

Surveillance of diseases with high potential epidemic in Conakry: meningitis, cholera and bacillary dysentery (2009 - 2013)

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Abstract

Introduction: Diarrheal diseases and meningitis are among the first causes of death in the world.

Objective: The aim of this study was to evaluate the follow-up of the epidemiological surveillance of diseases with epidemic potential at the laboratories of the National Hospital of Donka (LHND), the National Hospital of Ignace Deen (LHNID) and the National Institute of Public Health (LINSPI).

Material and Methods: This was a four years retrospective study, from May 1st, 2009 to May 1st, 2013. Data collection was made from the registers.

Results: Only the LHND had notified cases of cholera (17 cases =100%). The frequency of proven cases by gender was respectively 52.94% men for 47.06% women. The most affected age groups were those of 21-40 years (41.18%) and 41-60 years (29.41%). The mean age was 21.59 ± 4.71 years. During this survey period, the LINSPI notified more cases of meningitis (60%), followed by the LHND (21.88%) and the LHNID (18.12%). The age group from 0 to 5 years was the most affected by meningitis with 84.29% for LHND and 77.59% for LHNID. The mean age was 2.87 ± 0.63 year. The *Hemophilus influenzae b* was the most encountered with 55.73% at the LINSPI, 47.15% at the LHND and 27.59% at the LHNID. Five of twenty suspected samples for red diarrhea were positive for *Shigella dysenteriae*.

Conclusion: The epidemiological surveillance of diseases with epidemic potential is useful and necessary for the control, prevention and fight against these infectious bacterial diseases.

Keywords: Epidemiological surveillance; Cholera; Meningitis; Bacillary dysentery; Conakry

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1. Introduction

The World Health Organization (WHO) defines an epidemic-prone disease as any disease that can be acquired by a relatively large number of people in a given region during a relatively short period of time [1]. Etiologically and epidemiologically, the collective memory remains marked by epidemics of cholera and bacillary diarrhea [2]. Diarrhea, a frequent reason for consultation, is a public health problem in developing countries.

Meningitis is an inflammation of the meninges which is often of bacterial or viral origin with 70 to 80% of cases of viral origin [3,4]. In tropical Africa, cerebrospinal meningitis (MCS) rages with particular acuity in an area that extends from the Atlantic coast to the Horn of Africa, it is the "meningitis belt" which finds its limits. Between the 8th and 16th degree of the north altitude [5]. In Guinea, in 2008, two hundred and thirty-five (235) suspected samples could not be analyzed due to a lack of reagents and consumables. As of March 29th, 2013, more than 200 cases of meningitis had been reported with about twenty deaths in several prefectures of the country. On the other hand, on October 21st, 2013, two hundred and eighty-nine (289) cases of cholera with 28 deaths (9.68% lethality) were notified in Conakry and in some prefectures of the country [6]. The purpose of this work was to evaluate surveillance activities for priority bacterial diseases.

2. Material and methods

The Bacteriology laboratories of the National Hospital of Donka and National Hospital of Ignace Deen national as well as the Laboratory of the National Institute of Public Health served as a framework for this work. The registers and annual activity reports of the services plus the survey sheets designed for the cause were the material used This was a retrospective study of the descriptive type lasting 4 years during the period from May 1st 2009 to May 1st, 2013. All patients who attended these laboratories during the period and whose information was recorded in the registers took part in the study. Sociodemographic data (sex, age) not being available for the LINSP (which only received samples), these two variables were studied for Donka and Ignace Deen. Sampling was exhaustive and 2142 samples listed including 2048 of meningitis, 74 of cholera and 20 of bacillary diarrhea were collected. The data collected was processed using Word and Excel software. The statistical analysis focused on the sex and age variables, the Chi2 tests and the mean were calculated.

3. Results

The frequencies of suspected cholera cases by gender and those of proven cholera cases at the LHND are shown in Table 1 and Table 2 respectively. Those of proven cholera cases by age are shown in Table 3. However, no cases of cholera were recorded at the Ignace Deen National Hospital Laboratory and at the National Institute of Public Health Laboratory during the study period.

