

# Pathology of Infants and Children from Mother Older Than 35 Years at CHU of Brazzaville, Congo

E.R. Nika<sup>1\*</sup>, J.R. Mabila Babela<sup>1,2</sup>, S.B.A. Bouangui-Bazolana<sup>3</sup>, and G. Moyer<sup>2</sup><sup>1</sup>Department of Pediatrics, University Hospital Center of Brazzaville, Republic of Congo<sup>2</sup>Faculty of Health Science, Marien Ngouabi University, Republic of Congo<sup>3</sup>Department of Obstetrics and Gynaecology, Far East Rand Hospital, Johannesburg, South Africa**Received Date:** September 10, 2015, **Accepted Date:** November 02, 2015, **Published Date:** November 12, 2015.**\*Corresponding author:** Evrard Romaric Nika, Department of Pediatrics, University Hospital Center of Brazzaville, Republic of Congo, E-mail: [nikaevrard@yahoo.fr](mailto:nikaevrard@yahoo.fr)

## Abstract

**Aims:** To determine the rate of admissions of infant and children from the mother older than 35 years, to determine the main pathology sources of hospitalization, to determine the place of birth defects, and to identify their risks factors.

**Patient and Methods:** A cross sectional study comparing infants and children born to the mother ( $\leq 35$  years old = group 2) and those born to the mother older than 35 years (group1) which was conducted from March 2013 to March 2014 in pediatric ward.

**Results:** One hundred and seventeen infants and children born to the older mothers were registered, which is 4% of hospitalization. No predominance of sex was noted (sex ratio = 1). The mean age of infants and children was  $11.6 \pm 7.9$  months old (range, 1 to 30 months). The mean age of older mother was  $40 \pm 2.6$  years (range, 36 to 45 years). The main pathology sources of hospitalization were acute gastroenteritis followed by upper respiratory infections. Twenty three (18.8%) had birth defects. The main one was Down syndrome followed by congenital heart defects. The mother's age didn't influence the occurrence of main conditions source of hospitalization in both groups. Lower socio-economic level impacted the occurrence of congenital defects ( $P < 0.025$ ) and so was the advanced maternal age (AMA) ( $p < 5\%$ ). Primiparity and the first order birth were the predisposing factors for birth defects ( $p \leq 0.01$ ).

**Conclusions:** The infants and children of the older mother are less frequently admitted. Under nutrition and birth defects especially down syndrome, are common. There is a close relationship between the lower socio-economic level, the advanced maternal age and the happening of birth defects.

**Keywords:** Epidemiology; Infant; Children; Advanced maternal age

## Introduction

Pregnancies occurring outside the maternal age range of 19-34 years increases the risk of morbidity and mortality in both the mother and the newborn [1,4]. Therefore most studies on advanced maternal age ( $>35$  years) conducted in Africa [3, 4] and elsewhere [1, 2] are devoted to perinatal/ maternal morbidity and mortality. However, if it is established that the acquired skills of the child at birth has an influence on the future development of the child, the impact of maternal age on the child concerns intra uterine life and perinatal and post-neonatal period as well. Moreover, the mother-child dyad remains inseparable during the first 1000 days of life of the child. Therefore it seems appropriate from a survey conducted in pediatric ward, to describe the epidemiology and clinical aspects of infants and children born to advanced maternal age and to determine the type of birth defects and identify their risk factors.

## Patients and Methods

This was a cross-sectional study conducted from March 2013 to March 2014 in a pediatric department at University Hospital

Center of Brazzaville. It included all infants (ages 1 to 12 months) and children (ages 12 to 30 months) whose mother was over 35 years old at the time of their birth. The collection of data was done after completion of admission procedures. Informed consent of the mother or both parents was obtained. The study focused on the description of epidemiological aspects of parents, infants and children, and the clinical data during hospitalization. The appreciation of the socioeconomic status of the family was based on the classification of Gayral Taminh et al [5]. As for the evaluation of nutritional status, we relied on the standard deviation in accordance with WHO references for growth of the child [6]. A univariate analysis was performed to serve the following purposes; on one hand to identify the determinants of birth defects, and on the other hand to determine the influence of maternal age on morbidity of infants and children. In this second case, the study compared infants and children born to mothers over 35 years (cases; group 1) to those born to mothers younger than 35 years, (control ; group 2). In all cases, the calculation of odds ratio (OR) and confidence intervals (CI) of 95% were calculated. The assessment of perceived differences to the chi-square test with a significance threshold of 0.05.

