Journal of Public Health International

Open Access - Peer-Reviewed - ISSN 2641-4538

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Research Article

Proportion of WaterBorne Diseases in Children Aged 0 To 5 Years in the Health Area of the Urban Dispensary in Ebolowa - Cameroon

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Published citation: NANA PAMELA, P M Tebeu, H Ngouakam, I Takougang, H Fouedjio et al. (2021) **Proportion of WaterBorne Diseases in Children Aged 0 To 5 Years in the Health Area of the Urban Dispensary in Ebolowa - Cameroon**. *Journal of Public Health International* - 4(2):17-24. https://doi.org/10.14302/issn.2641-4538.jphi-21-3897

Article DOI: 10.14302/issn.2641-4538.jphi-21-3897

Abstract

Background

Water-related diseases are water-related disorders of the body. They are a public health problem as they are responsible for 60% of infant mortality in our developing countries. There are few studies in South Cameroon on the subject.

The overall objective of this work was to study the explanatory behavioral factors of waterborne diseases in children aged 0 to 5 years in the health area of the urban dispensary in Ebolowa in Cameroon in 2020.

Methodology

This was an analytical cross-sectional study comparing two groups of children (group 1: children affected by waterborne diseases; group 2: children unaffected by waterborne diseases) within the health area of the Ebolowa urban area. It lasted 21 months and the study period was from 28 December 2020 to 22 January 2021. We included children aged 0 to 5 years present in households where parents/guardians gave their informed consent. Sampling was probabilistic and cluster sampling. Using the Kelsey formula, we obtained a sample of 420 households and 566 children. Data was collected using a questionnaire and stored in the Excel spreadsheet and analyzed with CDC USA's epi info software 7.2.2.6. The calculation p value was done with Stat Calc at the significance threshold of 0.05.

Bold

The proportion of waterborne diseases was 97% (549/566) among the children aged 0 to 5 years surveyed. The most common reasons for using the health service for children aged 0-5 years were diarrhea 78.62% (IC75.06-81.80), and malaria 78.09% (74.09-81.30). The median age of children suffering from these pathologies was 36 months (24; 60). The gender ratio (Boys/Girls) was 2.06/1.

Conclusion

We propose to increase the awareness of mothers/guardians on good practices; also, to increase health promotion in the fight against waterborne diseases.

Keywords:
Proportion; waterborne diseases; child; Ebolowa; Cameroon

Article Information	
Running Title	proportion of waterborne diseases in children aged 0 to 5 years in ebolowa in 2020
Academic Editor	Anubha Bajaj, Consultant Histopathology, A.B. Diagnostics, New Delhi, India.
Received Date	10 July 2021
Accepted Date	24 July 2021
Published Date	31 July 2021
Online	31 July 2021
Publication	Volume 4; Issue 2; Pages 17–24
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Introduction

Waterborne diseases are contracted through ingestion, direct contact with contaminated water, or when water is a living environment for hosts such as larvae or parasites. Water-related diseases are very diverse and sometimes directly related to water through a host or a vector. According to the WHO, epidemics due to water contamination are usually characterized by an explosive onset. Waterborne diseases are water-related disorders of the body.

Worldwide, "Waterborne diseases kill more than 5 million people per year. Almost 2.3 billion people suffer from water-related diseases and they account for about 60% of child mortality" (WHO, UNICEF). These diseases are observed in developing countries [1]. They cause 3.4 million deaths per year, of which 2.2 million are due to diarrheal diseases, particularly cholera [2]. They are the second most common cause of death among children under five years of age. In Cameroon, the lack of public drinking water distribution forces the inhabitants to resort to spring and well water. [3]. Blastocysts Hominis had been identified in the municipal lake of Yaoundé in the Center by Ajaegah in 2017 [4]. Cameroon has 10 regions and very few recent studies in the South region which has a fairly dense hydrographic network [5]. But the explanatory factors are important to detect because although more than 76% of the population (WHO 2015) uses safely managed drinking water in Cameroon, these pathologies persist. In Ebolowa, the disease burden remains high; 23% of cases until 2019. Children are not the only ones affected and the incidence is alarming.

The purpose of this study was to find out the proportion of waterborne diseases in children aged 0-5 years in the health area of the Ebolowa urban dispensary in Cameroon in 2020.

