



Determinants of Self-medication of Children by Their Parents at Kisangani

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Authors' contributions

This work was carried out in collaboration between all authors. Author BGM designed the study, performed the statistical analysis, wrote the protocol and the first draft of the manuscript. Author KET managed the analyses of the study. Authors RM and OA managed the literature searches and contributed to the discussion section. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To describe features of self-medication of children and determine factors associated with it.

Study Design: This was a cross-sectional study.

Place and Duration of Study: This study was conducted in five hospitals of Kisangani, in the Democratic Republic of Congo.

Methodology: We included all parents who brought their children for a new consultation. The dependent variables were the fact of giving medicines to children and the reasons related to this practice. Collected data were managed by Epi info™ 7.2.0.1. Chi-square test and Odds ratio evaluated the association between the level of instruction and other variables at 95% confidence interval.

Results: During the study period, 403 parents answered to our questionnaire. Most of them were mothers (94.8%). Parents' education level was low (62.53%). Most of sick children were between 2 to 24 months-old (54.6%). They received at home 2.1 ± 1.3 drugs (1 to 8 drugs; median: 2 drugs):

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81% were modern, 14% combined modern and traditional and 5% were traditional alone. Tablets and syrups were the two most used forms. Antipyretics like paracetamol were the most used. Parents gave drugs with dosage errors in 58% of cases. Only 37.8% of them asked advice from a physician, nurse or pharmacist to determine the dose. The main reasons for giving medicines without prescription were avoidance of too many formalities in hospitals or lack of enough money to bring children to the hospital.

Factors associated with self-medication were the female sex of parents ($P = .004$), the longer duration of the disease before bringing the child to the hospital (OR 1.5: 0.9 – 2.5; $P = .04$) and storage at home of drugs used formerly (OR 1.8: 1.1 – 3.1; $P = .01$). Parents of 30 years-old and less gave fewer medicines than more above 30 years-old ($P = .0005$).

Conclusion: The rate of children self-medication is high at Kisangani. Communication of health professionals, doctors, nurses and pharmacists is needed to reduce it.

Keywords: Self-medication; children; parents.

1. INTRODUCTION

Drugs used to take care of the illness or to relieve symptoms can be harmful. This can occur either during a controlled therapeutic use by a doctor in the hospital or self-medication. Its prevalence is high, ranging between 56.5% [1] to 94.4% [2-3]. Its determinants are numerous: poverty, [3-4], low instruction level of the parents [3-5], the absence of communication between parents and healthcare professionals [6-8].

Self-medication can modify the symptoms and disorientate or delay clinical diagnosis [9], cause harmful effects by overdose [9], select resistance to antimicrobials, especially to antibiotics and antimalarials [10-11]. This is a complex problem in the sub-Saharan region where infectious illnesses are the main reasons of children deaths [12].

Self-medication of children is special because, except some cases occurring among teenagers, drugs are given to children by their parents at home. So many life-threatening adverse drug effect are under-reported because parents confound them with the signs of the illness [9]. Poisoning by natural products (plants, leaves, peels or roots) used in the traditional medicine can also occur [4,13,14]. This survey was undertaken to determine the prevalence and determinants of self-medication of children in Kisangani.

2. MATERIALS AND METHODS

This cross-sectional study concerned five hospitals of Kisangani, in Democratic Republic of Congo: the University Hospital of Kisangani (third level hospital), Nouveau Village de Pédiatrie, Alabul, Hôpital du Cinquantenaire de Kisangani,

General Reference Hospital of Makiso-Kisangani District. There are 6 secondary level hospitals and one third level hospital in Kisangani town. The choice of these five hospitals out of seven was made randomly. Data were collected during 10 months (from July 2015 to April 2016).

All parents, fathers and mothers, who brought their children for a new consultation and who gave their consent were included. Follow-up consultations, as well as children who came alone or accompanied by their elder brother or sister, were excluded. Parents were interviewed. The questionnaire was pretested with parents coming to consultation with their children in a first level hospital in Makiso township. The primary independent variables were child's age, age and sex of the parent, his/her instruction level. The dependent variables were the fact of giving or not medicines to children and the reasons related to this practice.

A former study in the country found a prevalence of 59.6 % [15]. Therefore, we had to interview 370 parents or more, on the basis of the formula $n \geq (z^2 * p * q) / d^2$ with an error risk of 5%.

