Contents lists available at www.innovativejournal.in

INTERNATIONAL JOURNAL OF NURSING DIDACTICS

homepage: http://innovativejournal.in/ijnd/index.php/ijnd

IJND ISSN: 2231-5454

Prevalence of Asthma and Allergic Diseases among Children 13-14 Years in Lubumbashi/Drcongo

Léon Kabamba Ngombe [1,2,&], Katumbo Mukemo[1], Nathalie Kaj Kayomb [3], Michel Kabamba Nzaji [2], Benjamin Kabyla Ilunga [1.2,3], Nyembo Mukena Christophe[1], Oscar Luboya Numbi [1.2,3,4]

[1]School of Nursing of Lubumbashi, ISTM Lubumbashi (R.D.Congo), Department of research
[2]University of Kamina (R.D. Congo), Faculty of Medicine, Department of Public Health, Unit of Toxicology
[3]General Hospital of reference Sendwe, Service of Dermatology
[4]University of Lubumbashi (R.D. Congo), Faculty of Medicine, Department of Public Health
[&]Dr. Léon Kabamba Ngombe, University of Kamina, Faculty of Medicine, Unit of Toxicology.
E-Mail: Leonngombe@yahoo.fr

DOI: http://dx.doi.org/10.15520/ijnd.2016.vol6.iss3.140.05-09

Summary:
Introduction: The prevalence of asthma and allergic diseases in children is increasing in the world, and constitutes a public health problem. The first goal of this work is to determine the prevalence of asthma and allergic diseases among school children 13-14 years in the city of Lubumbashi, and contribute to develop the mapping of the prevalence of asthma in the world and in RD Congo
Methods: It is a cross-sectional study following the ISAAC study protocol phase I, with a simple random sampling among students aged 13-14 years in 7 schools of the city of Lubumbashi. Of these facts, a written questionnaire of the ISAAC study (International Study of Asthma and Allergies in Childhood) was administered to students by a single investigator.
Results: This study determined the prevalence of asthma and allergic diseases among 3534 students aged 13-14 years in 7 schools in the city of Lubumbashi. The written questionnaire revealed the prevalence of symptoms such as: current wheezing 15.17% (p=0.38), asthma 10.33% (p<0.001), cough 64.64%(p<0.001), Rhino conjunctivitis 11.49% (p<0.001), current allergic rhinitis 21.73%(p<0.001) and 16.41 eczema (p<0.001). For the majority of the questions, the prevalence was significantly higher among female students than the male students.
Conclusion: Our results show that asthma and allergic diseases are public health problems in our environment.

Key words: asthma, allergy, prevalence, children, age, Lubumbashi

INTRODUCTION

The prevalence of asthma and allergic diseases in children is growing in western countries and in the developing countries, and constitutes a public health problem [1, 2, 3]. Currently many gaps still persist as to the etiology of asthma and allergic diseases. Of this fact, the prevalence of asthma varies from one country to another but also from one region to another in the interior of the country [4]. The Isaac Study Phase I(International Study of Asthma and Allergies in Childhood) is an epidemiological study that allows to have data in the prevalence of asthma and allergic diseases in the world [5]. In the city of Lubumbashi, we do not yet have epidemiological studies on the prevalence of asthma. Then, the primary purpose of this work is to determine the prevalence of asthma and allergic diseases among school children 13-14 years in the city of Lubumbashi. The secondary objective is to contribute to develop the mapping of the prevalence of asthma in the world and in RD Congo.

METHOD

Type of study, a study framework and population:

It is a cross-sectional analytical descriptive study that has for purpose to determine the prevalence of asthma and allergic diseases among children in the school environment. This study is carried out in the city of Lubumbashi.

In fact, the city of Lubumbashi is the second largest city of the Democratic Republic of the Congo the most populated after Kinshasa, its population would be around two million residents according to the latest estimates [6]. It is the economic capital of the Democratic Republic of the Congo; it is also the capital of the province of Katanga. It is designated as the Copper belt capital because of the production of the copper and is part of the Copper Belt of Africa. This study was conducted in 2014 on a period of 3 months, ranging from 1 May to 31 July 2014 in the county of Lubumbashi which is part of the 7 counties of the city of Lubumbashi.

