Food Poisoning and Care-Seeking Behavior - Cases of Students from the City of Mohammedia in Morocco - Prospective Study

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Abstract

Background: Food poisoning is a problem that affects public health. It is unveiling opens an opportunity for action to identify and avoid the problem. The main objective of this study is to analyze the environmental factors that influence the obligation to consult a doctor or not following food poisoning.

Methods: The study was conducted, following a prospective survey, on a sample of 408 students chosen at random from six schools of urban origin in the city of Mohammedia in Morocco.

Results: 33.6% of the students confirmed having consulted the doctor against 66.4% after food poisoning. In the same way, we found that 16.2% (n = 66) of the students who declared poisoning following the consumption of an offending food were hospitalized. In addition, only 13.6% of intoxicated carried out analyzes were requested by the consultant doctor. 59.3% of the drugs prescribed by doctors are anti-infectious followed by gastro-entero-hepatology 15.4% and 12.3% are analgesics.

Conclusions: Overall, this study confirms that food poisoning is very frequent among students in Morocco, so parents should be educated about the danger of food poisoning in their children, by presenting them to a doctor immediately after contamination to avoid complications.

Background

Food poisoning is an infection caused by the ingestion of food or drinks contaminated with certain infectious agents or their toxins [1], the bacteria responsible for food can manufacture toxins and release them into the food, allowing microbial development [2]. Most of the time, food poisoning heals on its own without treatment after a few days. However, taking drugs can help limit unpleasant effects like diarrhea, abdominal pain, and fever. In some more serious cases, hospitalization may be necessary. This is particularly the case when the infection affects fragile people such as children or with a deficiency of the immune system.

Methodology

The study is carried out over the period from December 2014 to November 2015. The sample used for the survey is made up of 408 students; 194 boys (47.54%); and 214 girls (52.45%) in six establishments of urban origin in the city of Mohammedia: two primary schools (Ghazali School and Wallada); two middle schools (Mohammedia and Allal Ibn Abed Allah) and two high schools (Eljoulane and Jaber Ibn Hayan).

Ethics

The ethical standards of the study were approved by the Director of the Academy of Education from Casablanca in Morocco. Informed consent was obtained from all participants. Each potential respondent
was properly informed of the questionnaire objectives, the related aspects to the study, and the research procedure.

**Data Collection**

The questionnaire aimed to underline the problem of food poisoning and care-seeking behavior among students in Morocco. The first section gathered the anthropometric characteristics of the students (age, sex, weight, and height). The following section of the questionnaire concerned clinical data (duration of symptoms, doctor's consultation, hospitalization, etc.). The last section of the questionnaire explored the treatment used.

After entering and filtering the data on Excel media, it was transferred to SPSS statistical analysis software. The results are given in the form of tables and figures; all statistical tests are considered significant if the p-value is less than 0.05.

**Results And Discussions**

The results of the question “after intoxication, do you see a doctor?”, show that 33.6% (n = 137) of the children confirmed having consulted the doctor against 66.4% who answered "no". Among those who answered yes, 48.17% (n = 66) are primary school students, 27.73% (n = 38) are middle school students and 24.09% (n = 33) are high school students. The distribution of intoxicated children consulting the doctor according to the duration of the symptomatology is presented in Figure (1).

This figure shows that 45.25% (n = 62) of the students who saw the doctor responded that the symptoms lasted less than 24 hours, while 12.41% (n = 17) of the students who did not saw the doctor after the food poisoning, they had symptoms that lasted between 48 and 72 hours. The chi-square test shows that these two factors are significantly associated (chi-square = 11.99; p < 0.007). Nonetheless, the rate of children who see a doctor in the summer is 48.17% and 24.09% (n = 33) in the fall. However, the chi-square test did not confirm the significance (p < 0.33). The main reasons the cases did not go to the clinic were rapid healing or mild symptoms (66.4% of cases) and the feeling that the visit was not useful or would not make a difference. The main reasons for consultation were unusual symptoms. This situation makes it possible to say that the parents are aware of the dangers that food poisoning can cause, this is why the parents rush to consult a doctor to be sure of the state of their child.

Figure 2 summarizes the results of the distribution of students consulting the doctor and their age. The chi-square test shows a strong link between these two factors (chi-square = 16.54; p < 0.005).

Otherwise, 3 out of 7 children under the age of 7 years confirmed that they had consulted the doctor. However, 43 people among students aged 7 to 10 years (n = 94), consulted the doctor which represents a rate of 45.74%, while the rate of students consulting a doctor and who are aged 13 to 16 years old is 37%. This materializes the idea that parents feel responsible for the health of their children at a young age.
Another study [3], also demonstrated that the age of the individual has a negative effect on access to healthcare. Moreover, the older the individual, the more he gives up healthcare. In other words, children have the most access to healthcare compared to adults. These results are in line with the study carried out by the High Commission for Planning on the behavior of households facing the demand for healthcare in Morocco [4].