Materials/Methods

Study Design, Setting and Population

This was a cross-sectional analytical study with an assigned/unassigned design. The study was conducted in the Ebolowa health district in the urban dispensary health area. Ebolowa is an urban community in Cameroon. It is the regional capital of Southern Cameroon and the chief town of the Mvila department. Ebolowa has an area of 56km2.

The Ebolowa Health District has a total population of 216,455. The study population is the urban clinic area, which represents 42,013 inhabitants went from December 28, 2020 to January 22, 2021. Target population: after calculations, the number of children aged 0 to 5 years in our study site was 2285. We included: Children aged 0 to 5 years old, in the vicinity of the study site. Children aged 0-5 years in households with parental/guardian consent; Children aged 0 to 5 years living in the health area of the urban clinic without any previous history. In Ebolowa for 6 months or more. Children with and without waterborne diseases. *Exclusion criteria*: If no answer, absent and unavailable

Sample Size and Data Collection Tools

The type of sampling was probability and cluster sampling. Households were randomly selected by neighborhood. To determine the sample size in our study, we used Kelsey's formula.

$N=2P(1-P)((Z\alpha/2 + Z1-\beta) / (Po-P1))^2$, $P = (P1+P0)/2$

This sample size was calculated using the STATCALC application of Epi- Info software version 7.2.2.6. We considered safe sanitation as a determinant of waterborne diseases in children; with the hypothesis that children from the health area who are sick under 5 years of age are related to poor water quality is 50% (P0 exposed) and 33% sick children with good water quality (P1 unexposed). Power at 80% and 5% for α and 20% for β errors. N= 420. [7] Dependent variables: occurrence of a waterborne disease: (present, absent), qualitative binary. Independent variables: either qualitative or quantitative.

Collection Tools: Data were collected from households using a four-section questionnaire after informed consent/assent.

Collection Procedure: we conducted semi-structured interviews using a questionnaire that underwent several modifications.

Data Analysis

The software epiinfo7.2.2.6 was used for data analysis. Concerning statistical tests, in order to assess the relationships between the dependent and independent variables, we calculated the OR (IC95%) and P value at the 0.05 significance level. The Wald test was used, taking into account the significance level below 0.2.

Ethical Considerations

We have received: a research authorization issued by the deanery of CIESPAC; An ethical clearance issued by the ethics committee of CIESPAC; A research authorization issued by the regional delegate of public health of the south; Authorization from the Ebolowa District Chief. The participant was asked to answer our questions after giving his consent.

Results

The proportion of waterborne diseases was 97% for 566 children aged 0-5 years surveyed in 420 households selected in the health area of the Ebolowa urban dispensary (Algorithm).

According to table 1, the 50–60-month age group had a higher proportion of 32.98%. The 0–5-month age group had a lower proportion of 5.28%. The 6–16-month age group had a proportion of 15.66%. The 17-27 months age group has a proportion of 8.20%, 28-38 months 97.43%, 39-49 months 12.20%.

Table 1. Proportion of waterborne diseases by age group

Age group (months)	Waterborne diseases N=566					
	Present P n=549			Absent A n=17		Total
	n	%	n	%	n	%
0-5	29	5,28	4	23,53	33	5,83
6-16	86	15,66	3	17,65	89	15,72
17-27	141	25,68	5	29,41	146	25,80
28-38	45	8,20	1	5,88	46	8,13
39-49	67	12 ,20	3	17,65	70	12,37
50-60	181	32,98	1	5,88	182	32,16

According to table 2, the first cause of consultation for children aged 0-5 years was diarrhea (78.62%); the second was malaria (78.09%); the third was bilharzia (9.54%); the fourth was scabiosis or scabies (1.94%); the fifth cause of consultation was dysentery (0.71%); the sixth cause was typhoid fever (0.71%); the last and seventh cause was pityriasis versicolor or skin mycosis (0.35%). These are probable cases, i.e., consistent with the clinical picture.

It emerges that in Table 3, the median age of the children with these conditions was 36 months with Q1 of 24 months and Q3 of 60 months. The proportion of boys who suffered from waterborne diseases was 67.21%. On the other hand, the proportion of girls was 32.79%.

Discussions

Limitations of the Study

All scientific and human work is fraught with pitfalls, and we have noted several limitations.

