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Impact of Environmental Pollution on the Frequency of Seizures in Children with Sickle Cell Disease (CH Kenitra Morocco)

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Abstract

The sickle cell disease sickle cell anemia called Expired aussi is a genetic disease Caused by abnormal hemoglobin. The pediatric ward of the provincial hospital kenitra recorded a workforce of 164 children with sickle cell disease over a period of twenty four months (June 2010-June 2012). On average seven to eight (7 to 8) children are born per year with this disease. The majority of these children are admitted to the pediatric ward and have an increased susceptibility to infections. To identify socio-economic and environmental factors in the care of children and their families. The study group consists of 60 children aged 7 - 14 years. Clinical and analytical information is obtained from records and doctors during consultations of these patients. The results show that 64% of these children are from rural areas against 30% of children of urban origin, while 6% live in suburban areas, however 68% of these children use septic false. In parallel they consume well water. Clinical examination and white blood cell count revealed a prevalence of 76% for fever cases reviews some of qui-have ticemia September, 43% for leukocytosis. Moreover, we noted that diarrhea is very common in this sample. Parenting was made bacteriological examinations of well water consumed by these children. In conclusion, the present study showed a significant combination entre les frequency of sickle cell crises infectious presented by the children studied and the environmental quality of life and family in the child qui develops.

Keywords

Sickle Cell Anemia, Child, Infection, Pediatrics

1. Introduction

Sickle cell disease is a genetic disorder of hemoglobin (Labie *al.* Det, 2003) related to the presence in high concentrations in red blood cells of an abnormal hemoglobin (hemoglobin S Hb S). This is a serious pathology which is characterized by high morbidity and mortality [1] [2] and it frequency and severity of a major problem of e public health at the global scale [3]. It is an autosomal recessive my ladie.

Contamination of the land under water by pathogens is the cause of several diseases. These water-borne diseases have been responsible for large epidemics of dysentery, typhoid fever, cholera, among others. The works by many researchers have reported the presence of these diseases especially in the southern oases of the country [4]. In this context, it seems interesting to conducted a study in the sense of assessing the bacteriological quality of water wells for domestic use the majority of children are sickle cell monitored for sickle cell disease in the pediatric ward of the provincial hospital Kenitra, which includes a large sickle cell recruitment with an enrollment of 164 children in 2011 [5]. The majority of these children admitted to the pediatric ward have an increased susceptibility to infections whose main objective is to determine the etiology and determinants of the high incidence of infectious crises presented by these children.

2. Material and Method

2.1. Frame of the Study

The plain of the Gharb or the basin of the Sebou—is an area located in the North West of Morocco, characterized by a very important agricultural and industrial potential. It is crossed by the Sebou, one of the most important wadis of the country. However, the diversity of polluting human activities in the region (agriculture, industry, traffic...), usually installed along its banks, and the lack of sewage treatment plants affect the quality of the environment of region [6]. Other parts, low and irregular household income generated by these activities affect the level and quality of vie [7]. All of these environmental, socio-economic and nutritional factors could have an impact on the health of the population, especially child health.

2.2. Subject and Method

S part of a prospective cross-sectional study conducted from June 2010 to July 2012, 60 cohort affected children were listed by consulting the consultation registers of pediatrics. Attempts cont act with concerned parents, were considered before the start of the investigation and that, in view:

- their consent to participate in the survey.

- From identify attachment of these children (exact address, workplace of the father and the mother, etc ...).

Thereafter, it was thought to s assessment of the bacteriological quality of well water consumed by these children especially at the time of the interviews it was

found that the children of majorities consume well water whose construction n ' not comply with current regulations and the conditions of prevention of water quality related risks of these wells are not respected.

So in order to better assess the bacteriological characteristics of well water from our study area our work was carried out in 8 well to know.

-P1: the rural commune Mnasra Douar laafayfa

- P2: the rural commune Mnasra Douar riyahs elbahrya
- P3: the rural commune souk LHAD ouelad Jelloul
- P4: the rural commune sidi med Lahmer oulad Mensour
- P5: the rural commu not ouelad Mesbah Douar rouiff
- P6: located sister rural town ouelad Mesbah Douar rouiff
- P7: the rural commune Megren Douar bghilya (**Figure 1**)
- P8: Located on the rural commune Mnasra douar kabate (**Figure 1**)

2.3. Methods of Sampling and Analysis

The data presented in this study come from a the sampling campaign water performed on all eight stations (wells) during the winter period. To make this work, we conducted a random sampling of household wells are children drépanocytaires, which are more or less scattered in different parts of our study area.

