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Research Article

Congenital Abnormalities Clinically Visible in Preschool Setting in Lomé (Togo): Epidemiological and Clinical Aspects

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Abstract

Introduction: To determine the prevalence and distribution of clinically visible Congenital Anomalies (CA) among preschool children in Lomé, in order to prepare the establishment of a register of malformations in Togo.

Materials and methods: This was a prospective cross-sectional study with descriptive and analytical purposes that took place from March 1st to September 30th, 2021 (7 months). It focused on preschool children in Grand Lomé. Sampling was clustered and each child was the statistical unit. Schwartz's formula was used and 708 children were expected for the survey. The minimal number of children for statically significant results was 610.

Results: Out of 633 children surveyed, 38 (21 boys (55.26%) and 17 girls (44.84%)) had a clinically visible birth defect. The prevalence of CA was 6%. They presented 22 types of AC for 6 different devices and systems. Abnormalities of the osteoarticular system were the most found (34.23%) followed by facial abnormalities (23.68%). The risk factors identified were family history of CA and consanguineous marriage, traditional medication use, and malaria infection during pregnancy.

Conclusion: Apart from hospital data, data from this study must be taken into account in the malformation management policy in Togo. A nationwide study in preschool and maternity hospitals in Togo must be conducted to consolidate the data, necessary for the establishment of the malformation register.

Keywords: Congenital abnormalities; Children; Malformations; Togo; WHO

Introduction

Congenital Abnormalities (CA) are one of the leading causes of neonatal mortality and infant morbidity in the world. They are also sources of disability and social stigma. In 2021, the World Health Organization (WHO) estimates nearly 303,000 newborns death before the age of 28 days in the world due to CA [1]. The less serious CA can be treated with a significant social, economic and emotional impact. The fight against CA mortality in developed countries is primarily based on editing CA record, which makes it possible to monitor epidemiological evolution, plan a public health policy, detect the potentially teratogenetic risks factors and regulate management [2,3]. In addition to these records, there is usually antenatal diagnosis, which allows adequate multidisciplinary management, a monitoring of the evolution and a prognosis of the concerned pregnancy [4]. In many developing countries, particularly in Africa, the CA registration and monitoring system is almost non-existent [5,6]; the incidence and mortality of CA are very speculative because of the lack of a real database. In Togo, only hospital studies have been carried out [7-16], and they are not sufficient to establish malformations record. Data on CA outside the hospital setting are non-existent. It is therefore in the perspective of setting disorders register to elaborate CA policy management that we have decided to carry out this work on the CA clinically visible in preschool setting in Lomé. The general objective was to determine the prevalence of clinically visible CA in preschool in Lomé. The specific aim was to describe the socio-demographic and clinical characteristics of these disorders, identify the most common and serious CA as well as the associated risk factors. Finally, it is also about preparing the establishment of disorders record.

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Material and Methods

This was a prospective cross-sectional study with descriptive and analytical purpose, which took place from March 1st to September 30th, 2021, accounting for 7 months. It focused on children in preschool establishments in Grand-Lomé. During the academic year 2020-2021, Grand-Lomé had 807 educational establishments, attended by 38,850 children, divided in 12 teaching inspections. Sampling was clustered and an included preschool corresponded to one cluster. Each child surveyed constituted the statistical unit. The estimation of the minimum sample size for obtaining meaningful results is made by the Schwartz formula:

$$N = \frac{Z^2_{\alpha} p(1-p)}{e^2} \times 1.5$$

The variables were p=6.76% and e=2.5%. We took 1.5 to minimize the cluster effect, especially since this is not a knowledge assessment study. By applying this formula, we obtained a minimum sample size of 610 children to be surveyed.