The joint analysis of the doctor’s consultation (dependent variable), the clinical signs, and certain socio-demographic variables are presented in Table 1. The analysis of the logistic regression with the dependent variable “the consultation of a doctor following intoxication” shows that only the variables bloody diarrhea, abdominal pain, red spots, and the duration of the symptomatology which explain the choice of the parents to consult the doctor with respective significations of p less than 0.03; 0.01; 0.04 and 0.005.

|                      | Wald | Df | Sig. |
|----------------------|------|----|------|
| Age                  | 0.30 | 1,00 | 0.58 |
| Sex                  | 0.11 | 1,00 | 0.74 |
| Fever                | 0.69 | 1,00 | 0.41 |
| Diarrhea             | 2.32 | 1,00 | 0.13 |
| Bloody diarrhea      | 3.29 | 1,00 | 0.03*|
| Abdominal pain       | 6.60 | 1,00 | 0.01*|
| Nausea               | 2.31 | 1,00 | 0.13 |
| Vomiting             | 0.32 | 1,00 | 0.57 |
| Eye disorders        | 1.11 | 1,00 | 0.29 |
| Headache             | 0.08 | 1,00 | 0.78 |
| Breathing problems   | 0.00 | 1,00 | 1.00 |
| red spots            | 3.52 | 1,00 | 0.04*|
| Duration of symptomatology | 0.28 | 1,00 | 0.005*|
| Constant             | 2.00 | 1,00 | 0.008|

The distribution of intoxicated according to hospitalization shows that 16.2% (n = 66) of the students who declared to be intoxicated following the consumption of an offending food are hospitalized. Our results are superior to those found in another study with 10% (679/6742 cases) [5].
However, the average length of stay is 11.66 ± 1.78 hours, with a minimum hospitalization not exceeding one hour and a maximum of 3 days. Though, durations of hospitalization were classified into two groups, 70.2% (n = 40) were hospitalized for less than 12 hours, and 29.8% stayed in the hospital for more than 12 hours. Logistic regression analysis (dependent variable = length of hospitalization) shows that certain factors have well explained the variation of this variable such as sex, age, the sign of fever, and the sign of diarrhea, thus the signal of the doctor, and the duration of the symptomatology. All, the hospitalization is under the prescription of the doctor, as well as the state of health of the intoxicated especially if the duration of the symptomatology exceeds 12 hours and if the child presents clinical signs like fever and acute diarrhea. Hospitalization also depends on the child’s age and his sex. Table 2

| Variable              | A      | Wald | Df | Sig.  | Exp(B) |
|-----------------------|--------|------|----|-------|--------|
| Établissement         | 0.37   | 0.22 | 1.00 | 0.64  | 1.44   |
| Age                   | -0.89  | 2.86 | 1.00 | 0.04* | 0.41   |
| Sex                   | 4.10   | 5.55 | 1.00 | 0.02* | 60.23  |
| BMI                   | -0.31  | 2.24 | 1.00 | 0.13  | 0.73   |
| Fever                 | -2.56  | 4.10 | 1.00 | 0.04* | 0.08   |
| Diarrhea              | -2.89  | 3.49 | 1.00 | 0.06* | 0.06   |
| Bloody diarrhea       | 19.76  | 0.00 | 1.00 | 1.00  | 281.38 |
| Abdominal pain        | 0.33   | 0.05 | 1.00 | 0.83  | 1.40   |
| Nausea                | -0.76  | 0.27 | 1.00 | 0.60  | 0.47   |
| Vomiting              | -1.23  | 0.58 | 1.00 | 0.45  | 0.29   |
| Eye disorders         | -1.41  | 0.72 | 1.00 | 0.40  | 0.25   |
| Headache              | 0.88   | 0.64 | 1.00 | 0.42  | 2.42   |
| red spots             | 7.24   | 0.00 | 1.00 | 1.00  | 1391.08|
| Season                | -0.38  | 0.48 | 1.00 | 0.49  | 0.68   |
| Doctor consultation   | -7.44  | 4.64 | 1.00 | 0.03* | 0.00   |
| Symptom duration      | 0.05   | 7.33 | 1.00 | 0.01**| 1.06   |
| Constant              | -0.86  | 8.73 | 1.00 | 0.00***| 0.43   |

The chi-square test of independence between the sex and the length of hospitalization shows a significant link (chi-square = 3.77; p < 0.052). In fact, out of all hospitalized for less than 12 hours (n = 40),
57.5% are male students and 42.5% are female. However, students who are hospitalized for more than 12 hours (n = 17) are dominated by females with a rate of 70.59% against 5 males.