Table 1 Frequency of suspected cholera cases by sex at the Donka National Hospital Laboratory

Sex	Number	Percentage (%)
Male	35	47.30
Female	39	52.70
Total	74	100

Chi² = 0, 01; P> 0, 05

Table 2 Frequency of confirmed cases of cholera by gender at Donka National Hospital

Sex	Number	Percentage (%)
Male	9	52.94
Female	8	47.06
Total	17	100

Chi² = 0,526; P> 0, 05

Table 3 Frequency of proven cases of cholera by age at Donka National Hospital

Age (years)	Number	Percentage (%)
0-20	3	17.65
21-40	7	41.18
41-60	5	29.41
61-80	2	11.76
Total	17	100

Mean age: 21, 59 ± 4, 71 years; Extremes: 0 and 80

The frequencies of suspected cases of meningitis at the LHND, LHNID and LINST are indicated respectively in Table 4, while those of confirmed cases of meningitis are presented in Table 5.

Table 4 Frequency of suspected cases of meningitis in the three study centers

Centres	Number	Percentage (%)
LHND	690	33.69
LHNID	510	24.90
LINSP	848	41.41
Total	2048	100

Table 5 Frequencies of confirmed cases of meningitis in the three study centers

Centres	Number	Percentage
LHND	70	21.88
LHNID	58	18.12
LINSP	192	60.00
Total	320	100

Chi² = 0, 82; P> 0, 05

The distribution of cases of meningitis according to sex and age are indicated respectively in Tables 6 and 7, while their distribution according to the bacterial species identified from the cerebrospinal fluids are presented in Table 8.

Table 6 Frequency of meningitis cases at LHND and LHNID by gender

Center	LHND		LHNID	
	Number	%	Number	%
Male	47	67.14	30	51.72
Female	23	32.86	28	48.28
Total	70	100	58	100

Chi² = 0,095; P> 0, 05

Table 7 Frequency of cases of meningitis at the LHND and at the LHNID according to age

Centres	LHND		HNID	
	Number	%	Number	%
0-5	59	84.29	45	77.59
6-10	3	4.29	2	3.45
11-15	1	1.42	2	3.45
16-20	2	2.86	2	3.45
21 and above	5	7.14	7	12.06
Total	70	100	58	100

Mean age: 2,87± 0,63 years Extremes: 3 months and 80 years

Table 8 Frequency of bacterial species isolated from cerebrospinal fluid in the three study centers

Centers	LHND		LHNID		LINSPI	
	Number	%	Number	%	Number	%
<i>Hemophilus influenzae</i> b	16	27.59	33	47.15	107	55.73
<i>Neisseria meningitidis</i> A	7	12.06	0	0	72	37.50
Gram-negative <i>Coccobacillus</i>	17	29.31	10	14.28	0	0
<i>Streptococcus pneumoniae</i>	9	15.52	21	30	13	6.77
Gram-positive <i>Diplococcus</i>	6	10.35	5	7.14	0	0
<i>Neisseria meningitidis</i> c	1	1.72	1	1.43	0	0
<i>Neisseria meningitidis</i> b	2	3.39	0	0	0	0
Total	58	100	70	100	192	100

Table 8 shows that in the LHND and LHNID laboratories, the lack of reagents at some point during the concerned period, the lack of reagents did not allow identification of 27 cases of Gram-negative coccobacilli with 17 cases (21.31%) at the LHND and 10 cases (14.28%) at the LHNID. Similarly in these two laboratories it was also the same for 11 cases of Gram positive Diplococcus with 6 cases (10.35%) at the LHND and 5 cases (7.14%) at the LHNID.

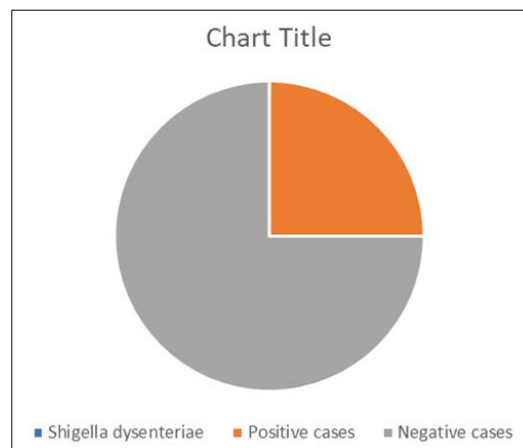


Figure 1 Prevalence of *Shigella dysenteriae* cases among suspected cases of red diarrhoea

Our results showed that only the National Public Health Laboratory had notified cases of bacillary dysentery (*Shigella dysenteriae*) with a relative frequency of 25% (5/20).

