Original Article

SELF-MEDICATION WITH ANTI-MALARIAL MEDICINES AMONG HIGH SCHOOL STUDENTS IN DAR ES SALAAM, TANZANIA

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ABSTRACT

Objective: The objective of this study was to determine the prevalence of self-medication with anti-malarial medicines among high school students in Dar es Salaam, Tanzania and to assess their knowledge on malaria and the dangers of self-medication.

Methods: A pre-tested questionnaire was used in data collection. Data obtained include demographic characteristics, use of anti-malarial medicines without prescription in the past six months, knowledge on malaria, knowledge on the dangers of self-medication, type of anti-malarial used for self-medication, the source of medicine and reasons for self-medication. Data were analyzed using SPSS version 20. Descriptive analysis was undertaken and the chi-square test was used to test significant differences in proportions between the different variables. A p-value of less than 0.05 was considered to be statistically significant.

Results: A total of 400 students were enrolled in the study. The frequency of anti-malarial self-medication by high school students in Dar es Salaam was 18.5%. The overall students' level of knowledge on malaria and on the dangers of self-medication was low (73.0%). Artemether/lumefantrine and malafin® tablets were the most frequently used medicines for self-medication with a prevalence of 45.9% and 38.5% respectively. Past experience in treating similar disease, lack of money and easy access to anti-malarial medicine emerged as the main factors influencing their self-medication practice.

Conclusion: The prevalence of self-medication with anti-malarial medicines by high school students is relatively high given the low prevalence of malaria in Dar es Salaam. The students demonstrated a low knowledge on malaria and on the dangers of self-medication.

Keywords: Malaria, Self-medication, Anti-malarial medicines, Prevalence, Knowledge, High school students, Dar es Salaam, Tanzania

INTRODUCTION

In 2015 there were between 148 and 304 million new cases of malaria worldwide and it was estimated to kill around 732 000 people in whom 92% of the deaths are estimated to occur in Sub Saharan countries affecting mainly children [1]. Self-medication with anti-malarial medicines are commonly practiced globally especially in developing countries and therefore raising concerns to policymakers as it can lead, but not limited to the development of drug resistance, and under or overtreatment. Self-medication is the selection and use of medications to treat self-recognized or self-diagnosed conditions or symptoms without physicians' prescription [2]. Several studies have reported self-medication practice among adults and students in developing countries [3-7], but very few in Tanzania [8-11]. Chipwaza *et al.*, conducted a study in the Kilosa district in Tanzania, on self-medication and revealed that self-medication with anti-malarial medicines is a fairly common practice among adults [8]. However, the extent and knowledge in urban, educated Tanzanian youths like high school students on self-medication with anti-malarial medicines have not been reported knowing that they might have the low insight of the risk; more knowledge about the medicines and their use and therefore likely to evade seeking medical help from health facilities [12].

Studies carried out elsewhere have demonstrated a number of influential factors for self-medication practice including the level of education, family influence, easy availability of medicines, mild illness, previous experience of treating similar illness, economic status, lack of availability of healthcare personnel and exposure to advertisements [13-15]. Despite the reported decline in malaria transmission, morbidity and mortality in Dar es salaam [16], fever is still a major complaint in many outpatients which points out to the importance of non-malaria febrile illnesses. In these areas with low prevalence of malaria-like Dar es Salaam [16, 17], the symptoms like fever and headache which are common symptoms of various other diseases are likely to be confused with symptoms of malaria leading to self-misdiagnosis and therefore improper self-treatment.

Several risks are being associated with self-medication practice, including misdiagnosis, wrong selection of medicines, poly-pharmacy or under-dosage, delays in seeking proper management and prolonged duration of use. Other potential risks could include the development of adverse medication reactions, dangerous medicine interactions and masking of severe diseases and development of medicine resistance. Under-dosage in hyperparasitaemia has been linked with the development of resistance [18]. Development of medicine resistance has been a big problem in Tanzania and this has led to the several changes of malaria treatment regimen like the change from chloroquine to Sulphonamide based combinations and later on to artemisinin-based combinations (ACTs) [11, 19-21].

This study therefore aimed (i) to find out the prevalence of self-medication practice in high school students in the past six months, (ii) to determine the factors associated with anti-malarial self-medication by high school students, (iii) to determine the most common anti-malarial medicine used by high school students for self-medication, (iv) to determine the knowledge of high school students regarding malaria and the dangers of self-medication, (v) to determine the reasons for not consulting medical doctors, (vi) to determine the sources of medicines for self-medication and (vii) to determine the most common medicines used for self-medication.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted between March 2016 and April 2016 in all municipalities of Dar es Salaam, Tanzania.

Study setting and sampling techniques

A list of all high-level secondary schools in Dar es Salaam was obtained from the Ministry responsible for education in Tanzania. Simple random sampling technique was used to get the sample of schools to be studied from each municipality. All high school students from each selected schools who were willing to participate in this study were enrolled.

Data collection

Data collection involved direct interviews using a questionnaire adapted from previous similar studies and it was consisting of both open and close-ended items. The questionnaire consisted of three parts including a section on demographic characteristics, a section on prevalence and a section for assessing students' knowledge. The questionnaire helped in gathering facts about respondent's practice of self-medication with anti-malarial medicines and their knowledge on the implications of practicing self-medication. The questionnaire was pre-tested in two high-level secondary schools in Dar es Salaam 1 mo before the commencement of the actual data collection and it involved 20 students with 10 students from each school. The pre-testing helped in re-structuring the questionnaire whereby all ambiguous questions were corrected and all irrelevant questions were omitted.