We included, children of both sexes, enrolled in the selected preschool establishment, and for whom their parents gave written consent for their participation in this study. We excluded children from selected establishments whose parents had not accepted their participation, or were absent on the days of the survey. The included establishments were also those for which the headmasters gave their written consent to examine the children who were enrolled there. We had the authorization of the Ministry of Primary, Secondary and Literacy Education. The sampling was done in three stages: the inspections, establishments and children. The choice of inspections was made by random sampling with a proportional probability according to the number of inspections. Based on this mechanism, three inspectorates comprising 315 establishments were chosen. The establishments were selected by sampling stratified on the number of establishments. Thus, 12 establishments were selected. According to cluster sampling, 708 children were expected for the survey. A survey questionnaire was designed for data collection. Data collection took place in schools from May 7th to June 7th, 2021, accounting for 30 days, by two teams each composed of two doctors and a nurse. Data entry and analysis were done using EpiData 3.1, Excel and R version 4.0.5 software. The descriptive study was based on the description of the socio-demographic and clinical characteristics of children with CA. The quantitative variables were expressed on average and associated with 95% of confidence interval and standard deviation. The qualitative variables were expressed in numbers and in percentages. The comparative study was based on a bivariate and multivariate analysis. In the bivariate analysis, the comparison between the dependent variable (congenital disorder, sex, age) and the qualitative variables was carried out using a Pearson chi-square test. Fisher's test was used in case of invalidity of Pearson's chi-square test. The comparison between the dependent variable and the quantitative variables was carried out using the Student test as a parametric test or the Wilcoxon test as a non-parametric test. Differences were considered significant if the p-value was less than 0.05. In the multivariate analysis, a stepwise downward logistic regression was performed. The measure of association was the adjusted Odds Ratio (OR) and its confidence interval at 95%.

Results

Prevalence

During the study period, 633 out of 708 expected children were examined with a participation rate of 89.41%. Thirty-eight (38) had presented at least a clinically visible CA. The prevalence of the CA clinically visible in pre-school settings in Lomé was 6%.

Sociodemographic and educational characteristics of the children

The average age of the children was 4 years old ± 0.81 with extremes of 2 and 5 years old. Th4e most found age group was that between 4 and 5 years old in both sexes. There were 21 boys (55.26%) and 17 girls (44.84%). The sex ratio was 1.23. The average age of preschool start in girls was 3.6 years old ± 0.81 with extremes of 2 and 5 years old and in boys 3.8 years old ± 0.81 with extremes of 2 and 5 years old. Nineteen children (50%) were in section 1 and the other 19 (50%) were in section 2.

Description of CA

Twenty-two types of CA involving 6 different devices and systems have been identified. Table 1 presents the distribution of CA according to the types found. Abnormalities of the osteoarticular system were the most found (13; 34.23%) followed by face disorders (9; 23.68%) and the central nervous system (5; 13.15%). Table 2 presents the distribution of CA according to the devices and systems concerned. At the top of the osteoarticular system abnormalities, were supernumerary fingers or toes (polydactylies) with 6 cases out of 13, followed by clubfeet with 2 cases out of 13. Face disorders were dominated by the facies of trisomy 21 with 3 cases out of 9 followed by cleft lip (2 cases out of 9). Hypospadias (2 cases) and cryptorchidism (1 case) shared urological abnormalities.

Parents sociodemographic and medical characteristics and risk factors: Concerning the mothers, 3 (7.89%) were under 20 years old, 33 (86.85%) were between 20 and 40 years old and 2 (5.26%) were more than 40 years old at the time of delivering children with CA. Table 3 shows the distribution of the noted characteristics during pregnancy in the mothers.

As for the fathers, there were none under 20 years old; 19 (50%) were between 20 and 40 years old and 19 (50%) over 40 years old. Two fathers were congenital disorders carriers (polydactyly). Overall, there was blood relation between parents in 7 couples. The comparative analysis made it possible to note that the family history of congenital disorder (p=0.022), taking traditional medicine during pregnancy (p=0.020), malaria infection during pregnancy (p=0.001) and the notion of consanguineous marriage in the family (p=0.001) are risk factors for CA (respective OR >1). Taking iron and folic acid during pregnancy is a protective factor against CA (OR <1). Further details are given on these data in Table 4.

