in postnatal wards, premature baby care unit (PBU) and Neonatal Intensive Care Unit (NICU).

Data analysis

Data were entered and analyzed using standard statistical package (SPSS) software version 26.

Out of Socio-demographic data quantitative data were described using mean, standard deviation (SD) and range. Qualitative data were described using frequency distributions and proportion with 95%CI.

Past and present obstetric data, adverse maternal and newborn outcomes were described using proportions, percentages and frequency distributions.

Key elements of ANC (booking visit, type, frequency, services etc) were scored and Utilization of antenatal care services were classified as well utilization and partial utilization by based on the scoring system. The significance of association between the utilization of antenatal care services and the presence pregnancy outcomes were assessed by applying Chi square test.

RESULTS

A sample of 216 advanced maternal age women delivered in Colombo North Teaching Hospital were recruited for this study. The age range was 35 – 45 years with a mean age of 37.8 (SD=2.4) years. Almost all (98.1%) of them were married and many (87.5%) married before 35 years of age. Majority of the participants were Sinhalese (87.5%) and 64.8% were Buddhist. Most (61.1%) of the participants were educated above GCE Ordinary level and 81% were housewives. Nearly two thirds (64.4%) had a monthly income of more than Rs. 30,000. A majority (91.7%) of them were multiparous women. Ever usage of contraceptive method among them was 68.1% with a mean duration of 5.9 (SD=3.6) years. Past caesarian section history was given by 29.4% of women. A larger proportion (94.4%) of women had children and approximately, two thirds (67.3%) had two or more children. Many of multiparous women had no previous antenatal (85.5%) or post-natal (86.3%) complications. Uncomplicated live birth was the previous pregnancy outcome in 80.8% multiparous women.

Table I: Frequency distribution of the AMA postpartum women by Socio demographic and past obstetric characteristics

Characteristic	Frequency (n=216)	%
Ethnicity		
Sinhala	189	87.5
Muslim	14	6.5
Tamil	11	5.1
Burger	2	0.9
Religion		
Buddhist	140	64.8
Catholic/Christian	51	23.6
Islam	14	6.5
Hindu	11	5.1
Education		
< GCE Ordinary level	84	38.9
>GCE Ordinary level	132	61.1
Occupation		
Housewife	175	81
Employed	41	19



Income		
< Rs. 30000.00	77	35.6
> Rs. 30000.00	139	64.4
Marital status		
Married	212	98.1
Unmarried	4	1.9
Parity		
Primiparous	198	91.7
Multiparous	18	8.3
Past obstetric characteristics		
Presence of living Children		
Yes	187	94.4
No	11	5.5
Number of children (n=187)**		
One child	61	32.6
Two children	88	47.0
Three children	32	17.1
Four children	3	1.6
Five children	3	1.6
Antenatal complications (n=198)*		
No antenatal complications	169	85.3
Gestational diabetes	16	8.0
Pregnancy induced hypertension	10	5.0
Pre eclampsia	1	.5
Placenta previa	1	.5
Heart disease	1	.5
Mode of delivery in last pregnancy (n=187)**		
Normal vaginal delivery	126	67.3
Caesarian section	55	29.4
Vacuum delivery	3	1.6
Forceps delivery	2	1.0
Vaginal delivery after Caesarian section	1	.5
Previous Postpartum maternal complications (n=198)*		
No complications	171	86.3
Postpartum hemorrhage	19	9.5
Preeclampsia	8	4.0
Past pregnancy outcomes (n= 198)*		
Live birth	160	80.8
Miscarriage	27	13.6
Intra Uterine Death	8	4.0

Most (77.8%) of the current pregnancies were planned. Out of all AMA women, 84.7% had utilized more than one type of ANC services. Nearly 60% registered for ANC before 8 weeks of gestation. Most of them (65.3%) had more than 12 ANC clinic visits. Majority (75.9%) well utilized comprehensive ANC services. Concerning the current pregnancy nearly two fifths of study participants (41.2%) have had preexisting chronic medical conditions. More than half of participants (52.7%) experienced antenatal morbidities with 27.8% reporting GDM.



