Original Research Article

Family planning and child malnutrition: Relationship between age at first pregnancy, birth interval, family size and malnutrition in children aged 0-24 months admitted to the nutritional centers of the Liberty Hospital and Mother and Child Hospital of N'djamena (Chad)

ABSTRACT

This study was conducted to analyze the relationship between the age of first pregnancy, the birth interval, family size, and severe acute malnutrition in children aged 0 to 24 months living in Ndjamena and hospitalized at the nutrition centers of the Mother and Child Hospital and that of Liberty.It is a descriptive cross-sectional study based on a field survey. It allowed us to collect data from 103 mother-child dyads from March 14 to May 15, 2018. The sampling was random according to the malnourished children received in the two hospitals during the survey.

A Slater scale, a UNICEF measuring rod, a survey form, and a 2006 WHO Z-Score table was used to collect anthropometric data from children and those relating to family planning. The data collected was processed and analyzed manually and then on a computer using Word, Excel, Sphinx, and Stata software. Univariate and bivariate analysis of the data was done.

The results revealed that severe acute malnutrition affects 74.76% of the children surveyed. Of this population, 58.25% have an interbirth interval of ≤ 24 months, 61.03% come from households with at least six individuals, and 73.79% were born to mothers aged ≤ 25 years. From this work, the statistical tests using the Chi-square test had to show a clear significance between the dependent variable, the nutritional status of the children, and each independent variable, which underlie the study's hypotheses($P<0.01$). This made it possible to verify and confirm the study's main hypothesis: "severe acute malnutrition in children aged 0 to 24 months is closely linked to short intervals between births, age at first birth, and family height ".

Keywords: Family planning, malnutrition, birth interval, Liberty Hospital, mother and child hospital, Ndjamena.

1. INTRODUCTION

Family planning allowsindividuals and couples to anticipate the number of children desired, space births, and plan their birth. This is possible through contraceptive methods and the treatment of infertility. A woman's ability to space and limit her pregnancies directly impacts her health and well-being and the outcome of each pregnancy. (WHO, 2012).The policy of family planning was mentioned by the economist Malthus for whom the increase in population is a danger to the survival of humanity insofar as resources do not follow the same rhythm (anonymous, 2009).

Over the years, the term has evolved, involving several aspects. The one that interests us is the nutritional health of mother and child. This aspect, which depends on food, the socio-economic level of households, Water-Hygiene and Sanitation (WASH) actions. Furthermore, according to several studies, medical coverage also depends on the spacing of births, the mother's age at first birth, and even household size. Nutrition and family planning (FP) programs and services are often seen as separate, yet integrating these interventions can benefit mothers and children.

Central and West African countries have some of the highest fertility rates in the world, averaging 5.7 children per woman. In Chad, where the population has almost tripled over the past thirty years, rating ofseven children per woman. The use of modern methods of contraception remains very limited throughout the country (Ministry of Health, 2012). Depending on the region, it concerns 10% and 20% of all women aged 15 to 49, and the prevalence rate is even lower among 15 to 19-year-olds. Teenagers forced into marriage represent 20, 30, and up to 60% of their age group. Maternal mortality rates are very high, with an average of 510 deaths per 100,000 live births (EDST-MICS, 2015).

In Chad, the prevalence of chronic malnutrition is 30.5% nationally. About a third of children under 5 suffer from growth retardation, of which 12% suffer from the severe form. The prevalence of GAM is 14.3%, including 3.8% SAM in children aged 6 to 23 months, against a prevalence of GAM of 7.6%, including 1.2% SAM in children aged 24 to 59 months. These results show that children aged 6 to 23

months are significantly more affected by malnutrition than those aged 24 to 59. (National Nutrition Survey, 2020)

Faced with these high malnutrition rates, the following study question imposed itself on us: what links can be established between the components of family planning and the occurrence of severe acute malnutrition in children from 0 to 24 monthsLiving in Ndjamena?It is to answer this question that this study, which has as its theme: "Family planning and child malnutrition: the relationship between age at first pregnancy, birth interval, family size and malnutrition in children aged 0-24 months admitted to centers nutritional services at the Liberty Hospital and the Mother and Child Hospital of N'Djamena in Chad" was initiated.

The study's objective is "to analyze the possible relationships between family planning/age of first pregnancy, birth interval, family size and severe acute malnutrition in children under 24 months living in N 'Djamena in Chad'.This will specifically be:

- Assess the relationship between the age of first pregnancy and severe acute malnutrition in children under 24 months;

- Assess the links between interbirth intervals and severe acute malnutrition in children under 24 months;

- To assess the links between family size and severe acute malnutrition in children under 24 months.