Discussion

The objective of this study was to determine the prevalence of the CA clinically visible in non-hospital settings, particularly in preschools, to describe their epidemiological and clinical characteristics and to identify risk factors. The purpose was to

Table 1: Distribution of congenital abnormalities according to the types found.

	n	%
Encephalocel	1	2.63
Macrocephaly	1	2.63
Facial dysmorphism	2	5.26
Facies trisomy 21	3	7.89
Cryptorchidism	1	2.63
Albinism	1	2.63
Spina bifida	2	5.26
Hypospadias	2	5.26
Cleftfoot	2	5.26
Microcephaly	1	2.63
Flatfoot	1	2.63
Congenital alopecia	1	2.63
Ombilical hernia	3	7.89
Genu varum	1	2.63
Congenital scoliosis	2	5.26
Cleft lip and palate	3	7.89
Anorectal malformation	1	2.63
Congenital strabismus	1	2.63
Congenital nevus	2	5.26
Polydactyly	6	15.78
Genu valgum	1	2.63
Total	38	100

Table 2: Distribution of congenital abnormalities according to the devices and systems concerned.

	n	%
Nervous system	5	13.15
Face	9	23.68
Digestive system	4	10.52
Uro genital system	3	7.90
Skin and dander	4	10.52
Osteoarticular system	13	34.23
Total	38	100

Table 3: Distribution of the noted characteristics during pregnancy in the mothers.

	n	%
Spontaneous abortions	8	21.10
Iron intake and folic acid	31	81.58
Taking traditional products during pregnancy	7	18.4
Frequent use of tobacco and alcohol	1	2.63
Malaria during pregnancy	22	57.89
Anemia during pregnancy	4	10.52
Diabetes during pregnancy	1	2.63
Sickle cell disease during pregnancy	1	2.63
High blood pressure during pregnancy	1	2.63

Table 4: Distribution of factors associated to congenital abnormalities.

	Odds –ratio	IC 95%	p-value
Family history of congenital anomaly	2,65	1,4-6,78	0,022
Taking medication during pregnancy			0,02
Iron and folic acid	0,38	0,15-0,97	
Traditional product	2,63	1,30-6,73	
Malaria during pregnancy	6,49	3,29-12,78	<0,001
Consanguineous marriage	6,85	2,68-17,50	<0,001

strengthen the databases leading to the establishment of birth defects records, an essential tool for an effective, efficient and resilient policy for the management of these congenital disorders in Togo. Indeed, in Togo, studies have been conducted in hospitals, particularly teaching hospitals [7-16] and have provided data. These data show that, most often, congenital disorders which represent emergency cases, are admitted to the hospital in our working conditions. Other cases are not necessarily taken to hospital, sometimes because of financial shortfall reasons, ignorance of the existence of medical care or belief that the anomaly is not considered as a disease but a spell of nature or ancestors. These spells which would most of the time be irreversible, and for which, if there were to be any solution, would only come from the ancestors and not from modern medicine. In our case, going to hospital is not therefore the primary the place where we can find the majority of defects, to gather reliable data on them that can be used to set up a non-hazardous policy. In this regard, we have chosen to focus on the preschool environment where children with CA who would not be taken to hospital could be found. Their clinical examination in this school setting saves them from hospital decor, removes parents' attention from the lack of financial means and sharpens the possible expectation of a medical solution.