The samples are taken on salt Moroccan standards as references: NM.ISO 19458; 2009. Once the levy MADE bottles are kept in a cooler at 4 This transported to the laboratory for bacteriological analysis in 8 hour that follow. The geographical coordinates of the wells were obtained using a GPS. Analysis of well water samples Are carried out at the level of the National Institute of Hygiene RABAT "Department Microbiology and food hygiene" The analytical reference methods sought bacteriological parameters and references methods used are summarized:

Figure 1. Pictures of some s well studied.

NM ISO 6222/2007, classification index NM 03.7.005, Water quality: This method consists in describing the enumeration of revivifiable microorganisms present in water by counting the colonies in a nutrient culture medium agar after Aerobic incubation at 36˚C and 22˚C.

NM ISO 6461-2/2007: Water quality - Search and enumeration of spores of sulphito-reducing anaerobic microorganisms (Clostridia)

This procedure describes the method of finding and counting the spores of anaerobic sulphito-reducing microorganisms (Clostridia) by membrane filtration. It is applicable to all types of water provided that it is not loaded with suspended matter.

NM ISO 7899-2/2007; Classification index NM 07.3.006, Water quality research and enumeration of intestinal enterococci in human drinking water waters of swimming pools and other disinfected or clean waters: by the membrane filtration method.

NM ISO 9308-1/2007; Classification index NM 03.7.003: Water quality - Search and enumeration of Escherichia coli and coliform bacteria present in water intended for human consumption by membrane filtration;

3. Results and Discussion

3.1. Bacteriological Results

The concentration of the total mesophilic aerobic flora at 37˚C varies between a value maximum of 900 CFU/ml stored in the wells P1 and a minimum value of 2 CFU/ml tered in at P5 and P6 well. At 22˚C, the minimum value is recorded in the P5 wells of a concentration of 16 CFU/ml, while the maximum value is stored P1 in the wells of a concentration of 2000 CFU/ml (**Figure 2**).

In the case of total coliforms, the minimum concentration is P6 and P5 level well (1 CFU/100mL). While the maximum concen tration is achieved at the well P7 (2000 CFU/ml). Referring to the recommended standards for food (Moroccan standard), the majority of water analyzed in this study are not s permissible for consumption. We note an increase in total coliforms come well as the wells P7, P8, P1 P3 and P2 (**Figure 3**).

For all the samples analyzed, the numbers of fecal streptococci vary CFU/100 ml P5 and P6 to 200 CFU/ml P2. This number of fecal streptococci greatly exceeds recommended standards (0 CFU/ml) (**Figure 4**).

The search for *faecal streptococci* parameter is a confirmation of the nature of fecal pollution. So if found in a water sample for coliform group of organisms but not *E. Coli*, the identification of *faecal streptococci* give a significant confirmation of Fecal pollution (WHO, 1994).

Fecal coliform counts ranging from a total absence at the well P5et P6 (CFU/ml) and a maximum concentration at the wells P1, and P2 (300 CFU/ml) (**Figure 5**).

As for *sulphite-reducing anaerobes*, the number ranges from 0 to 20 CFU/100ml (**Figure 6**). This number exceeds the recommended standards (absence in 100 mL). They are normally present in fecal matter but in a smaller

quantity than *E. coli.* Their Absence in an underground aquifer or an alluvial water table is a sign of Natural filtration. The presence of spores of *sulphite-reducing anaerobes* In nature wate reminds fecal contamination and in the absence of *coliform* bacteria, a Contamination [8]. The presence of these spores would claim that fecal pollution is ancie detached or intermittent [8].

