

Full Length Research Paper

Perception, knowledge and use of antibiotic among communities in Chad

Ndoutamia G.^{1*}, Fissou H. Yandai², Nadjilem D.³ and Gatsing D.⁴

¹University of Doba, Chad.

²Laboratory of Hospital of Mother and Child in Ndjamen, Chad.

³University of N'Djamena, Chad.

⁴University of Dschang, Cameroon.

Received 27 April, 2017 ; Accepted 17 May, 2017

Chad is a country where self-medication and use of antibiotic without medical prescriptions are still observed. These practices lead to the apparent emergence of resistance to antibiotics for bacteria. The aim of this study was to assess the abusive and inappropriate use of antibiotics among the communities. The surveys were conducted in N'Djamena and Moundou, two major cities of Chad. All the respondents were aged more than 14. They had different social status and some were married. All were interviewed through questionnaire sheets. The collected data were cleaned and validated using the Statistical Software Package for the Social analysis. Data analysis was performed using the Pearson chi-square test. Of the 500, 472 returned sheets contained complete information. Therefore, the response rate was 94.4%. 296 (62.7%) were male and 176 (37.3%) women. The majority of the participants were between 25-34 years (36.9%). Their levels of training vary: primary (40.8%), secondary (33.1%) and higher (26.1). Their professional and marital status also varied. The marital status revealed 37.7% single and 46.8% married. The rate of antibiotic use was significant among the young people, from 25 to 34 years old (61.49%; $p = 0.002$). As far as the antibiotics acquisition is concerned, 33.2% of the people interviewed affirmed that they had received probabilistic medical prescription of drugs of which 2.5% is on customers' demand. It was also established that 6.8% of medicines were purchased without medical prescriptions and 4.2%, on the advice of unqualified street vendors. With regards to the sources of drugs, 20.6% of the antibiotics were purchased from pharmacies and 11.0% from street vendors. Bad practices in the use of antibiotics could be related to knowledge gaps on the subject. Young people, in particular, those with low incomes and lower level of education were the most concerned. Educational, informational, communicative initiatives and application of regulations on sales of antibiotics are needed to control the misuse of antibiotic in Chad.

Key words: Antibiotic resistance, socio-demographic characteristics, bacteria, virus, education, Chad.

INTRODUCTION

Antibiotic resistance has become a global concern and more so for Africa which is almost entirely absent from

*Corresponding author. E-mail: ndoutamia@gmail.com. Tel: 00235 66 32 46 67.

the statistical data. The deplorable hygiene conditions facilitate the transmission of bacterial infections at both inter-human, animal, and environmental level as well. The inadequate prescriptions, self-medication and free sale of antibiotics are factors that increase the irrational consumption of these molecules (Chauvin, 2009). The use of antibiotics of last generation in the animal industry has more aggravated the situation (Bywater, 2004; Gillani et al., 2010). Various studies, in particular those on the group antibiotic resistance (RIIP), confirm the magnitude of the problem of bacterial resistance to antibiotics in the developing countries, in particular, the resistance by the production of β -lactamases in broadened spectrum in *E. coli* and *Salmonella*, and the resistance to Quinolones among Gram-negative bacteria (RIIP, 2014; Iroha et al., 2009; Ibrahim et al., 2013; Aruna and Mobashshera, 2012). Similarly, the resistance of the Gram-positive bacteria such as *Streptococcus pneumoniae* to the penicillin G has been reported elsewhere (Jacobs, 1999). Moreover, in many African countries, it was noticed that the pharmaceutical products can be easily obtained in the markets, by the roadside, managed by the sellers; thus, favoring the anarchic use of these products. While information on antibiotic in developed countries is readily available, similar knowledge relating to the resistance to antibiotic is rare in Chad. Therefore, the present study proposes to assess the demographic and socio-economic factors associated with the improper use of antibiotics.