The prevalence found in this study is high at 6%. It is even higher than the hospital data of Amont-Tanoh-Dick et al. [17] (1.8%) in Abidjan, and that of Sabiri et al. [18] (4%) in Rabat. It is substantially equal to the hospital frequency found by Gnassingbé et al. [7] (6.76%) in Lomé (Togo) and Bénié et al. [5] (6.8%) in Abidjan (Ivory Coast). In India, malformations affect 2.5% of births [19]. In Canada (2013), the malformations rate was 3 to 5% [20]. These studies were done in relation to the general population or living births. The variability of the study populations may explain these differences. However, it remains difficult to compare the incidence of birth defects. The incidence varies over time within a continent, country and region depending on several environmental and genetic factors [21]. A study in the general population or in maternities covering all living births or not would be more reliable. If human resources are available, the funding of research is still slow to be a policy priority in developing countries like Togo. Moreover, this lack of funding forced us to limit our study to clinically visible disorders. Extending that to disorders whose diagnosis requires an additional examination which generates more costs that we cannot impose on the parents of those children in a context where funding for these kinds of research is not a priority and research studies are stalling. Of course, infectious diseases such as malaria and typhoid fever are still today the leading causes of death in the general population and even infants. However, their eradications go through the pillar of research as well. Shifting paradigm is absolutely necessary. This study nevertheless allowed us to find out various CA. This is also the case in studies similar to ours [22-26]. In our study, the head, the trunk (thorax and abdomen), the pelvis and the limbs, the external genitalia, the central nervous system and the terminal part of the digestive system were concerned. Our study is characterized by the predominance of osteoarticular disorders as reported by Kouamé et al. [22] and by many other authors [5,18,27-31]. Some studies, on the other hand, have helped notice a predominance of neural tube defects [32,33]. Even while Bénié et al. [5] reported clubfeet (18%) followed by genu recurvatum (14%) as the first osteoarticular disorders, we report in our case predominance of polydactylies (46.17%). This difference in distribution could be explained by the unknown or known multifactorial origin of congenital disorders [34].

Several risk factors have been described in the occurrence of congenital disorders: advanced maternal age, consanguinity, polyhydramnios, prematurity, tobacco and alcohol consumption during pregnancy and history of abortions [6,18,21,35,36]. Some of these factors were found in our study. Maternal age is described as a risk factor after 35 years old [37,38]. However, the risk of this disorder after 35 years old is not supported by all studies [22]. This risk was not found in our study. Other factors could be involved but would remain difficult to find [19]. The association of gestality with congenital anomalies was not evaluated in this study. However, a study in India showed it to be a risk factor [19]. Family history of congenital disorders (p=0.022), taking traditional medicine during pregnancy (p=0.020), malaria infection during pregnancy (p=0.001) and the consanguinity in the family (p=0.001) are the risk factors of CA (respective OR>1) reported by our study. Traditional medicines are numerous in Togo and we have not been able to identify the specific incriminated products. Consuming local products in medical matters is not a bad thing, for they are more accessible to the populations. However, they lack of regulation and monitoring in their composition, packaging and conservation. It happens that they are harmful to pregnancies. Consanguinity is described as a risk factor for the occurrence of congenital disorders. Our study reported a fourth degree consanguineous marriage in 7 couples, accounting for 18.42%. Similar results were reported by Anyawu et al. [39] who noted a frequency of 19.51% of consanguineous marriages in their studies. Mosayebi et al. [40] found a frequency lower than 7% of consanguineous marriage, while Sabiri et al. [18] noted 48.7% higher. This is a factor that can be modified by awareness. In fact, consanguineous marriage is a widespread practice in some communities that need to be targeted and raised awareness by relying on customary chiefs and other local authorities.

Conclusion

The prevalence of clinically visible CA in preschool settings

is high. The disorders vary and almost all devices and systems are affected. Apart from hospital data, data from this study should be taken into account in the disorders policy management in Togo. A nationwide study in preschools and in maternity wards in Togo should be conducted to consolidate the data needed to establish the birth defects record.