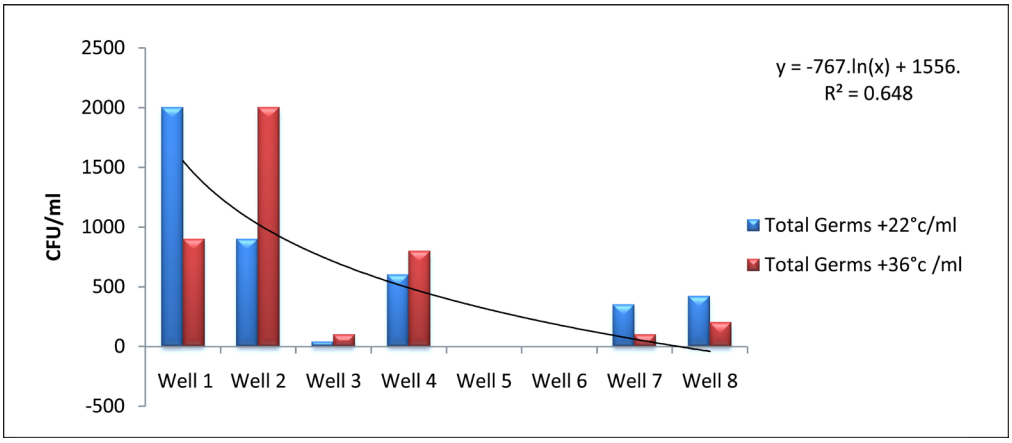

Figure 2. The total mesophilic aerobic flora in different wells.

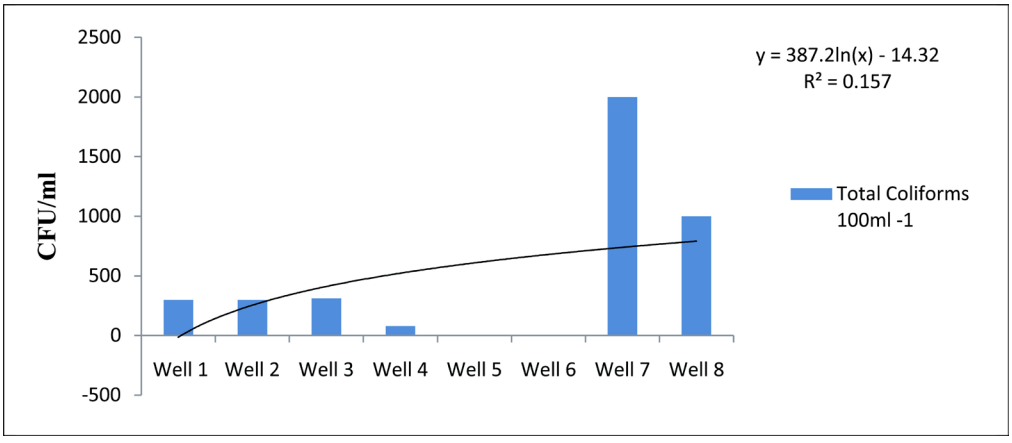

Figure 3. The total coliform levels found in different wells.

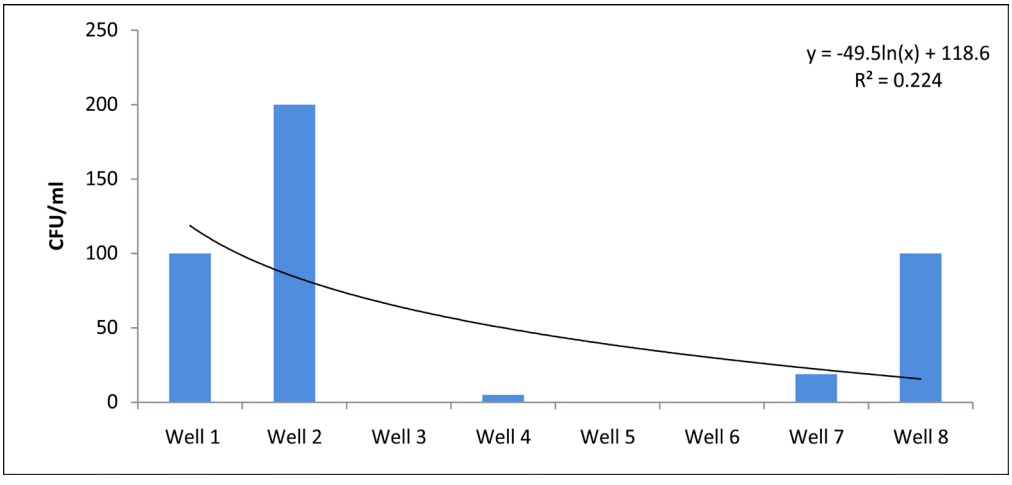

Figure 4. The fecal streptococci in different wells.