The distribution of the length of hospitalization according to the food incriminated does not show any significant link (chi-square = 3.33; p < 0.505). However, for students hospitalized for less than 12 hours, 35% (n = 14) ate meat, 25% whose food was confectionery and 25% ate fish. In addition, for students who were hospitalized for more than 12 hours, the offending foods are fish and confectionery. Figure 3

Our results are similar to other studies, indicating the incrimination of meat in the first position of contamination [6]. Also, eggs, and products containing eggs, such as creams and pastries, account for almost 40% of cases of food poisoning in Europe [7].

Furthermore, only 13.6% of the intoxicated carried out analyzes were requested by the consulting doctor.

Table 3 presents the results of the logistic regression analysis, the dependent value of which is analyzes performed. The analysis shows that the age parameters, clinical signs such as eye disorders, and breathing difficulties as well as the intoxications that occurred during the summer explain more the compulsory choice of analyzes considering the danger that can cause these effects.

The biology report always takes precedence over toxicological analysis [8; 9]. Indeed, certain biological abnormalities allow to suspect a toxic, or a class of toxic and are in some cases a direct reflection of the toxic effect, thus making it possible to confirm a diagnosis and to orient the toxicological analysis which aims to identify and / or measure the toxic ingested [9].
Table 3
Analysis of logistic regression, dependent variable "Analysis performed"

| Variable             | A     | Df | Sig. | Exp(B) |
|----------------------|-------|----|------|--------|
| Age                  | -0.444| 1  | 0.009*| 0.642  |
| Sex                  | 0.266 | 1  | 0.714 | 1.304  |
| Fever                | 0.743 | 1  | 0.340 | 2.103  |
| Diarrhea             | 0.693 | 1  | 0.372 | 2.000  |
| Abdominal pain       | -1.043| 1  | 0.242 | 0.353  |
| Nausea               | -0.021| 1  | 0.983 | 0.980  |
| Vomiting             | -0.537| 1  | 0.514 | 0.584  |
| Eye disorders        | 1.131 | 1  | 0.041*| 0.098  |
| Headache             | 1.238 | 1  | 0.114 | 3.449  |
| Breathing problems   | 22.964| 1  | 0.013*| 0.410  |
| Duration of symptomatology | -0.002 | 1  | 0.867 | 0.998  |
| Season               | -0.311| 1  | 0.047*| 0.733  |
| Food                 | -0.245| 1  | 0.444 | 0.783  |
| Hospitalization      | -0.874| 1  | 0.250 | 0.417  |
| Constant             | -0.541| 1  | 0.000 | 0.701  |

Often, a symptomatic or specific supported is the doctor's first measure Depending on the pathogen identified or suspected, and depending on the severity of symptoms and the risk factors of students with food poisoning [10, 11]. Indeed, these students essentially suffer from two major symptoms which are abdominal pain and diarrhea which can be associated with fever. The presence, intensity, and duration of symptoms depend, of course, on the etiology. Treatment will therefore vary depending on this etiology.

From Table 4 we have noticed that 59.3% of the drugs prescribed by doctors are anti-infectives followed by gastro-entero-hepatology 15.4% and 12.3% are analgesics. This can be explained by the presence of serious signs and symptoms in patients at risk (children) [12].
Conclusion

Food poisoning among children and adolescents is very poorly assessed as evidenced by the lack of publications in this area. This Moroccan study clearly shows that food poisoning is a frequent pathology. Our study, even for a short time, largely confirms this trend, which should normally set off the alarm bells and urge those responsible to take an imperative look at preventing this scourge which threatens the health of citizens.

Abbreviations

df: degree of freedom, Sig.: Signification

Declarations

Ethics approval and consent to participate

The ethical standards of the study were approved by the Director of the Academy of Education from Casablanca in Morocco. Informed consent was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.
Competing interests

The authors declare that there they have no conflicts of interest.

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Authors’ contributions

Hasnae Lamine: Carried out studies concept and design, participated in the sequence alignment, and drafted the manuscript. El hassane Ouanouche & Abdelmajid Soulaymani: English editing, critical, and revision of the manuscript for important intellectual content. Abderrazzak Khadmaoui: Contributed to the data interpretation, studies concept and design, and supported drafting the manuscript (Supervisor). All authors read and approved the final manuscript.

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**Figures**
Figure 1

Distribution of intoxicated students according to the consultation and the duration of the symptomatology
Figure 2

Distribution of intoxicated students by consultation and age

Figure 3
Distribution of hospitalization according to the food