References

1. World Health Organization. Key Landmarks on Congenital Anomalies. 2020.
2. Texas Health Data. Birth Defects. 2021.
3. CDC. Metropolitan Atlanta Congenital Defects Program (MACDP). Centers for Disease Control and Prevention. 2021.
4. Couture A, Baud C, Prodhomme O Saguintaah M, Veyrac C. Congenital malformations: Antenatal Diagnosis and Becoming. 6th ed. Sauramps Médical: Paris; 2011.
5. Bénié AC, Lohourou GF, Akobé AJR, Traoré I, Kpangni AJB, Inza B. Clinically visible congenital malformations. Rev Int Sc Abj-RISM. 2021;23(1):17-23.
6. Fiogbe MA, Goudjo E, Gbenou AS, Fiogbe DA, Tonato-Bagnan AJ. Clinically visible birth defects and risk factors listed in newborns in Cotonou. J Rech Sci Univ Lomé. 2013;15(1):67-74.
7. Gnassingbe K, Tomta K, Akakpo-Numado KG, Lamboni D, Tekou H. Clinically visible malformations in children: epidemiological aspects and the problems posed by their management at the Tokoin teaching hospital in Lomé. J Rech Sci Univ Lomé. 2010;12(1):105-10.
8. Guedenon KM, Doubaj Y, Akolly DAE, Moussa WB, Saka B, Adjenou K, et al. Hutchinson-Gilford Progeria syndrome: Report of the first Togolese case. Am J Med Genet A. 2020;182(6):1316-20.
9. Foli A, Mawouto F, Elom TO, Rollin DA, Sollim T, Manani H, et al. Birth defects visible at birth in Lomé, Togo. J Rech Sci Univ Lomé. 2021;23(2):195-203.
10. Gnassingbe K, Akakpo-Numado GK, Attipou K, Kpoedjou K, Tekou H. Les encephaloceles au Chu Tokoin de Lome. J Rech Sci Uni Lomé. 2006;8(2).
11. Boume MA, Akakpo-Numado GK, Adabra K, Anani K, Metchihoungbe SC, Kante TB, et al. Left Posterolateral Congenital Diaphragmatic Hernia in Neonatal Revelation Form: A Case in Togo, A Developing Country. SM J Pediatr Surg. 2016;1(1):6.
12. Folligan K, Laleye A, Moumouni H, Koffi KS, Yao GV, Adjagba M, et al. Abnormality of sexual development: a case of male pseudohermaphroditism or abnormality of sexual development. J Rech Sci Univ Lomé. 2012;14(1):67-70.
13. Agbeko FY, Fiawoo M, Djomaleu RA, NZonou M, Talboussouma S, Hemou M, et al. Congenital Hip Dislocation with a Genu Recurvatum in Togo: A Case Report. Asploro J Biomed Clin Case Rep. 2021;4(1):72-6.
14. James YE, Gnassingbe K, Folligan K, Adjenou KV, Akakpo-Numado GK, Tekou A, et al. Anatomical and radiological study of living thoraco omphalopages conjuncts: about two cases with literature review. J Rech Sci Univ Lomé. 2013;15(3):333-41.
15. Gnassingbe K, Tomta K, Mihluedo-Agbolan KA, Peketi KA, Akakpo-Numado GK, Amekudzi WA, et al. Neural tube defects in pediatric surgery of the Lome teaching hospital (Togo). J Rech Sci Univ Lomé. 2013;15(3):427-35.
16. Koffi KS, Djadou EK, Guedehoussou T, Atakouma DY, Bakonde B, Tatagan-Agbi K, et al. Epidemiological and clinical profile of trisomy 21 in Togo. J Rech Sci Univ Lomé. 2015;17(2):397-402.
17. Amont-Tanoh-Dick F, Gouli JC, N'Gouan-Do¬moua AM, Aka J, Napon-Kini H. Epidemiology and immediate deviation of newborn malformations at Yopougon University Hospital in Abidjan, Côte d'Ivoire. Rev Int Sc Med. 2006;2:7-12.
18. Sabiri N, Kabiri M, Karboubi L, Bouziane A, Barkat A. Risk factors for congenital malformations: prospective study at the Souissi maternity hospital in Rabat, Morocco. J Pédiatr Puériculture. 2013;26:198-203.
19. Sarkar S, Patra C, Dasgupta MK, Nayek K, Karmakar PR. Prevalence of Congenital Anomalies in Neonates and Associated Risk Factors in a Tertiary Care Hospital in Eastern India. J Clin Neonatol. 2013;2(3):131-4.
20. Agence de la santé publique du Canada. Les anomalies congénitales au Canada. Rapport de surveillance sur la santé périnatale. Ottawa; 2013.