2. MATERIAL AND METHODS

2.1 Type of study

This is a descriptive cross-sectional study based on a field survey. It allowed us to collect data from March 14 to May 15, 2018, from dyads of mothers and children aged 0 to 2 admitted to the Mother and Child Hospital (HME) and the Freedom of Ndjamena.

2.2 Study period

This research was carried out over six (06) months, from February to July 2018. The month of February served us for the submission, correction, and validation of the research protocol used to carry out this study. We also obtained authorization to collect data from the administrative managers of the two hospitals concerned. The months of March to May were devoted to collecting survey data,while those of June and July were for processing and analyzing data from the surveys, all this under the supervision of our thesis director.

2.3Study population

The population used for this study consists mainly of the following:

- Children from 0 to 2 years old living in the province of N'Djamena and hospitalized in one of the nutrition centers of the Mother and Children Hospital and the Chad-China Liberty Hospital during the data collection period;

- Mothers of these children who met the study eligibility criteria.

2.3.1 Eligibility criteria

The following criteria were defined in the research protocol to allow us to define the sample of the population concerned by the study:

- For kids:these were children with ages less than or equal to two (02) years of age on the date of the survey; they were malnourished and hospitalized in one of the nutrition centers of the Mother and Child Hospital and the Chad-China Liberty Hospital.

- For mothers:be the mother of a child who meets the eligibility criteria and enrolled in the study after the informed consent of said mother;

The mother-child dyad comes from a family living in the province of N'Djamena.

2.3.2 Exclusion criteria

Are not considered by the study all children and mothers who do not meet the eligibility criteria established above.

2.4 Sampling methods

This is a purposive, non-representative sample. It was obtained by reasoning based on the eligibility criteria over the data collection period established by the research protocol. This sample is distributed as follows:

- 49 mother-child dyads (couples) surveyed at the Chad-China Liberty Hospital;

- 54 mother-child dyads (couples) were surveyed at the Mother and Child Hospital.

2.5 Data collection and analysis tools

For the study, we used a survey data collection sheet dealing in its first part with data relating to malnourished children and in its second part with data relating to mothers;

The data collected was processed and analyzed manually and then on a computer using World, Excel, and Sphinx software.

The World software was used for entering textual data. Excel software was used for calculations, graphs, and tables. The Sphinx software in its version v 5.1.0.4 was used to design the input mask, automatic input, and data processing.

The main titles developed in the data collection sheet include:

- Identification of malnourished children;
- Anthropometric parameters of malnourished children;
- The family situation;
- Family planning and the gender relationship.

For the calculation of these anthropometric indicators in children, the following instruments were used:

- A Salter scale was used for weight gain;
- A UNICEF height chart for size determination;
- Survey props printed on A4 paper for note-taking.

Before the operational phase of the collection, a test of the instruments was done in the two nutrition centers of the two hospitals. This text was intended to reassure us of the good condition of the equipment that will be used for the anthropometric measurements of children. The results obtained from this pre-test

enabled us to validate the survey sheet definitively. The pre-test is the stage that follows the recruitment of survey agents.

3. RESULTS AND DISCUSSION

3.1 RESULTS

At the end of the surveys carried out with 103 mother and child dyads, having met the eligibility criteria and agreed to participate in the said study during the period indicated, several results were obtained.

3.1.1 Distribution of children by sex and age group

By table 1 of the study results, which was carried out from March to May, the children who participated in the study are made up of more or less equal proportions of girls and boys. The age group most affected by severe acute malnutrition (SAM) at this time of year is 0 to 12 months, constituting 63% of the study sample.

Table 1. Distribution of children by gender and age group

		Children's age range				
		0 to 6 months	6 to 12 months	12 to 18 months	18 to 24 months	TOTAL
Sex	Male	16	17	11	7	51
	Feminine	16	16	8	12	52
	TOTAL	32	33	19	19	103

3.1.2Distribution of children according to their rank among the siblings

As for the rank of the children in the study among the siblings, the firstbornis the most affected by malnutrition. They make up 28%.The first three born to mothers surveyed together make up 65% of children affected by malnutrition (Fig. 1).