## Results

During the study period, 3402 infants and children were hospitalized in pediatric service. 2907 of them were infants and children aged up to 30 months and among them, 117 were born to mothers aged over 35 years, representing 4% of hospitalizations. They were 62 boys (53%) and the sex ratio M / F was 1:1. The median age was 10 months (range 1 to 30 months). The mean age of the mothers at childbirth was  $40 \pm 2.6$  years (range, 36 to 45 years). The median number of children each mother had was four (range, 1 to 9). The first born was affected in 9.4% of cases, the 2nd or 3rd child by birth order in 31.6% of cases, the 4<sup>th</sup> birth order or beyond in other cases. The educational level of the mother was nil in 0.9%, primary education in 12.8%, secondary education in 73.5% and tertiary in other cases. The socioeconomic level of the family was considered low in 39.4%, middle in 53.8% of cases, and high in 6.8%.

The average birth weight of infants and children was  $3205 \pm 558.8$ gm (range; 2000 to 4500gm). It was below 2500gm in 13.7% of cases, between 2500 and 4000gm in 79.5% of cases and greater than 4000gm in 6.8 % of cases. Most mothers (92.3%) had practiced breastfeeding. The use of breast-milk substitutes was found in 48% of mothers. Nine of them (7.7%) used exclusively breast milk substitutes. The main causes of hospitalization in this study were acute gastroenteritis followed by upper respiratory tract infections (Table 1). The malformative pathology was found (without being the main cause of hospitalization) among 23 infants and children; and that was mainly a morphotype suggesting trisomy

Diagnosis at discharge	n	%
Acute gastroenteritis	31	26
Upper respiratory tract infection	27	
- Rhinopharyngitis	25	23
- Submaxillary Adenophlegmon	2	
Lower respiratory tract infection	26	
- Bronchiolitis	14	22
- Bronchopneumopathy	09	
- Pulmonary tuberculosis	2	
Malaria	15	
- Simple malaria attack	4	13
- Severe and complicated malaria	11	
Urinary tract Infection	9	8
Paediatric AIDS	4	3
Epilepsia	2	2
Domestic accidents	2	2
Cellulitis	1	1
Total	117	100%

**Table 1:** Main causes of hospitalization of infants and children of older mother

Birth defects	n	%
Probable Trisomy 21 *	14	61
Congenital heart defect	4	17
Malformative uropathy	2	9
Craniofacial dysmorphism	1	5
Ambiguous genitalia	1	4
Gyration abnormality	1	4
Total	23	100

**Table 2:** Main congenital defects found in infants and children of elderly mothers

\*with congenital heart defect associated in 6 cases

	Birth defects		OR [95% CI]	p value
	Yes	No		
Socioeconomic level				
Low	14	33	2.9 [1.1 – 7.4]	< 0.025
> Low	9	61	0.4 [0.2 – 1.0]	< 0.025
Parity				
Primiparity	6	5	6.3 [1.7 – 23.0]	< 0.01
Multiparity	17	89	0.2 [0.1 – 0.7]	< 0.01
Birth order				
first	6	5	6.3 [1.7 – 23.0]	< 0.01
> first	17	89	0.2 [0.1 – 0.7]	< 0.01
Mother's educational level				
≤ primary	5	11	2.1 [0.7 – 6.8]	> 0.05
> primary	18	83	0.5 [0.2 – 1.6]	> 0.05

**Table 3:** Univariate analysis of determinants of birth defects

21 (T21) followed by congenital heart defect (Table 2). The T21 was associated with congenital heart defect in six cases, including a ventricular septal defect in two cases, an atrioventricular septal defect in two cases and an atrial septal defect in two cases. Under nutrition was reported in 53.6% of cases, of which 36 cases (30.8%) were being moderately malnourished and 29 cases (24.8%) were being severely malnourished. Short stature and microcephaly were reported in 14 and 15 cases, respectively. At last, 34 infants and children (29.1%) had psychomotor delay. Table 3 reports the influence of certain characteristics on the occurrence of congenital defects. It appears that the congenital defects were more frequently observed in cases of low socioeconomic level (OR = 2.1;  $p < 0.025$ ), primiparity and first born child (OR = 6.3;  $P < 0.01$ ). However, the

	Maternal age (years)		OR [95% CI]	p value
	> 35	≤ 35		
under nutrition				
yes	29	33	0.8 [0.5 – 1.6]	> 0.05
No	88	84	1.2 [0.7 – 2.2]	> 0.05
Birth weight (g)				
< 2500	10	16	0.6 [0.3 – 1.4]	> 0.05
≥ 2500	107	101	1.7 [0.7 – 3.9]	> 0.05
Birth defect				
yes	23	9	2.9 [1.3 – 6.6]	< 0.001
No	94	108	0.3 [0.1 – 0.7]	< 0.001

**Table 4:** Impact of maternal age on morbidity of infants and children

level of mother's education had no influence on the occurrence of congenital defects. The analysis of Table 4 shows that the birth defects occur three times more often in children born to mother with AMA ( $P < 0.001$ ). On the contrary, the proportion of children with low birth weight and that of malnourished children were similar in both groups ( $p > 0.05$ ).