MATERIALS AND METHODS

Type, period and area of study

This cross sectional study was performed by surveys carried out from June to July 2016 in two major cities of Chad, which were Moundou, the economic city, located at 437 km to the south of the capital, and N'Djamena, the capital city. These two communities were chosen on the basis of the heterogeneity of the population, the technical plateau of hospitals, the densities of the populations and the relatively high literacy rate that is likely to facilitate the filling of the questionnaire sheets without interpreters.

Target population

The target population was composed of men and women of varying age above 14 years. Due to the absence of data on the knowledge of antibiotics by the community of Chad, it was assumed that 50% of the population practice auto medication. Thus, on the basis of this estimation, the following formula was applied: $n = \frac{\varepsilon^2 p(1-p)}{i^2}$ (Mandhouj et al., 2004). This gave a sample size of 384 individuals, by opting for a confidence level of 95%, and a margin of error of 5%.

The study tool (questionnaire)

The questionnaire is composed of 54 questions divided into three sections. The first part focused on the sociodemographic characteristics of respondents such as sex, age, the level of study, occupation and marital status. The second section involved the

origin of antibiotics (doctor and street vendor) and the mode of access to medicines (pharmacy, market). The third part focused on the assessment of the knowledge of respondents on the subject of antibiotics and the reasons for which these antibiotics were used (bacterial infection, viral infection, Influenza and fever), the duration of the activity of an antibiotic in the body and its side effects.

Nature of the investigation

Formal surveys have helped to collect data on the basis of the questionnaires, by direct interview of people in their home, the streets and the markets. These items of information were confidential; therefore, precautions had been taken to avoid the presence of a third person in accordance with the ethical principles of statistics.

Data analysis

The quantitative data were entered and processed using the Excel software and Statistical Package for the Social Sciences (SPSS). The analysis of the different parameters was made using the SPSS software (version 18) and the results were presented as the percentages. The graphs were obtained using the excel software (version 2010). The comparison of parameters such as the sociodemographic characteristics and the consumption of antibiotics were performed according to the test of Chi-square of Pearson. The differences were considered significant for values of $p < 0.05$.

RESULTS

In total, 500 people responded to the survey. Out of the 500, 472 returned sheets contained complete information whereas 28 incomplete sheets were removed. Therefore, the response rate was 94.4% (472/500).

Socio-demographic characteristics of respondents

Most of the participants were men (62.7%) and 37.3% were women as shown in Table 1. The majority of the participants were between 25 and 34 years old (36.9%). Their levels of training varied: primary (40.8%), secondary (33.1%) and higher (26.1%). Their professional and marital status also varied. The marital status revealed 37.7% of single and 46.8% of married.

Respondents' attitudes and behaviors regarding antibiotic use

The study indicated (Table 2) that 50.4% of individuals surveyed had used the antibiotics in the six months that preceded the investigation against 49.6% who had not consumed. Among the 50.4% consumers of antibiotics, 2.5% had obtained it on their request, 2.7% on medical requirements after the laboratory examinations. 33.2% of medical prescriptions were systematic and probabilistic. In contrast, 6.8% of people had used the antibiotics

Table 1. Demographic and socio-economic characteristics of respondents.

Variables	Number	Percentage
Sex		
Male	296	62.7
Female	176	37.3
Age		
15-24	169	35.8
25-34	174	36.9
35-44	70	14.8
45-54	20	4.2
55-64	27	5.7
65 and more	12	2.5
Level of education		
Primary	193	40.8
Secondary	123	26.1
University	156	33.1
Professional status		
Without defined profession	40	8.5
Civil servant	43	9.1
Workers	59	12.5
Unemployed	33	7.0
House wife	39	8.3
Retired	24	5.1
Person of private means	29	6.1
Others (farmer, businessman, shoe-maker)	80	16.9
Marital status		
Single	178	37.7
Married	221	46.8
Divorced	54	11.4
Widow (Widower)	19	4.0

without medical prescription and 4.2% were advised by the street vendors. The modes of access to antibiotics varied. 3.4% of respondents consumed antibiotics available in their home; 20.6% had bought it in pharmacies; 11.0% bought it from street vendors; 2.3% took the remains of previous treatments, 6.4% purchased in the shelves by the roadside and 6.8% consumed drugs from the clinics and the physician offices. Among consumers of antibiotics, 23.09% were able to specify the nature of the antibiotics used, while 27.33% of them experienced difficulties.