The population that is of interest to the ISAAC Study is composed of two age groups of children: 13-14 years and 6-7 years. The group of children of 6-7 years was not concerned in our survey for technical reasons. The age of 13-14 years was chosen because it reflects a period during which the mortality of asthma is common and that children can respond themselves to the written questionnaires and the video-questionnaire [7]. The Isaac study requires as a recommendation a recruitment of 3000 children. Then, the size of the sample of 3000 children will detect a statistically significant difference in the prevalence of wheezing and of the severe asthma in a year between the two centers. This difference could be set to 99% and 90%, respectively, with a level of significance of 1% [6]. The written questionnaire of the Isaac study includes questions on the past and the

present of the episodes of wheezing, the frequencies of the wheezing, sleep disturbance, and limitation of the voice during the attack, induction of wheezing after a physical effort, a cough that is not in connection with a respiratory infection, and other issues concerning the presence and severity of rhinitis as well as eczema. Only the written questionnaire was used in the city of Lubumbashi after having been translated into French and adapted to the local context of the DRC. In fact, the questionnaire was pre-tested to ensure its understanding and reliability to provide the correct information. This study has received the authorization of the ethics committee of the University of Lubumbashi and informed consent has been obtained from the part of the parents as well as the heads of the various schools.

We have proceeded by a simple random sampling of 7 secondary schools in the city to have a total of 3534 pupils aged 13-14 years. A single investigator has conducted the study and explanations were not given on all the terms of the written questionnaire. With regard to the statistics, the data was input in Excel 2010, statistics have been carried out on the software Epi Info 7, and the prevalence was compared in each group by the Chi-Square test. The significance level was fixed at 0.05.

RESULTS

In total, 3534 Students of the commune of Lubumbashi aged 13-14 years have participated and responded to written questionnaires of the Isaac study among whom 2176 boys is 61,57% and 1358 girls is 38,43%. In regard to the age of the children, 53.96% of students was 13 years old and 40.04% was 14 years old without a significant difference between the two ages (p=0.88) (**Table I**). Concerning the responses to written questionnaires, we note a prevalence of wheezing in the course of the life of 15.17% and 8.52% during last months. The difference is significant between the two sexes with regard to the whistling during 12 months (p<0.001). Asthma has a prevalence of 10.33% and the female sex has reported more this problem compare to the male sex with a significant difference (p<0.001). The prevalence of wheezing after effort was high among girls compared to boys (20.22% against 27.25%). The rhinitis has been found more among girls than boys in the course of the life and during 12 months (40.35% against 24.49%; 32.12% against 14.75%). The rhino-conjunctivitis had a prevalence of 11.49% with a predominance of the female sex compare to the male (p<0.001).The Cough has been more reported among girls than among boys (27.57% against 34.76%). Eczema and rashes have been reported with a high prevalence among girls in contrast to boys with a statistically significant difference (p<0.001). In general, the children have always consulted for symptoms in relation with asthma and the incidence of respiratory allergic diseases in clinic. The Rhinitis (30.59%) and the cough (64.64%) have been the symptoms most reported. Beside the wheezing in the course of the last twelve months, the girls have reported respiratory symptoms of the questionnaire significantly then boys with a statistically significant difference (p<0.05) (**Table II**).

DISCUSSION

The ISAAC study is considered as a model to calculate the rate of asthmatic children throughout the world, with a chronology of issues facilitating the child to answer. The use of the standardized questionnaire of the Isaac study in our survey will: first facilitate that our results be compared with other studies in the world; second, illustrate to the heads of schools that asthma exists and could constitute a major public health problem. And finally, our study will serve as an argument for the establishment of a first aid kit containing salbutamol in the different schools. As well, this questionnaire has a few drawbacks including: the difficulties of understanding of some of the words or terms by the students; which may explain the lack of response to some questions. Then, the risk of memory errors in relation to the events on which are interviewed the students may result in overestimation or underestimation of the prevalence already evoked in some literature.

In our study, we had 53,96% of students aged 13 and 46.04% 14 years of age. In regards to the sex, the boys represent 61,57% and girls 38,43%.The male predominance is not found in our study compared to some other Isaac studies [8.9], and those conducted by OSSEY YA [10] And ROUDAUT [11] in the Ivory Coast. RONMARK [12] in Sweden has not found the same thing as we are. The City of Lubumbashi is a region with strong mining activity and it is victim of pollution from mining companies. According to the literature, the evaluation of Wheezing respiratory follows a global trend, which is linked to air pollution as supported Anderson [13].We cannot confirmed that our prevalence of 11.28% of respiratory wheezing is due to the pollution from mining within the city of Lubumbashi. When we evaluate the wheezing history in a period of 12 months, we find that our results are low compared to those found by Koffi in Côte d'Ivoire [8], and by Pearce in the various cities in Europe [14]. However, the Wheezing after the effort show a high prevalence of 30% compared to the spontaneous wheezing in our study. PERONI [15] in Italy has made the same finding like us. In addition, it is important to know that physical exercise is blamed in triggering asthma attack according to the literature [16]. A trend to the contrary is found by HU [17] in Chicago.