## Discussion

This study reports a series of 117 infants and children born to older mothers (AMA), representing 4% of admissions during the study period. In Congo, according to the Demographic and Health Survey [7], 62.8% to 88.2% of mothers over 35 years old are willing to have children. In view of these data, we can conclude that the number of children born to older mothers reported in this study does not reflect the national data. However, this study allows assessing the health problems of these infants and children. In developed countries, the maternal age at first birth has been rising. This is the case in the US where the National Vital Statistics Reports 2012 indicates an increase in late pregnancy [8]. These represent 5.68% of all births, a rate similar to that encountered in some European countries like France.

In this study, 9.4% of mothers were to their first child only against 59% of those who were rather to their fourth child and more. In Congo, 19.7% of women have their first child beyond 35 years and at that age, 72.6% of them wish to have more children; similarly, 69.7% of mothers with at least four children still want to have more children [7]. Given these results, giving birth beyond maternal age of 35 years is therefore a social phenomenon in Congo. With regard to maternal-fetal consequences inherent in late pregnancy, an increased awareness in this population is necessary to reduce morbidity and mortality which is still higher in Republic of Congo [7].

In this series, 13.7% of mothers had low birth weight infants. This rate, though higher than that was reported in general population of Brazzaville [9], generally seems low when we know that advanced maternal age is often associated with low birth weight [9-11]. Moreover, as already pointed out by some authors [8] in this study, no statistically significant difference was found between infants and children born to older mothers (AMA) and those born to younger mothers (Table 4). In all cases, the high neonatal mortality among low birth weight newborn [12] may explain the low percentage found in this study and considering the children who survived as near miss.

The high rate of use of breast milk substitutes (48%) reported in this study is contrary to the results in the general population. Indeed, in the Republic of Congo, nearly 12 to 15% of mothers resort to breast milk substitutes during the first six months of life of the child and this rate decreases to 5.6% between 18 to 23 months [7]. Feeding infants with breast milk substitutes in

developing countries is met with several restrictions. In Congo, for example, where over half the population lives below the poverty line, bottle-feed is managed with one bottle or two bottles. Thus, the compulsory sterilization of bottles before usage becomes somehow compromised considering the common use of firewood in most households [13]. It thus stems from bad practices exposing the child to several diseases. Moreover, it is established that bottle-fed children were 17 times more likely to be hospitalized for an acute respiratory infection than those fed with breast milk [14]. Similarly, the risk of dying from an infectious cause in the first month increases by six fold in case of feeding with breast milk substitutes [15]. The malnutrition rate observed in this study is similar in Congo and in other developing countries. However, this rate does not vary with maternal age (Table 4).

The distribution of pathology of infants and children born to older mother (AMA) in this study (Table 1) has similar findings reported in previous studies both in the general pediatric population [16] and in infants and children [17]. The malformative pathology, more in trisomy 21 followed by congenital heart defects (Table 2), was dependent on socioeconomic level of the family, the parity, age of the mother and the birth order (Tables 4 and 5). The relationship between advanced age of mother and congenital defects had already been established by several authors [18-20]. Indeed, in women over 35 years, the risk of giving birth to a child with non-chromosomal and chromosomal abnormalities is four times higher than in younger women. Down syndrome is the most common chromosomal disorder; its prevalence in the literature is estimated between 1.4 and 2 ‰ pregnancies. Lower socioeconomic level was significantly associated with the occurrence of congenital defects in this study, which can be explained by poor monitoring of pregnancy. It is possible that the older mothers with "their previous experience" may neglect antenatal care, exposing the fetus to infections. Primiparity and first born among siblings are associated with birth defects ( $p < 0.01$ ). It is known that the duration of exposure to particular infectious or metabolic teratogens (diabetes, malnutrition) or toxin (alcohol) increases with maternal age and so does the parity and number of children. The contrary results observed in this study may be explained by the small sample size in this study or, the risk of birth defect may possibly increase with the advanced maternal age in primiparous woman.

## Conclusion

The infants and children from older mother are distinguished by the low frequency of admission. It is the prerogative of disadvantaged social groups. Under nutrition is often an associated factor. The high rate of defects found in these infant and children should lead to strengthening education for behavior change with regard to the risk of morbidity and mortality they cause.

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\*Corresponding author: Evrard Romaric Nika, Department of Pediatrics, University Hospital Center of Brazzaville, Republic of Congo, E-mail: [nikaevrard@yahoo.fr](mailto:nikaevrard@yahoo.fr)

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