Table II: Frequency distribution of the AMA postpartum women by chronic medical condition and antenatal complication in current pregnancy

	Frequency	%
Chronic Medical Condition		
No preexisting medical condition	127	58.8
Diabetes mellitus	51	23.6
Essential hypertension	16	7.4
Hypertension and Diabetes Mellitus	7	3.2
Psychiatric illness	5	2.3
Anemia	4	1.9
Heart disease	2	.9
Thyroid disease	3	1.4
DM and heart disease	1	.5
Total	216	100.0
Antenatal complication		
Gestational diabetes mellitus (GDM)	60	27.8
Pregnancy Induce Hypertension and Gestational Diabetes Mellitus	21	9.7
Pregnancy induced hypertension (PIH)	12	5.6
Placenta previa	7	3.2
Anemia	6	2.8
Pre eclampsia	4	1.9
GDM & pre eclampsia	4	1.9
None	102	47.2
Total	216	100.0

A larger proportion (87.5%) delivered after completing 37 weeks of gestation. Caesarian section rate was 57.4% due to past caesarian section, lack of progression to labor and fetal distress. Adverse maternal outcomes were noted in 8.3% with 3.7% experiencing post-partum hemorrhage. Newborn complications were noted in 37% with overweight (19.4%), preterm delivery (12.5%) and low birth weight (9.7%) being more common.

Table III: Frequency distribution of the AMA postpartum women by current pregnancy outcomes

	Frequency	%
Mode of delivery(n=216)		
Elective caesarian section	68	31.5
Emergency caesarian section	56	25.9
Normal virginal delivery	91	42.1
Vacuum delivery – Delivery arrest in 2 nd stage	1	.5
Indication for caesarian section(n= 124)		
Elective caesarian section(n=68)		
Past caesarian section	45	66.2
Elderly primly and sub fertile	11	16.2
Prime 40 years and above	7	10.3
Secondary subtitle	5	7.3
Emergency caesarian section (n=56)		
Lack of progression	22	39.3
Fetal distress	16	28.5
Past section in pain	10	17.8



Fetal mal presentation in labor	5	8.9
Impending eclampsia	3	5.3
Maternal outcomes		
Normal without complications	198	91.7
Postpartum Haemorrhage	8	3.7
Pre eclampsia	4	1.9
Infected episiotomy or caesarian scar	2	.9
Eclampsia	1	.5
Breastfeeding problems	1	.5
Psychosocial Imbalance	1	.5
Near miss following arrested while caesarian section	1	.5
Newborn outcomes		
Normal without complications	136	63.0
Overweight (above 3.5 kg)	42	19.4
Low Birth Weight (less than 2.5 kg)	21	9.7
Extremely premature delivery (28 weeks or less)	7	3.2
Sepsis	5	2.3
Meconium aspiration	2	.9
Congenital anomalies	1	.5
Jaundice	1	.5
Still birth	1	.5

Significance of association between Socio demographic characteristics and adverse pregnancy outcomes was assessed. Sinhalese (OR =2.98, 95% CI 1.29 – 6.87, p=0.008), Buddhist (OR =2.53, 95% CI 1.33 – 4.80, p=0.004) AMA women with intended pregnancies (OR =5.67, 95% CI 2.81 – 11.43, p<0.001) well utilized ANC services. Women educated below O/L (OR =0.4, 95% CI 1.33 – 4.80, p=0.027), those who had contraceptive issues (OR=0.27, 95% CI 0.10 – 0.74, p=0.007) reported low tendency to utilize ANC.

Adverse newborn outcomes (OR=0.32, 95% CI 0.16 – 0.61, p=0.001) were significantly associated with low tendency of utilization of ANC service.

DISCUSSION

The mean age of AMA women in this study was 37.8 years (SD=2.4) with a range of 35-45 years. More or less similar age, 37.1 years of AMA pregnant women was reported by a Retrospective cohort study done in Sri Lanka (Dias et al., 2014) and the study done in Northern Ethiopia it was 37 years (Mehari et al., 2020).

The majority of participants were Sinhalese (87.5%), followed by Muslims and Tamils (6.5% and 5.1% respectively). With regard of religion, majority were Buddhists (64.8%) with Christians/Catholics (23.6%) followed by Islamic (6.5%) and Hindus (5.1%). Comparatively same ethnic composition can be seen in economic and social statistics 2020. The religion is considered in statistics. The proportions of Buddhists (70.1%) and Islamic (9.7%) which were approximately same as the study findings, but Christians/Catholics (7.6%) and Hindus (12.6%) which showed a considerable difference (Central Bank of Sri Lanka, 2020). The detected difference could be expected as catchment area of the CNTH, most of the participants were from the Western coastal regions where a relatively larger proportion of Christians/Catholics and Hindus reside. Except the Hindus composition, Western Province population Statistics 2020 were tally with the Ethnicity and Religion composition of this study (Department of Census and Statistics, 2022).

Although the majority of participants were multiparous (91.7%) and the primi mothers were less than 10% but the national proportion of primies were 32.3% in the year 2018 (FHB, 2019).