The histories of asthma among children in our study represent 12% of prevalence. This is not really differ from the results found in the cities of Ivory Coast by Koffi [8]. Our data regarding the symptoms of asthma is part of the range of data ranging from 1.6 to 36.8% recovered by different ISAAC studies in the world [18]. For Weinberg, the prevalence of asthma which was low in the countries in track of developments is now to increase because of urbanization and industrialization in the latter[19].Some factors may explain this finding: industrial pollution, emissions of smoke by vehicles and motorcycles; the change of diet that result in the loss of the protection against allergic diseases caused by the lactobacilli, the decrease of the infection by Ascaris lombricoïdes among children which is considered protective against the development of asthma. The effects of all these factors may play an important role among young children [20]. With regard to the prevalence of asthma which is 10.33% in our investigation, it is difficult

to incriminate the effect of urbanization, industrialization and other factors because no environmental study concerning asthma has been conducted in the city of Lubumbashi.

Furthermore, the allergic rhinitis is defined as the nasal pathology induced by the inflammation of the nasal mucous membranes, dependent of IgE, following an allergic exposure. It is a very common disease, and its impact has been multiplied by 3 or 4 in a few decades. Despite its apparent benignity, rhinitis is responsible for morbidity not negligible, a significant impact on the quality of life, and a high cost to society. According to the literature, the complications with asthma are important, 20 to 30% of allergic rhinitis is associated with asthma and nearly two-thirds of asthmatics have an allergic rhinitis associated. However, there are close links between the nasal mucous membranes and bronchial [21].

As well, our prevalence of symptoms in relation with rhinitis is very high compared to that found in Kinshasa by AIT-KHALESD [22] and in Urmia (Islamic Republic of Iran) [23] but less than that found in Diyarbakir in Turkey by ECE [24]. However, the prevalence of rhinitis in Hong Kong [25] is higher than that of Lubumbashi. Often, it is difficult to determine the true etiology of this high prevalence in our environment. In effect, PRODANOVIC [26] has also been emphasized by many difficulties or shortcomings that still persist as to the etiology of asthma and allergic diseases (rhinitis, eczema) in the world.

The urticaria and the eczema, that they are allergic to IgE (atopy) or contact, are the more frequent allergic manifestations of the skin, whose pathogenic mechanisms and clinical presentations are very various [27,28]. Moreover, epidemiological studies show that in the past 20 years, the prevalence of eczema has doubled in most of the industrialized countries, ranging between 10 and 20%. And at the international level, it varies by a factor of 1 to 60 [29, 30].

Concerning the skin allergy, a high prevalence of rash during the last 6 months has been reported and a year after among children. The prevalence of eczema found in our study is higher than that found in the city of Kinshasa [22], in Iran by Rahimi [23]. In addition the prevalence of eczema in Lubumbashi is slightly greater than or almost equal to that of Guinea Conakry and of the urban environment in Côte d'Ivoire [22]. However, our prevalence of eczema (16.4%) is associated with a high prevalence of Rhino conjunctivitis (11.4%); and these results are similar to those found by some authors in Côte d'Ivoire, in Conakry and at the Casablanca [22]. Often the literature reveals that developing countries often have high prevalence of rhino conjunctivitis and eczema. This can also be valid in this observation. Nevertheless, in our series, the rate of urticaria (skin allergy) is 14.1% and 16.4% for eczema, that is to say our prevalence are among the high in the world; we have found a predominance of skin allergic manifestations in women, which is consistent with the majority of the studies carried out in the world.

In relation to the climate, the investigation has not analyzed the seasonal influence basis in the occurrence of asthma and allergic diseases (rhinitis, eczema) in the city of Lubumbashi. Nevertheless, some authors believe that the climatic differences do not significantly influence the distribution of asthma [31-32].

CONCLUSION

Our results show that asthma and allergic diseases are public health problems in our environment. Indeed, the prevalence of asthma and allergic diseases (rhinitis, eczema) in Lubumbashi follows the global trend, and would be linked probably to the urbanization of the city. As well, it is important to conduct studies at a later date to search for different environmental factors involved and establish a rescue kit containing salbutamol in the different schools.