21. OMS: Congenitale Malformations [Internet]. 2015
22. Kouamé DB, Brou-N'guetta AI, Kouamé YGS, Sounkéré M, Koffi M, Yaokreh JB et al. Epidemiology of congenital abnormalities in west Africa: results of a descriptive study in teaching hospitals in Abidjan: Côte d'Ivoire. Afr J Paediatr Surg. 2015;12(1):51-5.
23. Ahuka OL, Kapimba B, Iteke F. Panorama of visible birth defects in Eastern Democratic Republic of Congo during the war period. Ind J Appl Res. 2015;5:118-20.
24. Ngondo E, Munyantwari AE. Anorectal malformations. Case of the Provincial Hospital of North Kivu. Rev Med Gd Lac. 2016;7:18-20.
25. Luhiriri L, Kikwaya L, Alumeti DM, Batahi M, Kanku K, Mukwege MD. Ano-rectal malformations at Panzi Hospital: epidemiological and therapeutic aspects. About 15 cases. Rev Ann Afri de Méd. 2011;11:726-31.
26. Alumeti DM, Ngom G, Ndour o, Bahlaloni IE, Faye A, Ndoye M. Anorectal malformations in older children. About 16 cases, Senegal. Méd Afr Noire. 2011;5809:404-8.
27. Kouamé BD, N'guessan Brou I, Koffi KA, Odéhouri TH, Gouli JC, Yenan J et al. Epidemiology of congenital anomalies in Hospitals. Rev Int Sc Med. 2014;16:9-16.
28. Mashako RM, Nsibu NC, Nkinamubanzi M, Bitwe MR, Kajibwami E, Masamba L, et al. Congenital malformations in eastern Democratic Republic of the Congo: challenges and prospects. Int J Innovat Sci Res. 2017;33:256-61.
29. Marwah S, Sharma S, Kaur H, Gupta M, Goraya SPS. Surveillance of congenital malformations and their possible risk factors in a teaching hospital in Punjab. Int J Reprod Contracept Obstet Gynecol. 2014;3(1):162-7.
30. Alshehri MA. Pattern of Major Congenital Anomalies in Southwestern Saudi Arabia. Bahrain Med Bull. 2005;27:1-6.
31. Chente N'guefack C, Egbe OT, Halle EG, N'zesseu Djomo AL, Nana Njamen T, Tsingaing Kamgaing J et al. Congenital malformations at the Douala General Hospital: epidemiological and clinical aspects. J SAGO. 2013;14:11-6.
32. Kamgaing KE, Rogombe MS, Maniaga KR, Tsague G, Minko JI, Mi Kama MEet al. Congenital Malformations Seen in Libreville, Management and Evolution. EC Paediatr. 2018;7:422-34.
33. Gandhi MK, Chaudhari UR, Thakor N. Incidence and distribution of congenital malformations clinically detected at birth: a prospective study at tertiary care hospital. Int J Res Med Sci. 2016;4(4):1136-9.
34. Mossey PA, Little J, Munger RG, Dixon MJ, Shaw WC. Cleft lip and palate. Lancet. 2009;374(9703):1773-85.
35. Kamla JI, Kamgaing N, Nguifo Fongang EJ, Fondop J, Billong S, et al. Epidemiology of congenital malformations diagnosed at birth in Yaounde. Health Sci Dis. 2017;18:53-62.
36. Lubala TK, Shongo MY, Munkana AN, Mutombo AM, Mbuyi SM, Momat FK. [Congenital malformations in Lubumbashi (Democratic Republic of Congo): about 72 cases observed and advocacy for the development of a National Registry of Congenital Malformations and a National Reference Center for Human Genetics]. Pan Afr Med J. 2012;13:84.
37. Shawky RM, Sadik DI. Congenital malformations prevalent among Egyptian children and associated risk factors. Egypt J Med Human Genet. 2011;12:69-78.
38. Grover N. Congenital malformations in Shimla. Indian J Pediatr. 2000;67(4):249-51.
39. Anyanwu L-JC, Danborno B, Hamman WO. Birth Prevalence of Overt Congenital Anomalies in Kano Metropolis: Overt Congenital Anomalies in the Kano. Univers J Public Health. 2015;3(2):89-96.
40. Mosayebi Z, Movahedian AH. Pattern of congenital malformations in consanguineous versus nonconsanguineous marriages in Kashan, Islamic Republic of Iran. East Mediterr Health J. 2007;13(4):868-75.