Discussions

The 97% proportion of cases of waterborne diseases can be explained by the fact that the 0–5-year-old age group seems to be more vulnerable. According to Luc Perino and Michèle Adam in 2019, the immune system matures during infancy and their digestive tract is immature. Southern Cameroon is a malaria endemic region with high rainfall. Some authors have addressed the same subject as us among them some results are similar. Notably the study conducted in 2014 by Some [1] in Tanghin in Burkina Faso showed that malaria was more prevalent than typhoid fever and dysentery. For Mendo and Nguidjol in 2018 in Cameroon, malaria is a major challenge in sub-Saharan Africa and waterborne diseases constituted 40% of the first ten consultations. On the other hand, for Some in 2014, 50% of health register consultations in the Nomgr -Massson district in Burkina Faso were water related diseases [1]. But also, this study reported a prevalence of intestinal diseases of 71% in 1-11 months versus 96% in 24 months to 48 months. [7]. In addition, according to Sanou in 1999, there were 6.8 episodes of diarrhea per child per year in Burkina Faso compared to 3 episodes/year in Africa in 2017 (WHO) and 0.5 to 2/year in Europe.

Some results are lower than ours. The prevalence of diarrhea is 13% in South Cameroon according to DHS 2018. This is far lower than the proportion of diarrhea found in our study which is 78.62% (445/566). The DHS (2004) had shown a prevalence of 43% among 6-23 months old against 15.66% (6-16 months) and 25.68% (17-27 months) in our study. According to the author Sy et al in 2017, in Mauritania [8], diarrhea was 51.7% in children under 5 years. For Aubry (2012), dysentery represented

Table 2. Proportion of each waterborne disease in the health area of the urban dispensary of the Ebolowa health district (June to December 2020) (source epi info)

	Waterborne diseases (N=566)					
	P n=549 %		A n=17	%	Total	
Diarrhea						
Present	445	78,62	0	0,00	445	78,62
Absent	104	18,94	17	100,0	121	21,38
Malaria						
Present	442	80,51	0,00	0,00	442	78,09
Absent	107	19,49	17	100,00	124	21,91
Shistosomiasis						
Present	53	9,65	1	5,88	54	9,54
Absent	496	90,35	16	94,12	512	90,46
Scabies						
Present	11	2,00	0	0,00	11	1,94
Absent	538	98,00	17	100,00	555	98,06
Dysenteria						
Present	4	0,73	0	0,00	4	0,71
Absent	545	99,27	17	100,00	562	99,29
Typhoïd fever						
Present		0,73	0	0,00	4	0,71
Absent	545	99,27	17	100,00	562	99,29
Pytiriasis versicolor						
Present	2	0,36	0	0,00	2	0,35
Absent	547	99,64	17	100,00	564	99,65

10% of diarrheal diseases [6] versus 0.89% (4/449) in our study. According to Abdoulaye and Togo in 2019, 31% of diarrhea cases were noted in 12 months and older in Nara, Mali.

According to Djoudébbe, the prevalence of diarrhea was higher from 1996 to 2006 in Benin (24.2%) and Senegal (23.1%) than in Nigeria (7.9%) and Mali (9.2%).

These figures differ from those found in our study. The proportion of waterborne diseases in children under 14 years of age was 22% according to Aubry et al in 2011[7]. The prevalence of malaria was 78.09% which is a little higher than that reported in the study of Ashaondu [9] in 2016, which showed that 56.8% of children suffered from malaria, 4.4% from typhoid fever. And another study that reported 30% of malaria cases in 6-59 months. This suggests that malaria remains the leader among waterborne diseases in Cameroon [9]. A higher proportion of malaria cases than in our study was found by Somé [1] which was 64% in 2014 in Burkina Faso. In 2018, in Cameroon 247 cases of malaria per 1000

Table 3. Sociodemographic characteristics of children aged 0-5 years in the health area of the urban clinic in 2020

Characteristics	Water borne diseases (N=566)				Total		*P value*
	P(n=549)		A(n=17)		n	%	
Age(months)							
Extreme age (Min, Max)	1-60				1-60		1-60
Median age	36 (24,60)		24 (9 ;36)		36 (24 ;60)		0,007
Gender							0,770
Male	369	67,21	12	70,59	381	67,31	
Female	180	32,79	5	29,41	185	32,69	

inhabitants (WHO). In another study, we note according to Djoudébbe, the prevalence of diarrhea was high from 1996 to 2006.