Level of knowledge of respondents on the subject of antibiotics

The level of knowledge of the respondents on antibiotics is presented in the Figure 1. 42.9% of respondents

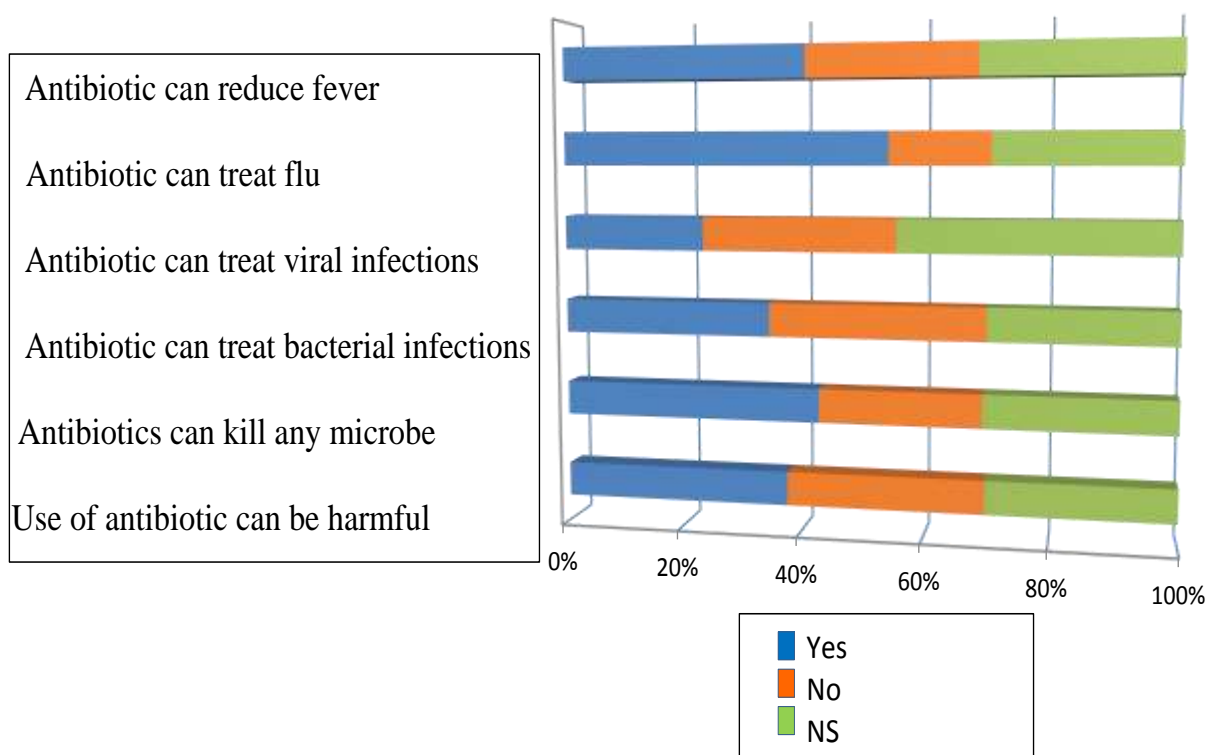
believed that antibiotics can kill all microbes. 23.72% asserted that antibiotics treated viral infections. Only 34.7% of the participants knew that antibiotics treat bacterial infections. For the symptoms of fever and flu, 40.8% argued that antibiotics can lower a fever and 54.4% thought that antibiotics cure the flu. 63.2% of the respondents knew that the duration of the activity of an antibiotic in the body was a few hours and 37.7% of them testified that its use could be harmful.