The questionnaire we used for an interview had four main sections of variables: socio-demographical data of parents and children, knowledge and awareness about risks, practices and details on given drugs, reasons and motivation of practices.

We grouped the education level in two sub-groups: parents who did not go to school, those who were at primary and secondary school had *low education level*. Those who achieved university level had *high education level*. An error about dosage described cases of drug dosage higher than maximum dosage by kilogram body

weight or lower than minimum dosage by kilogram body weight. If not so, the dosage was *correct*. Collected data were managed by the software Excel 2016 and Epi info™ 7.2.0.1. Association between the level of instruction and other dependent variables was evaluated by Bravais Pearson's chi-square test (with a *P* value less than 0.05) and Odds ratio at 95% confidence interval. Quantitative data were compared by *t* test or by a non-parametrical test (Kruskal-Wallis) if conditions required it.

3. RESULTS AND DISCUSSION

3.1 Socio-demographic Data

During the study period, 403 parents accepted to answer our questionnaire. The total of parents approached by investigators was We interviewed

382 mothers and 21 fathers. Forty mothers and 19 fathers refused. The mean age was 30.3 ± 7.9 years-old (17 to 64 years; median age: 30 years). Most of them lived in township of Makiso (64.27%). The low education level represented 62.53%. Among infants, those between 2 to 24 months-old were most numerous (54.6%), followed by 25 to 60 months (20.1%), with 61 months to 16 years (19.1%) and with 0 to 28 days (6.2%).

3.2 Medicines Given to Children

Parents gave about 2.1 ± 1.3 drugs (1 to 8 drugs; median: 2 drugs): 81% were modern, 14% combined modern and traditional and 5% were traditional alone. About dosage, 58% gave medicines with error versus 42% correct.

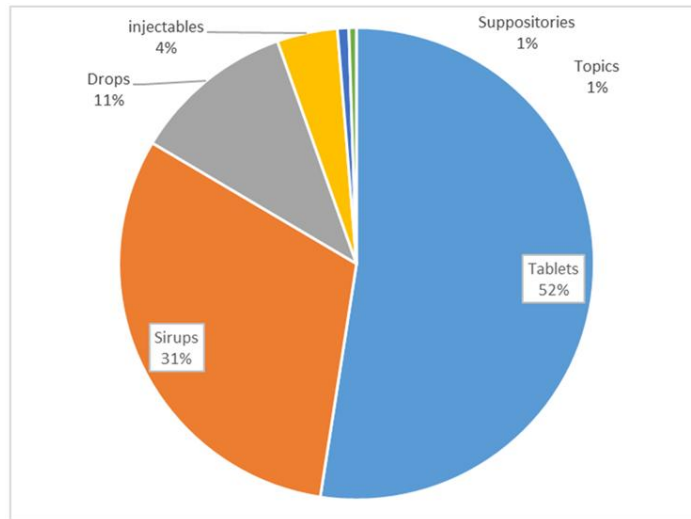


Fig. 1. Form of modern drug (n=304)

Table 1. Modern drugs given to children (N=323)

Antipyretics et antalgics (71.2%)	<i>Paracetamol (63,5%)</i>	205
	<i>Others (Acetyl-salicylic acid, butazolidine diclofenac)</i>	42
Antimalarials (30%)	<i>Quinine</i>	73
	<i>Artemisinin based combinations, sulfadoxin</i>	25
Antibiotics (26.6%)	<i>Amoxicilline, ampicillin, penicillin V</i>	31
	<i>Erythromycin</i>	16
	<i>Quinolones (Ciprofloxacin, Nalidixic acid, Norfloxacin)</i>	16
	<i>Others (Cotrimoxazole, chloramphenicol, tetracyclin...)</i>	38
	<i>Ceftriaxone</i>	4
Antiparasitics (17.6%)	<i>Mebendazole, metronidazole, Albendazole, levamisole</i>	57
Drugs for cough (15.8%)	<i>Bromhexine, eucalyptol, promethazine, salbutamol</i>	51
Others* (33.1%)	<i>Vitamins, Zinc, anti-emesis, xylo-methazoline, ...</i>	107

*vitamins, WHO ORS, laxatives, anti-diarrhea, spasmolytics, sedatives

Table 2. Natural products used as medicines (N=62)