Malaria is due to the bite of a female anopheles that has a predilection for stagnant and sunny pools of water. The south has a high rainfall, which justifies this prevalence. Regarding diarrhea the 2018 DHS confirms a higher proportion of diarrhea cases in the South and in Yaoundé among children under 5 years old. Diarrhea according to Maurage et olives 2002 in great majority is of infectious origin even if this origin is not always proven. Rotavirus is the most incriminated in children under 3 years of age according to Aubry and Bernard-Alex in 2011 [7]. This high proportion of cases has been recalled in several studies confirming the need to address it. Although diarrhea and dysentery cause 80% of deaths in 0–2-year-olds, our study did not report any deaths. Many of these children received treatment. Bilharzia is 9.54% which is much lower than the prevalence found by Tchouanguem et al in 2016 in Santchou, Cameroon among children aged 8 to 16 years who have easy contact with river water, as well as that of Solofianiaina JM who had found a prevalence of 0.7% to 69.90% in Madagascar in 2017. But the proportion that we found is in the range proposed by Solofianaina.

Scabiosis 1.94% is quite a low proportion compared to the figure of 5-10% (WHO) and 2.6% in 2018 (HRE). Dysenteria 0.71% is a low proportion, Typhoid fever 0.71% is quite low compared to the result of Ashaondu [9] in Cameroon in 2016 which was 4.4%. Regarding Pytiriasis versicolor 0.35% is a lower proportion compared to the 17% of cases in dermatological consultations in Tunisia, and against 5.21% of cases of mycoses in 0 to 13 years in Ebolowa (HRE) in 2018. But prevention measures for all these water-related pathologies should nevertheless be strengthened. The proportion of boys who suffered

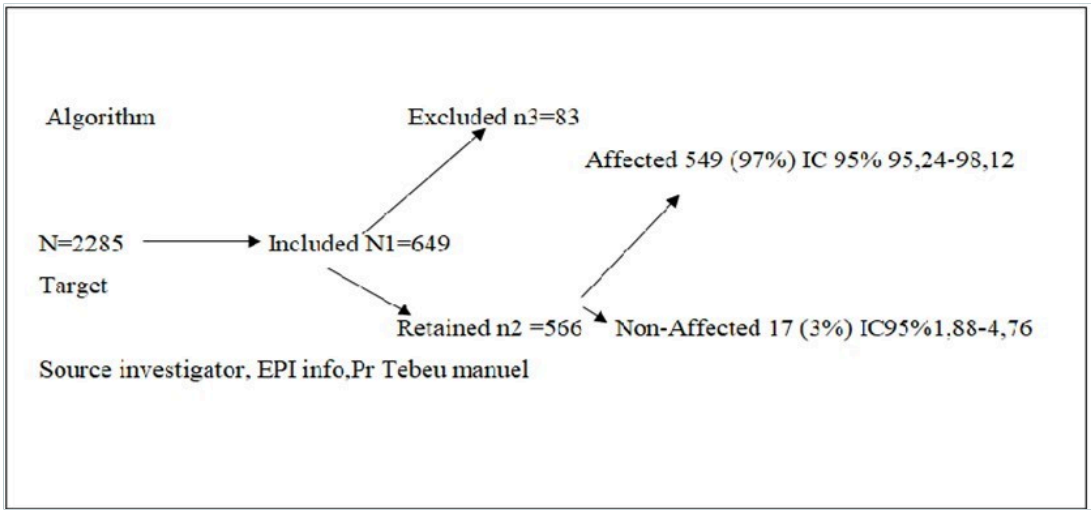

Figure 1. Intitle proportion of affected children

from waterborne diseases was 67.21%. This result is different from that of Some [1] in the sense that in his study girls (5.6%) were more affected by these water-related diseases than boys (4.95%) in Kofando, Burkina Faso. But similar to the study of Ndong in 2001. Figure 1

Conclusion

The proportion of waterborne diseases was 97% (549/566) among the children aged 0-5 years examined. Children with water-related illnesses had a median age of 36 months (24; 60). The proportion of boys who suffered from water-related diseases was 67.21% (369/549) and that of girls was 37.79% (180/549). This calls for new strategies to combat these waterborne diseases taking these factors into account in 2021.

Competing Interests

The authors have declared that no competing interests exist.

Acknowledgements

This research paper is the result of the efforts of several individuals and institutions who contributed in various ways to its development. We would like to express our sincere thanks to

To all those who have participated in our training.

We give thanks to the Eternal God three times holy.

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