Demographic and socio-economic variables and use of antibiotics

The bivariate analysis of the data of the consumptions of antibiotics and the sociodemographic variables showed a use of antibiotics quite frequent among men than women ($p = 0.0060$). However, the most affected individuals in

Table 2. Respondents' attitudes and behaviors regarding antibiotic use.

Variables	Number	Percentage
Consumption of antibiotic the last six months		
Yes	238	50.4
No	234	49.6
Respondent-clinician interaction		
Consumption of antibiotic on respondent's request	16	2.5
medical prescription on the basis of antibiogramme	13	2.7
medical systematic prescription	157	33.2
without prescription	32	6.8
On mobile vendor's prescription	20	4.2
others	2	0.4
Knowledge of the nature of the antibiotic used		
Yes	113	23.09
No	129	27.33
Sources of antibiotic		
At home	16	3.4
In pharmacies	97	20.6
Through mobile vendors	52	11.0
Left over antibiotics	11	2.3
By the roadside of the streets	30	6.4
The physician offices and clinics	32	6.8

**Figure 1.** Respondents' knowledge on the use of antibiotic. NS: non specified.

the two sexes were within the age bracket of 25-34 years (107/174 = 61.49%) as compared to the other age groups: 15 to 24 years (79/168 = 46.74%), 35 to 44 years (32/70 = 45.71%), 45 to 54 years (4/20 = 20%), 55 to 64 (40.74%), 65 and more (5/12 = 41.66%). This difference was statistically significant ($p = 0.002$). The result of analysis showed that the consumption of antibiotics was quite high (40.8%) among individuals who had a relatively low level of training as compared to those of the secondary level (26.1%) or higher (33.1%). As regards the marital status, the married were the most concerned (116/221 = 52.48%), as compared to the single (88/178 = 49.43%), divorced (25/54 = 46.29%) and widows/widowers (9/19 = 47.36%).

DISCUSSION

The present study revealed a considerable rate of use of antibiotics and self-medication among the community during the six months preceding the survey (50.4%). This rate could be explained in part by the fact that antibiotics were considered as magical products and the high desire of the Community to have a fast relief of the disease (Widayati et al., 2012). However, it is interesting to mention that this percentage of the use of antibiotics observed in our study was much greater than that reported in other studies in Jordan which was 28% (Ghadeer et al., 2012). It is quite possible that this large gap between Chad and Jordan in the matter of self-medication and the use of antibiotics is linked to the difference in the human development index (HDI) of the two countries. It may be recalled that the development index of Chad (0.340) was lower than that of Jordan (0.700) (IDH, 2012). However, this rate is consistent with the results of Ivory Coast in which 59.7% of the community had used antibiotics during the 12 months preceding the survey of Hounsa (Hounsa et al., 2009). Other investigations had shown that approximately, 60% of prescribed antibiotics in Nigeria in 2000 were not justified (Raynaud, 2008). In Nepal, more than 50% of the prescribed antibiotics in 1996 were not necessary, and 40% of prescriptions were inadequate (Raynaud, 2008). On the whole, the proportion of prescriptions of antibiotics that was not justified reached an average of 50% (Raynaud, 2008). This misuse of antimicrobials that is widespread in many countries could be linked to the gaps in the application of regulations relating to the purchase of antibiotics (Al-Bakri et al., 2005; Sawair et al., 2009).

Moreover, the study showed that the consumption of drugs can vary depending on the sex and age. The frequency obtained was higher among men ($p = 0.00601$). Similarly, age was a factor that was associated with the consumption of antibiotics (25-34 years, $p = 0.002$). Similar studies carried out in France have also reported a significantly high use of antibiotics among young people, and which decreased with age for both

men and women (Raynaud, 2008).