Local products	Frequency
Enema with indigenous leaves* +tetracyclin or chloramphenicol	41
Enema with trepid water	8
Instillation of the drops of cassava leaves in the nostrils	3
Honey	3
Drinkable potion with tea leaves+ coca cola or Fanta+ tomatoes leaves	3
'Lukunga' [†]	2

* Leaves of tomatoes, sweet potatoes, citronelle, tea, lemon, of "kongo bololo", of "tangausi"

† a mixture of snail shell dust + ember + palm oil applied on the fontanelle for dehydration

Table 3. Reasons of using or not the self-medication

	Reasons	Frequency	%
Yes (N=323)	To act in emergency and to avoid too many formalities	255	78,90%
	I didn't have any money to go to the hospital	56	17,30%
	To take care of the "djokombe" (diaper dermatitis)	20	6,20%
	To care « intra-abdominal cords » (abdominal spasms)	18	5,60%
	I think that it is a benign illness,	9	2,80%
	To accelerate the walk and finish breastfeeding quickly	3	0,90%
No (n=80)	I don't have enough information, so I am careful	66	82,50%
	I fear complications, dosage errors and adverse drug events	13	16,30%
	It is a banal diarrhea due to the walk on fours	1	1,30%

Table 4. Perception of the parents and practices

	Parents perceptions	Freq	%
Risk awareness (N=323)	Self-medication may have risks	290	72 %
	There may be drug interactions	149	46.10%
Source of information for dosage (N=323)	By myself, considering child's age	139	43.00%
	Doctors and Nurses	95	29.40%
	Old ordonnance	82	25.40%
	Friends and relatives	46	14.20%
	Pharmacists	27	8.40%
Drugs remaining after treatment (N=403)	Notice sheet	14	4.30%
	Stored at home	285	70.70%
	Thrown away	118	28.80%
Doctor spoke about risks of self-medication	Never	318	78.90%
	Sometimes	85	21.10%

Children were brought to hospital for fever (72.7%), respiratory symptoms (45%), digestive (44.2%).

Only 37.8% of the parents asked advice of a physician, nurse or pharmacist to determine the dose. In 21% of the cases, physician spoke to the parents of the risks of the self-medication.

3.3 Analytic Data

Factors associated with self-medication were the female sex of parents, the longer duration of the disease before bringing the child to the hospital and home storage of drugs used formerly.

Parents who arrived to hospital few time after the illness began, used self-medication in a lower rate than those who brought children later. Education level did not impact on use of self-medication.

There was no association between educational level and use of traditional medicines (OR = .8 (.4 – 1.6), $P=.3$) or the correct calculation of doses (OR = .5 (.1 – 1.8); $P=.5$). Comparison of means with the Mann-Whitney/Wilcoxon Two-Sample (Kruskal-Wallis) showed that parents of 30 years-old and less gave $1,9 \pm 1,2$ medicines versus $2,3 \pm 1,4$ medicines by those of more than 30 years-old (Test of Kruskal-Wallis 11,9; $P = .0005$).

Table 5. Factors associated with self-medication (N=323; 80.14%)

		Self-medication yes	Self-medication no	OR (95% CI)	P
Parents	Female	302	80		.004*
	Male	21	0		
Education level	low	207	45	1.3 (.8 – 2.2)	.09
	high	116	35		
Illness duration	Up to 2 days	123	39	1.5 (0.9 -2.5)	.04*
	> 2 days	200	41		
Remaining drugs	Stored at home	238	48	1.8 (1.1 – 3.1)	.01
	Thrown away	85	32		

*Mid P exact

The middle length of the illness of the children before the medical consultation was of 4.6 ±5.2 days (median length: 2 days; from 1 hour to 30 days). There was association between education level and duration of symptoms of the illness before consultation (5±5.7 days for the low level versus 3.8±4 days for the high level): Kruskal-Wallis=4.8; *P* = .02.

3.4 Discussion

In this survey, 80% of the parents gave some medicines to their children without medical prescription. This rate is superior to the 59,6% in Kinshasa (Democratic Republic of Congo) [15], 69% found in Italy [5], but lower at 85, 9% found in Morocco [6] and 96% in France [9].

(Table 1) showed a list of the medicines as the ceftriaxone that parents bought themselves without medical prescription in a pharmacy.

We think that this elevated rate can be due to several factors: low economic access to healthcare, weakness in the healthcare organization about welcome of the patients (Table 3), very low coverage of medical insurance [7], failure of the health system like insufficient regulation of the sector of medicines [12].