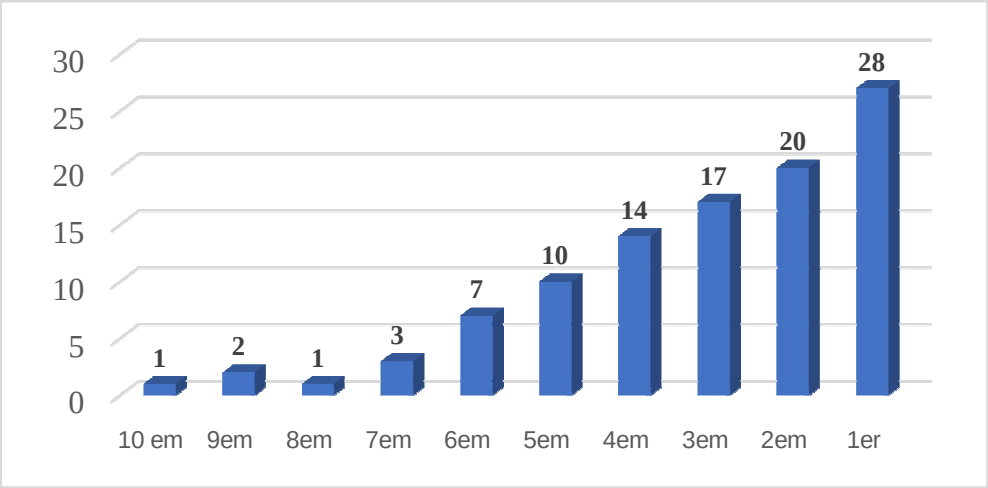
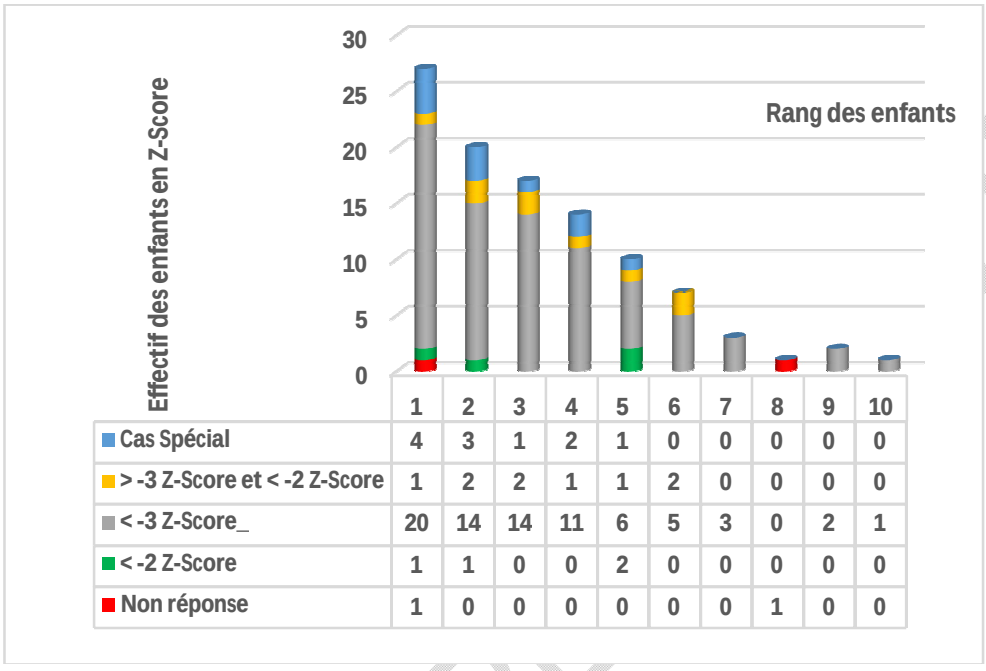


Fig.1. Distribution of children according to their rank in the siblings

3.1.3 Distribution of malnourished children according to their nutritional status

Fig. 2 reveals that, according to nutritional status, severely acutely malnourished children (–3Z-Score) are the ones who dominate in the study, with 74.8% of the study population.



	1	2	3	4	5	6	7	8	9	10
Cas Spécial	4	3	1	2	1	0	0	0	0	0
> -3 Z-Score et < -2 Z-Score	1	2	2	1	1	2	0	0	0	0
< -3 Z-Score_	20	14	14	11	6	5	3	0	2	1
< -2 Z-Score	1	1	0	0	2	0	0	0	0	0
Non réponse	1	0	0	0	0	0	0	1	0	0

Fig. 2. Proportion of malnourished children according to their nutritional status

3.1.4 Relationship between birth interval and nutritional status of children

The results in Table 2 show that at the 1% threshold (p = 0.000), the birth interval is significantly associated with the nutritional status of the children in the study. In this table, children with a birth interval of 12 to 24 months represent more than half (60%) of children affected by acute malnutrition.