Conflicts of Interest:

The authors do not declare any conflict of interest

The contributions of the authors:

All of the authors have contributed in one way or another to the development of this article from the beginning until its end

REFERENCE

[1]. Robertson CH, Heycock E, Bishop J, Nolan T, Olinsky A, Phelan PD. Prevalence of asthma in Melbourne schoolchildren: change over 26 years. BMJ 1991; 302(6785): 1116-1118.

[2]. Ninan TK, Russell G. Respiratory symptoms and atopy in Aberdeen schoolchildren: evidence from two surveys 25 years apart. BMJ 1992; 304(6831):873-875.

[3]. Leung R, Wong G, Lau J.Prevalence of asthma and allergy in Hong Kong schoolchildren: an ISAAC study.Eur Respir J 1997;10(2):354-60

[4]. CHARPIN D. Définition et épidémiologie de l'asthme. EMC (Paris), Poumon - plèvre -médiastin, 1984, 6039

[5]. Charpin D, Annesi-maesano I, Godard PH . Présentation générale de l'étude ISAAC. Rev Mal Respir 1997;14 :4S7-4S14.

[6]. Report from Wikipedia [Internet]. Lubumbashi (Congo). [cited 2013 Nov 22].

[7]. Asher MI et al. International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. European respiratory journal 1995,8(3):483-91.

[8]. Koffi N, Yavo JC, Kouassi B, Ngom A, Toure M, Fadiga A, Aka-danguy E. prevalence de l'asthme en milieu scolaire dans 3 regions bioclimatiques de la cote d'ivoire. Médecine d'Afrique Noire 2000;47 (10):416-420**.**

[9]. Pearce N, Weilands, Keil U, Laugridge P, Anderson HR, Strachian D, Baurnan A. The self-reported prevalence of asthma symptoms in children in Australia, England, Germany and New-Zealand : an international comparison using the ISAAC protocol. Eur. Resp J., 1993 ; 6 (10) : 1455 -61.

[10]. Ossey YA. Epidémiologie des maladies respiratoires, de l'asthme et du tabagisme en milieu scolaire à Abidjan. Thèse Doctorat en Médecine 85 ; N663.

[11]. Roudaut M, Meda AH, Seka A, Fadiga D, Pigearias B, Akoto A. Prévalence de l'asthme et des maladies respiratoires en milieu scolaire à Bouaké (C.I) : résultats préliminaires. Méd. Trop., 1992; 52 (3) : 279-82.

[12]. Ronmark E., Lundback B., Jonsson E, Latt S, Mills T. Asthma , type I allergie and related conditions in 7 and 8 ye a rs old children in Northern sweden : prevalence rates and risk factors pattern. Resp Med, 1998; 92 (2) : 316-24.

[13]. Anderson HR .The naturel history of asthma childhood. J. Epidemiol. Community - health, 1986 ; 40 (2) :121-9.

[14]. Pearce N, Weiland S, Keil U, Laugridge P, Anderson HR, Strachian D, Baurnan A. The self-reported prevalence of asthma symptoms in children in Australia, England, Germany and New-Zealand : an international comparison using the ISAAC protocol. Eur. Resp J.1993; 6 (10) : 1455 -61.

[15]. Peroni DG, Piacentini GL, Zizzo MG, Bone R Prevalence of asthma and respiratory symptoms in childhood in an urban area of North-East Italy. Bonaldi archives for chest diseases, 1998; 53 (2): 134-7.

[16]. Seka-seka J, Dasse SR, Yapo C.C, Akre DP, Sorho F, Involey, Sombo NT. Etude des maladies allergiques à Abidjan : aspects épidémiologiques. Afr. Bio. Med, 1998 ; 3 (2) : 47-53.

[17]. Hu FB, Persky V, Elay BR, Zeli A, Cooksey J , Richardson J. Asthma and wheezing in public school children. Association with maternal - smoking during pregnancy. Ann. Allergy asthma and Immunology, 1997; 79 (1): 80-4

[18]. ISAAC World wide variation prevalence of symptoms of asthma, allergic rhinoconjonctivitis and atopic eczéma : ISAAC. Lancet, 1998, 351(9111) : 1225-1232.

[19]. Weinberg EG.Urbanization and childhood asthma: an African perspective. Journal of allergy and clinical immunology 2000;105(2Pt1):224-31

[20]. Viegi G, Annesi I, Matteelli G. Epidemiology of asthma. European respiratory monograph 2003;23:1-25

[21]. Annesi Maesano I. Epidémiologie de la rhinite allergique Rev Fr Allergol 1998; 38(7) : 591-600

[22]. Ait-Khaled et al. Prevalence of symptoms of asthma, rhinitis and eczema in 13- to 14-year-old children in Africa: the International Study of Asthma and Allergies in Childhood Phase III. Allergy 2007: 62(3): 247–258.