The usage of any kind of contraceptives tallied with Family Health Bureau (FHB) statistics in 2019. National contraceptive prevalence rate was 66.9% (FHB, 2019) and the detected figure in the study was 68.1%.

Antenatal morbidities which were developed during current pregnancy but were not present at the beginning of the pregnancy were reported as 52.7%. “Gestational diabetes mellitus” (GDM) (27.8%) and “pregnancy induced hypertension” (PIH) (5.6%) were detected as common morbidities. Among participants 9.75% had both GDM and PIH. This figure of antenatal comorbidities were much higher than the national rate of 42% on pregnancies according to FHB Statistics in 2019. But the study done on china revealed that gestational diabetes mellitus, pregnancy induced hypertension, pre-eclampsia and placenta previa were more common antenatal morbidities in AMA (Shan *et al.*, 2018) and the Northern Ethiopian study revealed that AMA women were at 4.15 times higher risk for pregnancy induced hypertension compared with non AMA women (Mehari *et al.*, 2020).

Among 216 participants 57.4% had underwent cesarean section. In a study done on UK revealed that the women above 35 years of age were more likely to delivered by caesarian section (63.8%) and AMA had significantly associated with increased risk of caesarian section.(Kenny *et al.*, 2013).

Less than 10% of AMA postpartum women in the study were had adverse maternal outcomes and the Postpartum Hemorrhage (PPH) was the commonest adverse outcome and it was 3.7% from the total. According to the Indian study perennial tears, lacerations, and extension of episiotomies following advanced maternal age (AMA) which may lead to PPH (Pawde, Kulkarni and Unni, 2015). Added risk of having Preeclampsia and eclampsia (OR; 5.80 (95 % CI 2.66, 12.64) and 2.45 (95 % CI 1.03, 5.85) respectively) for pregnant women above 40 years had been revealed by a study done in New York but Compared with it our percentages were much low (1.9% and 0.9% respectively). Detected differences in our study may be due to participated age category as it was mainly 35 to 39 years (75.5%).

More than one third of newborns (37%) had adverse outcomes. Mainly 19.4% of offspring were overweight and 9.7% were LBW. Preterm deliveries accounted for 3.2%. Asian population indicated an increased risk of preterm delivery and greater risk of low birth weight with advanced maternal age (Koo *et al.*, 2012). Anyway, the significant ($p < 0.05$) association were detected between lower utilization of ANC services and adverse newborn outcomes.

CONCLUSION

A majority of the advanced maternal age women were multiparous women continuing their subsequent pregnancy.

Fairly high (68.1) Ever usage of contraceptive method was noted in the study population A larger proportion of participants (77.8%) were planned the current pregnancies and signifying a better pregnancy preparedness of AMA women. Many of the multiparous women had no previous antenatal (85.5%) or post-natal (86.3%) complications.

A significant proportion of AMA women (41.2%) had preexisting chronic medical conditions. More than half of participants (52.7%) experienced antenatal morbidities with 27.8% reporting GDM is it GDM or T2DM. ANC service utilization by AMA women were highly satisfactory (75.9%) with many of them (84.7%) utilizing more than one type of ANC services.

Fairly significant adverse outcomes were encountered by AMA women during and after the deliveries. A sizable proportion (12.5%) delivered preterm. Caesarian section rate was 57.4%. Adverse maternal outcomes were reported in 8.3% women. Even a single case of near-miss situation and 3.7% experiencing post-partum hemorrhage are hefty signals. More than one third (37%) of the newborns of the AMA women experienced complications with overweight (19.4%), preterm delivery (12.5%) and low birth weight (9.7%) being more common.

Optimal utilization of ANC services was significantly higher among Sinhalese, AMA women with intended pregnancies.

RECOMMENDATION

In a primary prevention focus to avoid pregnancies in advance maternal age, newly married couples should be educated and promoted to complete their families in early stages of their reproductive age and screening women for the Non Communicable diseases and control the preexisting medical condition before being pregnant is necessary for the better pregnancy outcomes.

To minimize the adverse pregnancy outcomes, The AMA pregnant women should be encourage to utilize the shared care and early detection of antenatal commodities and referred to tertiary care management is essential. Health care providers at different levels (Public Health Midwife, General Practitioners, Medical Officers of Health, members of the preconception counselling teams, Obstetricians etc.) should be requested to adequately counsel women in advanced maternal age, who seek advice to have a child in



their later ages, about the issues & risks of such a pregnancy. The Gaps in early pregnancy registration and better utilization of ANC should be addressed at micro level.

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