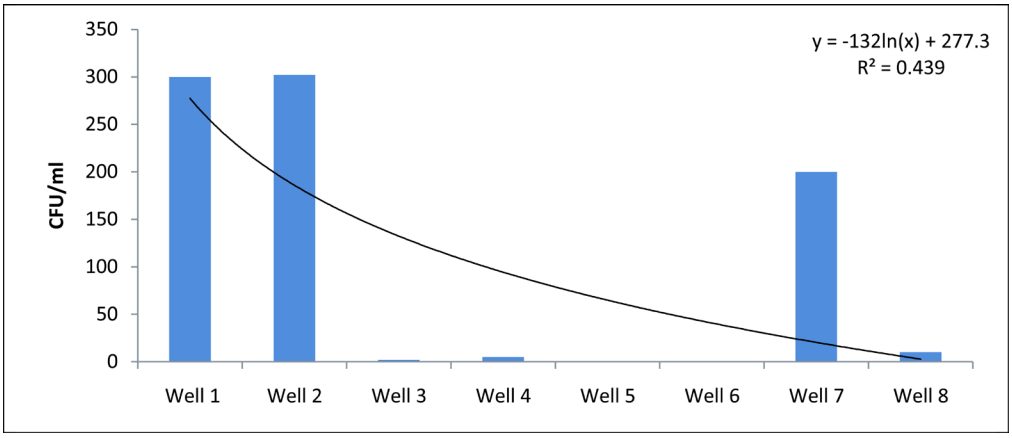

Figure 5. The Fecal coliforms in different wells.

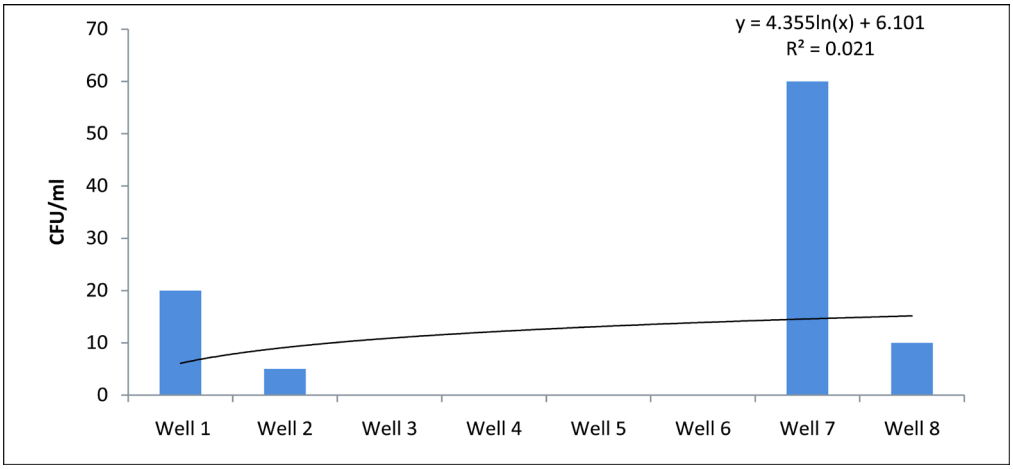

Figure 6. The Sulphite-reducing anaerobic germs in different wells.

The strong bacterial contamination of wells could be due to: protection of wells (open pit) use of animal waste as fertilizer for farmland surrounding the wells. In addition, the wells in our study area Severely polluted in indicators of fecal contamination, in agreement with those vate hole [9] for the groundwater of Marrakech and For the groundwater of Sidi Kacem [10]. Surface water loaded with microorganisms infiltrating the soil Sand, reach the water table without having benefited from effective filtration, and cause a multitude of pollutions mentioned The water of a water table is all the more vulnerable as the Ground is close to the surface of the ground, that the ground overlying the aquifer is Permeable and that surface sources of pollution are important. In addition, Surface water, accessible by wells, appear to be highly contaminated By organic materials of human and animal origin. The quality bacteriological study of well water reveals the contamination of the aquifer water from nearby pollution (agricultural land, herding cattle, existence of septic tanks), u sing animal waste as fertilizer for Agricultural land bordering the wells...). Finally analyzed well water is undrinkable, microbiological views, according to the Moroccan standard NM 07/03/01. This standard is applicable to all waters, or by the "natural" state or after treatment, intended for the drinking, cooking, food preparation or other

domestic purposes, they are supplied by a distribution network, from a tanker or a tanker, in bottles or containers Including spring waters.