[23]. M.H.Rahimi Rad, M.E.Hejazy, R.Behrouzian.Asthma and other allergic diseases in 13-14 year-old schoolchildren in Urmia: an ISAAC study. Eastern Mediterranean Health Journal 2007;13(5):1005-16

[24]. Ece A et al. Prevalence of asthma and other allergic disorders among schoolchildren in Diyarbakir, Turkey. Turkish journal of pediatrics,2001,43 (4):286-92.

[25]. Leung R,Wong G,Lau J, Ho A, Chan JK, Choy D, Douglass C, Lai CK. Prevalence of asthma and allergy in Hong Kong schooldren:an ISAAC study. Eur Respir J 1997;10(2):354-360.

[26]. Prodanovic H, Raherison C, Vernejoux J-M, TUNON DE LARA, Taytard A. La prévalence de l'asthme et de la rhinite est-elle différente selon la présence d'un animal domestique? Rev Mal Respir ; 2002.19, 735-740.

[27]. Conférence de consensus. Prise en charge de l'urticaire chronique. Ann Dermatol Vénéréol 2003; 130:1S182-92.

[28]. Bousquet J, Dutau G, Grimfeld A, de ProstY De la dermatite atopique à l'asthme .Paris: Expansion Scientifique Française; 2000.

[29]. Vichyamond P, Jiraonsanamunk O,Visitsunto I N,N.Tuchunda M Prevalence of asthma, rhinitis and eczema in chilldren from the Bangkok area using the ISAAC questionaries. Journal of the Medical association of Thaïland, 1998 ; 81 (3) : 175-84

[30]. William H, Robertson C, Stewart A, Ait-Khaled N, Anabwani G, Anderson R et al. Worldwise variations in the prevalence of symptoms of atopic eczema in the international Study of asthma and Allergies in childhood J Allergy Clin Immunol 1999; 103(1): 125-138

[31]. Roudaut M., Meda AH., Seka A., Fadiga D., Pigearias B., Akoto A. Prévalence de l'asthme et des maladies respiratoires en milieu scolaire à Bouaké (C.I) : résultats préliminaires. Méd. Trop., 1992; 52 (3): 279-82.

[32]. Stewart A, Asher I, Clayton TO, Crane J, D'Souza W, Illwood PE, and al. The affect of season of response to ISAAC questions about asthma, rhinitis and eczema in children. Int J. Epidemiol 1997 ; 26 (1) : 126-36.

Table 1: Distribution of students depending on the sex and age

Sex /Age	**Sex**		**TOTAL**	**X^2**	**P**
	M	**F**		**0.02**	**0.88**
AGE	N(%)	N(%)	N(3534)		
13(years) 14(years)	1172 (53.86)	735 (54.12)	1907(53.96)		
	1004 (46.14)	623 (45.88)	1627(46.04)		

Table 2: prevalence of respiratory symptoms suggestive of asthma

QUESTION	**boys (%)** **(n=2176)**	**girls (%)** **(n=1358)**	**Total (%)** **(n=3534)**	**OR** **IC95%**	**P**
Current wheezing	14.75	15.83	15.17	0.9 [0.76-1.11]	0.38
wheezing during the last 12 months	9.74	6.55	8.52	1.54 [1.19-2]	<0.001
History of asthma	8.50	13.25	10.33	0.61 [0.49-0.76]	<0.001
wheezing of effort during the past 12 months	20.22	27.25	22.92	0.68 [0.58-0.79]	<0.001
dry cough at night during the last 12 months	27.57	34.76	64.64	0.71 [0.62-0.83]	<0.001
Current Rhinitis	24.49	40.35	30.59	0.48 [0.41-0.55]	<0.001
Rhinitis during the last 12 months	14.75	32.92	21.73	0.35 [0.3-0.42]	<0.001
Rhino conjunctivitis during the last 12 months	10.20	13.55	11.49	0.72 [0.59-0.89]	0.002
Current rash	10.39	20.25	14.18	0.46 [0.38-0.55]	<0.001
rash during the last 12 months	7.81	19.81	12.42	0.34 [0.28-0.42]	<0.001
Eczema	11.81	23.78	16.41	0.43 [0.36-0.51]	<0.001