Table 2. Interbirth interval and nutritional status of children

		Nutritional status of children							
		No response	< -2 Z-Score	< -3 Z-Score	> -3 Z-Score and < -2 Z-Score	> -2 Z-Score	> -3 Z-Score	Special case	TOTAL
Birth interval	No response	1	1	5	1	0	0	4	12
	Under 12	0	0	13	0	0	0	1	14
		0	2	48	6	0	0	4	60

	From 12 to 24 months								
	25 to 36 months	1	1	2	2	0	0	2	8
	From 37 to 48 months	0	0	3	0	0	0	0	3
	48 months and over	0	0	6	0	0	0	0	6
TOTAL		2	4	77	9	0	0	11	103

Table 3 shows a significant correlation between household size and malnutrition at the 1% threshold (P = 0.000).

Table 3. Household size and nutritional status of children

		Nutritional status of children							
		No response	< -2 Z-Score	< -3 Z-Score	> -3 Z-Score and < -2 Z-Score	> -2 Z-Score	> -3 Z-Score	Special case	TOTAL (%)
Number of individuals in households	No response	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.97
	≤ 5 individuals	0.00	0.97	29.13	2.91	0.00	0.00	2.91	35.92
	≥ 6 individuals	1.94	2.91	44.66	5.83	0.00	0.00	7.77	63.11
TOTAL(%)		1.94	3.88	74.76	8.74	0.00	0.00	10.68	100.00

By the results presented in this table 3, assuming that families with no more than five people as being the least numerous and those with more than six people as the most numerous, the children of large families are exposed to malnutrition in a general way (63.11%) and severe in particular (44.66%). The study also revealed that the mother-child dyads surveyed come mostly from families aged between 5 to 10 people (54.90%).

The study revealed other interesting correlations, including:

- The mothers who participated in this study largely come from monogamous households (67.96%). Even if the sample is not representative, we can affirm, for this study, that malnutrition is not associated with polygamy;
- The mothers practice two monotheistic religions, and there is a clear predominance of mothers of Muslim faith (84.47%) who participated in the present study over those of Christian faith;
- The mothers surveyed are mostly young. The age group under 20 is the most represented, with 37.88%. The accumulation of up to 25 years constitutes 59.23%. The average age of these mothers is 23;
- Three-quarters (75%) of the first-born children in the study come from 37.88% of mothers whose age is less than or equal to 20 years;
- According to the mothers surveyed, the estimated average age for a girl to have her first childbearing is 16. Among these mothers, 79.61% believe that a girl can conceive her first child before the age of 18;
- Rare is the mothers surveyed who have a professional activity. They are mostly housewives (72.82%). The few rare activities practiced are limited to trade, hairdressing, sewing, crafts, agriculture, and livestock breeding.

- Almost half of the mothers surveyed (49.51%) have no schooling. The section of literate mothers constitutes 7.77% of the study sample. The mothers of children who have received primary and secondary education form 26.21% of the sample, while mothers who know how to read the Koran constitute 14.56%.
- In the study population, 51.45% of mothers would like to have several children, between 6-10 children, against 28.15% of mothers who would like to have at most five children. The average of the study is eight children per mother;
- Almost all of the mothers surveyed (94%) say they have not received training in family planning (FP) from health centers, hospitals, and other structures in N'Djamena;
- About the means used by mothers to delay or space pregnancies, 33.8% of mothers surveyed claim to practice abstinence, while 48.54% claim to use modern methods of contraception including, in descending order: pills (44.66%), implants and injections (41.74%), condoms (33%). Mothers who say they know nothing about these methods or do nothing at all to delay or space pregnancies make up 15.54%;
- Most women surveyed (87.37%) claim to recognize that family planning has advantages. It leads to better health for mothers (81.55%) and children (70.87%); it offers more working time to mothers (33%). Therefore, a better economic situation (27.18%) and planning allow mothers to devote themselves more to their children's education.
- More than half (56.1%) of the mothers surveyed believe that a child should be breastfed until the age of 19 to 24 months, and 51% of them affirm that from the age of 6 months, a mother can introduce complementary foods and water to infants;
- Most women surveyed affirm there is a lack of communication in the home between the man and the woman on family planning; some husbands impose their point of view.

3.2 Discussion

This study's main hypothesis (H0) is that "severe acute malnutrition in children aged 0 to 24 months is closely linked to short birth intervals, mothers' age at first pregnancy, and family size' '.
The verification of the secondary hypotheses allowed us to confirm our basic hypothesis.