3.2. ACP Statistical Analysis

Analysis of the main compost shows that (**Figure 7**):

- All the data collected in our study and the presence of two axis F1 (21.65%) and F2 (26.03).

- A first red cloud in the negative part of the F1 axis, which characterizes the patient who used the well water the statistical study shows a strong positive correlation between the use of well water and the frequency of attacks by years.

3.3. Discussion

The people here share common features making it globally uniform: Pathology and these consequences. The children were, for most of them from rural areas, from socio-economically and educationally disadvantaged families.

In studies of compliance, the socio-economic precariousness of families Described as a factor of difficulty, both as regards the regularity of the treatment and the consultations, given the weakness of health coverage and means of transport.

The fragility infection is a characteristic of sickle cell disease [11], this susceptibility to infectious agents is the result of a shift proved immunological dynamics of sickle cell [12], these children studied infectious syndrome is accentuated because of their adverse conditions favoring their exposure to sources of infection, what is confirmed by the high prevalence of leukocytosis associated with the condition Febrile presented by these children when mostly of rural origin

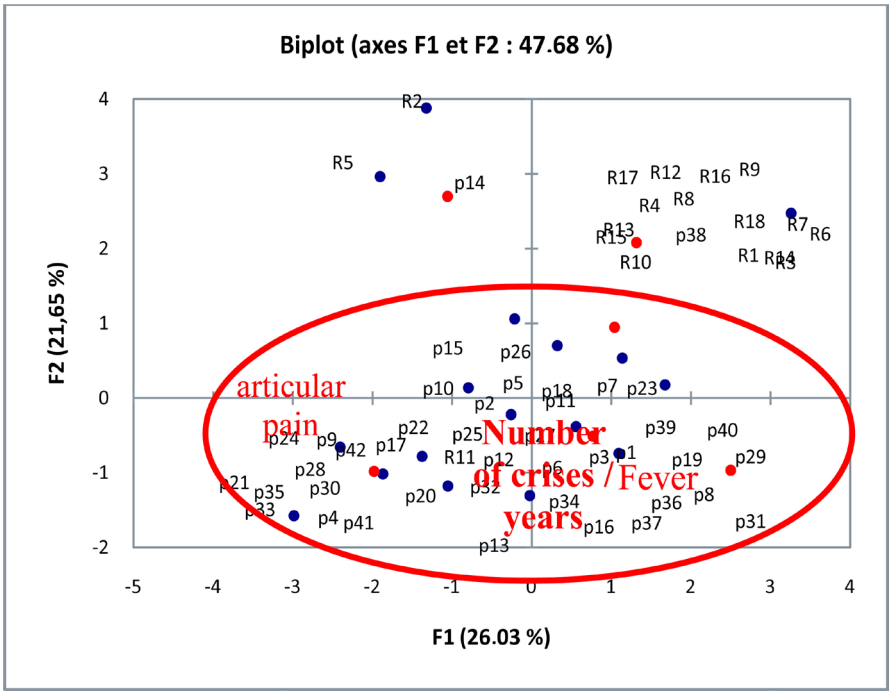

Figure 7. The factorial map of the bacteriological results and the number of crisis.

sickle cell crisis. Also these children use well water for food and domestic use including microbiological analysis revealed the presence of fecal contamination indicators of micro organisms and pathogenic microorganisms as enterobacteria Saprophytic [13], the klebcielles [14], Salmonella [15].

According to the statistical study, we have concluded that infectious seizures recorded by sickle cell patients recruited to the pediatric department are associated with the consumption of well water that does not meet WHO standards.

4. Conclusions

Our study had the merit to conclude that the quality of well water used by these patients does not meet Moroccan standards of drinking water. As it has demonstrated an association between the frequency of sickle cell anemia predominantly infectious presented by the children studied and the rate of water pollution consumed by the children studied.

Sickle cell disease is characterized by the absence of a specific treatment, reducing the risks of complications involve daily vigilance and adequate reactions under certain circumstances. Family health education is one of the conditions for the success of crisis management and prevention.

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