The high rate of self-medication can be due to the absence of communication by the health professionals about the issue of self-medication (Table 4): 78% of parents never received information during their child's consultation on the risks of self-medication. However, some studies showed an important reduction of this phenomenon after health education [6,8], an example of Brazil where PNAUM exists, i.e.

National Survey on Access, Use and Promotion of Rational Use Medicines) [16]. Lucie Ecker et al. found that Caregivers respected a medical decision of not prescribing an antibiotic 5 times more when physicians had explained the reason for their advice. Caregivers with high school-level education accepted 80% more medical decisions of not using an antibiotic [17].

Our data corroborate the one of the literature because other authors also found poverty [7,14, 18], health system failure [18], the lack of information of parents and their perception of the severity of the illness [19].

As for specific groups of medicines, we found a rate of self-medication with antibiotics of 26,6%. This rate is lower than the 44,8% found Uganda in [20], 62% found in China [14], but lower than the 12,3% found in University Hospital of Kinshasa [15], or the 21,5% found in Ivory Coast [15]. Note that in the Kinshasa survey, only parents received in the emergency department were interviewed.

30% of parents also used antimalarials. In Kinshasa, authors found 20,6% [15] while other found 29,7% in Uganda [15]. Other authors in sub-Saharan Africa, Latin America and south-east Asia regions found self-medication with antimalarials [2,12,18]. In these regions, infectious diseases are a common cause of death [12]. Overall, analgesics and antipyretics, especially paracetamol, were the most used drug, like many other studies found it [1,15,16,20,21]. In this study, up to 19% of parents used traditional African medicines, alone or combined to modern one. Fiston found a rate of 3.9% of African or Chinese traditional drugs [15], Mariafound 72.9 [1]. Despite the fact that they might be related to

serious adverse effects [13], especially when manipulated by non-skilled persons like parents themselves many studies found that phytotherapy improved some health problems [22].

More than half of parents were aware of risks due to self-medication (Table 4), but 46% thought that there might be drug interactions. Adverse drug effects were also found by authors [12]. About the basis on which they estimated the dose, 37,8% of them asked advice from nurses, doctors, pharmacists and 4,3% read the notice sheet. Most of them estimated the dose themselves, like Herbert found it [2]. Therefore, in this study, 58% of them actually gave incorrect doses. You MA found a higher rate of utilization of instructions sheets [3].

About how parents managed drugs after treatment ended, 70.7% stored them at home (Table 5). This enforces self-medication and risks of infant accidental intoxication. Poverty and lack of medical insurance might be causes of this phenomenon.

Hounsna found that, the risk of purchasing antibiotics in the marketplace decreased when patients were covered by medical insurance [7] and Ocan stated that storing medicines at home was a predictor of non-prescription use of antimicrobial medicines [20].

We found that females were more likely to use drugs without prescription. Luca found the same result [5]. In most of sub-Saharan countries, children are principally cared by their mother. Parent's age more than 30 years-old was significantly associated to self-medication. This can be explained by the burden of births in Democratic Republic of Congo: like in many sub-Saharan countries, parents have many children, but have a low income, so that they use non-prescribed drugs to minimize the burden of children healthcare. Before they have physician's drug prescription, they must first pay transport to hospital, consultation, then lab exams.

This study showed that a longer waiting time at home prior to hospital consultation was related to self-medication. Thi Hoan also found it [18]. Storing drugs at home was another predictor of self-medication. Many of this factors can be explained by the low education level.

3.4.1 Limits

In this study, we did not check out the importance of socio-economic level.

In this study, most of interviewed parents had low instruction level and did not use instruction sheet that could tell them if the drug they used was an antibiotic. Many of them did not bring to drugs in consultation to allow a correct description by the physician. This introduced bias. Recall bias must also be considered for two reasons. First, because some parents arrived to hospital more than 5 days later since their children's disease have begun. Second, many parents are so upset when their children are sick, especially when they present life-threatening symptoms (like seizures) that they might forget details.

4. CONCLUSION

The rate of children self-medication is high at Kisangani. Communication of health professionals, doctors, nurses and pharmacists is needed to reduce it.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

ETHICAL APPROVAL

This study had the agreement of research Authorities of the Faculty of Medicine and Pharmacy (University of Kisangani). Only parents who accepted freely to answer to our questions were interviewed. Collected Data were anonym and not available to people who were not involved in the survey.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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