H_1:"The shorter the interbirth interval, the more children are exposed to severe acute malnutrition".
The processing of the data of our present study reveals that the children surveyed with a short birth interval suffer more from severe acute malnutrition compared to the rest. This confirms hypothesis H1. Out of 103 children in our study, 85.71% suffered from severe acute malnutrition and were born or had a younger child after only 6 and 24 months. According to our study's results, these short interbirth intervals find their explanation in the low rate of use of contraceptive methods by the mothers surveyed.
Maternal. Akoto and Hill (1988) established in their study that the birth interval is inversely associated with malnutrition: the shorter the birth interval (less than two years), the more precarious the nutritional status of children. While studies by Penders et al. (1997) showed that too short a birth spacing increases the risk of mortality and retards growth in children and their brothers and sisters through prenatal growth retardation and early cessation of breastfeeding.The need for more communication from couples about family planning decisions can also explain this situation.

H2:"The larger the household size, the more the children are exposed to severe acute malnutrition". Assuming that families of more than six people are the most numerous, 63.11% of these children in the study are exposed to malnutrition in general and severe malnutrition in particular (44.66%). The study also revealed that the mother-child dyads surveyed come mostly from families whose size is between 5 to 10 people (54.90%), which allows us to confirm hypothesis H2.

The average number of individuals per household from which our dyads come is 9. This average is, therefore, much higher than the national average for the fertility index of women, which is seven children. This could explain the very fact of the child's conception in Chadian society. The child is seen as the wealth of the family. In many households in our dyads, the study revealed that there is no decision on when to have children, and many mothers are prevented from using contraceptives by their husbands. The results also revealed the lack of communication in the couples of our dyads about family planning.

H3: ’’The age of first childbearing, below 25 years, most often exposes children to severe acute malnutrition''.

Of the 77 children in the study, out of the 103 who suffer from Severe Acute Malnutrition (SAM), 28 are the firstborn of the mothers surveyed. Of these 28 first-born mothers, 21 come from mothers whose age is less than or equal to 20 years, and among them, 20 suffer from SAM, or 71.42%. This number increases to 25 children if we consider the age of the mothers in the range of 14 to 25 years (89.28%). This allows us to say that the mother’s young ageduring her first maternity (first rank of the child in the siblings) exposes the child to SAM. This confirms research hypothesis H3.
AIDELF (2002) concluded in his work that children born to adolescent mothers are significantly more likely to experience stunted growth than those born to other women. The young age of the mothers is a factor in severe acute malnutrition due to the inexperience of these mothers in taking care of their children nutritionally. Another explanation is that of the early marriage of girls in Chad. 28% of women aged 15 to 49 were married before age 15, and 69% of women aged 20 to 49 were married before age 18 (DHS, 2010). This rate varies according to the regions and oscillates between 60 and 84% in the other regions against 52% in N'djamena.
H4:Few women know about family planning and its links to their health and children.
The mothers surveyed as part of this research have an overall knowledge of FP methods and their benefits for them and their children. Generally, they do not use its methods to capitalize on its benefits. About the means used by mothers to delay or space pregnancies, 33.8% of mothers surveyed claim to practice abstinence, while 48.54% claim to use modern methods of contraception including, in descending order: pills (44.66%), implants and injections (41.74%), condoms (33%). Mothers who know nothing about these methods or do nothing to delay or space pregnancies constitute 15.54%. This result allows us to invalidate our hypothesis H4.
Finally, verifying the secondary hypotheses allows us to confirm the main hypothesis H0 of this study: "severe acute malnutrition in children aged 0 to 24 months is closely linked to short intervals between births, age at first pregnancy mothers, and family size."

4. CONCLUSION

At the end of this study, conducted among 103 mother-child dyads hospitalized during the data collection phase either at the Mother and Children Hospital or the Hôpital de la Liberté, led us to the following conclusion: family planning is closely linked to the occurrence of severe acute malnutrition in children aged 0 to 24 months, through the short spacing between two consecutive births, the young age of mothers at their first pregnancy and the large size of families or households. This study also revealed that knowledge of contraceptive methods of family planning by mothers is satisfactory, but the use of the latter remains a problem, and this, by the opposition of husbands, religious prohibitions,
In light of the preceding, it would be necessary to involve family planning in nutrition programs effectively or to create synergy between them to effectively guide the fight against child malnutrition in a country like Chad, where households are generally numerous and where the fertility index is seven children per woman. This integration of family planning would benefit families, the health of others, and for children if it can be made effective and sustainable. Women marry early.