4. Discussion

Epidemiological surveillance of meningitis, cholera and red diarrhea at the University Hospital of Conakry in the Laboratories of the Donka National Hospital, the Ignace Deen National Hospital and the National Institute of Public Health showed 17 proven cases of cholera for 74 suspects at Donka. At the National Public Health Laboratory and Ignace Deen National Hospital, data was not available at the time of the study.

The frequency of proven cases of cholera by sex at Donka Hospital showed a male predominance (52.94%) but this would not be significant ($P > 0.05$). On the other hand, the frequency of proven cases of cholera according to age gave a predominance of the 21- to 40-year-old group (41.18%) while that of 61 to 80 years old was the least represented (11.76%). The mean age of patients with cholera was 21.59 ± 4.71 years and the extremes were 0 and 80 years. This group of 21 to 40 years old was the most affected because it was made up of adolescents and young adults, a very active and mobile population, a factor of contamination. These results would be similar to those reported by Alhassane KM for which the age group from 24 to 55 years was more represented (40.8%), but different from those of Coulibaly M according to which all age groups of age were evenly represented [7,8].

The frequency of confirmed cases of meningitis in the three centers was 70 (21.88%) for 690 suspected cases in Donka, 58 (18.12%) for 510 suspected cases in Ignace Deen and 320 (60.0%) out of 848 suspected cases at the LINSPI. The difference between center frequencies was not statistically significant ($P > 0.05$). The frequency of meningitis according to sex in Donka and Ignace Deen showed a male predominance with respectively 67.14% and 51.72%. However, this predominance was not significant ($P > 0.05$). This result corroborates those of Chadia EF and Kalled et al. who, in their respective series reported male predominance of 82.3% and 81.50% respectively [9,10]. This result would nevertheless be different from that of Maiga B who found a female predominance of 52.5% versus 47.5% [11]. In Donka as in Ignace Deen, the age group from 0 to 5 years old was the most affected (84.29% and 77.59% respectively). The average age of the patients was 2.87 ± 0.63 years with 3 months and 80 years the extremes. The non-systematization of vaccination against meningitis could explain the high frequency in this segment. Our observation differed from that made by Mahamadou who found that the age group from 5 to 14 years was the most affected [12]. The bacterial species *Hemophilus influenzae* b and *Streptococcus pneumoniae* were those isolated by the three structures with frequencies of 27.59% at Donka, 41.75% at Ignace Deen and 55.73% at the LINSPI for the first species against 15.52% at Donka, 30.0% at Ignace Deen and 6.77% at LINSPI for the second bacterial species. However, the identification of the 27 cases of Gram-negative coccobacilli with 17 cases (21.31%) at the LHND and 10 cases (14.28%) at the LHNID could have corresponded to *Neisseria meningitidis*. Similarly, the identification of the 11 cases of Gram-positive Diplococcus with 6 cases (10.35%) at the LHND and 5 cases (7.14%) at the LHNID could have corresponded to *Streptococcus pneumoniae*.

Of the 20 samples examined at the LINSPI for bacillary diarrhea, 5 were positive, (25%). The reduced number of cases of bacillary diarrhea corroborates with certain data from the literature (case of bacillary diarrhea in Philadelphia estimated between 1/100 and 1/200 in 2009) [13].

5. Conclusion

It appears from this study that the epidemiological surveillance of cholera, meningitis and bacillary diarrhea is a daily practice of these laboratories. But it should be improved by the authorities and technicians, in particular by providing staff with appropriate and effective means of diagnosis in order to provide accurate and complete data.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflicts of interest.

Statement of informed consent

The confidentiality was observed throughout the data collection process. The results were used for strictly scientific purposes. Informed consent was obtained from all individual participants included in the study.

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