As far as the level of training is concerned, the data showed a link between the consumption of antibiotics and the level of training. It appeared that people with low level of education were more concerned than those with higher level of education and especially university ($p = 0.002$). This gap could be explained by the difference in the level of knowledge in the two categories of persons with respect to antibiotics. In contrast, it seemed that there was no correlation between the consumption of antibiotics and the profession of respondents ($p = 0.079$). The present study also showed a high percentage of consumption among the married than among the single ($p = 0.0082$). This could be explained by the fact that certain infections of the genital apparatus remained silent among women. The husband may be treated, but can be re-infected during each sexual intercourse. The persistence of the infection among the married was more apparent in polygamous families because a genital infection of one of the partners finally reached all the members of the family (women and the man). In such cases, the administration of antibiotic therapy to all the partners at the same time can stop the reinfection.

As regards the mode of access to medicines, the purchase of drugs in the illegal structures can be linked to economic factors and the easy access to drugs sold outside pharmacies. The majority of persons interviewed purchased antibiotics without medical prescriptions and on advice of street vendors. In addition, not all the prescribed antibiotics in a systematic way (33.2%) by clinicians were purchased in pharmacies (20.6%). This diversity of mode of access to antibiotics may be explained by the low economic power of the community associated with the low knowledge on the harmful effects of drugs sold in parallel. Furthermore, these drugs sold in pharmacies of Chad were usually two times more expensive than those sold in parallel markets, by the roadside or in mobile shops. This difference in the purchase prices may encourage the destitute people in the purchase of medicines outside pharmacies because they are less expensive and also sold without harassment.

The results showed that the perception of knowledge was disparate about the use of antibiotics. A minority of interviewees knew that antibiotics treated bacterial infections (34.7%). In contrast, a high percentage of respondents believed that antibiotics can kill viruses, heal flu or reduce fever. These false perceptions and confusions were reported in several surveys worldwide (Widayati et al., 2012). In Jordan, for example, a similar survey showed that the percentage of the population knowing that antibiotics treat bacterial infections was low (29.9%). Other investigations underscored medical prescriptions of antibiotics in the management of the symptoms such as colds, flu and fever which were often of viral origin (Stott, 1979; Rasamoelisoa et al., 1999; Mainous et al., 1996). This medical act may also

contribute to the maintenance of confusion within the community on the exact target of antibiotics. Another work specified that the prescription of antibiotic was also a way to give hope to the customers in order to keep patients' confidence (Faber et al., 2010).

With regards to the duration of activity of an antibiotic in the human body, more than half of the respondents knew that the time of activity of any drug was of a few hours. This level of knowledge could be linked to the empirical knowledge because any medicine has limited activity in time. In contrast, very few people knew that antibiotics can be harmful and this could be explained by the low level of knowledge on the side effects of an antibiotic by the general public.

Conclusion

This study is the first of its kind conducted in Chad, focusing on the analysis of factors related to the use of antibiotics in the community. It revealed a large heterogeneity of socio-demographic factors involved in the inappropriate consumption of antibiotics from different sources. The medical requirements were often empirical. Thus, the risks of selection of multidrug-resistant strains within the commensal Flora was therefore quite high and constituted a great threat to human and animal health. Consequently, educational campaigns, training and increased awareness must be implemented in order to improve the knowledge on antibiotics so as to operate changes in behavior and attitude in the use of these products.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

ACKNOWLEDGEMENTS

This work is the result of a collaborative project between the Ministry of Health and the Ministry of Higher Education, and the authors thank them for their supports. The authors thank Dr. Hassan Mahamat Hassan (physician), Mr Dabsou Guidassou (statistician-demographer) and Mr Madjitouloum Moyangar (demographer) of the Ministry of Public Health of Chad for the collaboration in the achievement of this work. The authors thank the persons interviewed and who have sacrificed their time to participate in the investigation. Finally, the authors also thank Issa Djimet and Alladoun Roland from the University of Doba for their critical reading.

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