Assessment of knowledge

Questions were mainly based on knowledge on malaria and on the harmful effects of self-medication. In total there were 21 questions for assessing knowledge of the students regarding the symptoms of malaria, awareness of the risks associated with self-medication and diseases which manifest similar symptoms like malaria. One point was awarded for each correct answer/information given, and a zero point

for the wrong answer or failure to provide the expected response. A knowledge scale was prepared and the score varied from 0-21 points and was classified into 3 levels according to the Blooms' cut off point. Based on the total score, the students' knowledge was then graded as low (0-11), medium (12-15) and high (16-21).

Data analysis

Data were analyzed using SPSS version 20. Descriptive analysis was undertaken and the chi-square test was used to test significant differences in proportions between the different variables for the study. A p-value of less than 0.05 was considered to be statistically significant.

Ethical issues

The study was approved by Muhimbili University of Health and Allied Sciences. Permission to conduct the study in the selected schools was sought from the ministry responsible for education in Tanzania through their district offices.

RESULTS

Demographic characteristics

A total of 400 high school students were enrolled to participate in this study whereby 68% were male. The participants' age range was 16–27 y with the majority of them falling in the age group of 19–21 y (69.4%), fig. 1. Sixty-four percent of the participants were form five students and the rest were form six students. Majority of the study participants (66.3%) were science students while the rest were arts and business students. The study participants were obtained in all municipalities of Dar es Salam with 33% of students from each municipality.
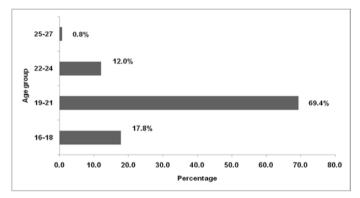

Fig. 1: Percentage distribution of age groups among study participants (n=400)

Table 1: Association between the frequency of anti-malarial self-medication and selected demographic variables among school students in Dar es salaam (n=398)

Respondents' characteristics	Not self-medicated	Self-medicated	P-value
Gender			0.214
Male	109 (85.2%)	19 (14.8%)	
Female	216 (80.0%)	54 (20.0%)	
Class Level			0.36
Form five	210 (82.4%)	45 (17.6%)	
Form six	114 (80.3%)	28 (19.7%)	
Age			0.082
16-18 y	59 (83.1%)	12 (16.9%)	
19-21 y	232 (83.8%)	45 (16.2%)	
22-24 y	33 (68.8%)	15 (31.3%)	
25-27 y	2 (66.7%)	1 (33.3%)	
Subjects combination			0.287
Science	219 (83.6%)	43 (16.4%)	
Arts	95 (79.2%)	25 (20.8%)	
Business	9 (69.2%)	4 (30.8%)	
School's Municipality			0.028
Temeke	115 (87.1%)	17 (12.9%)	
Ilala	111 (82.8%)	23 (17.2%)	
Kinondoni	100 (74.6%)	34 (25.4%)	

n=398

Prevalence of self-medication

This study revealed the prevalence of high school students practising self-medication with anti-malarial medicines to be 18.5%. The study also determined the prevalence of self-medication based on different characteristics including gender, age, class level, school municipality and subject combination table 1. There was a statistically significant difference in prevalence of anti-malarial self-medication based on the school's municipality (p=0.028). However, there was no statistically significant association in the prevalence of students' anti-malarial self-medication practice with respect to the rest of the characteristics.

Reasons for self-medication with anti-malarial medicines

The most common reasons for self-medication with anti-malarial medicines were the previous experience of treating similar illness (24%) and easy availability of medicines (18.4%) as shown in table 2.

Anti-malarial medicines utilized in self-medication

The commonest anti-malarial medicines mentioned to be used by the students for self-medication were artemether/lumefantrine (ALu) (45.9%) and Malafin® (pyrimethamine/ sulfamethoxy-pyrazine) (38.5%), fig. 2.

Table 2: Percentage distribution of reasons for doing self-medication among high school students in dar es salaam (n=141)

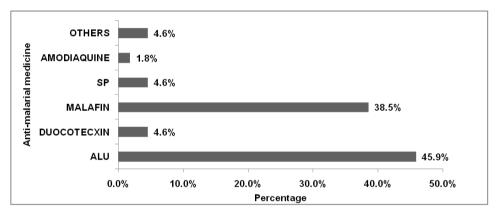| Factor	Count	Frequency (%)
Mild illness	9	6.4
Previous experience of treating a similar illness	34	24
Lack of money for visiting the health center	21	14.9
Lack of health care center	12	8.5
Easy availability of medicines	26	18.4
Difficult in accessing the healthy centers	6	4.3
No time	9	6.4
Poor service provided in health centers	14	9.9
Afraid of hospital procedures	10	7.1

n=141

Fig. 2: Percentage distribution of medicines used by high school students for self-medication (n=109)

Knowledge on malaria and dangers of self-medication

The study revealed that majority of high school students had low knowledge on malaria and dangers of self-medication with anti-malarial medicines (73.3%) and a very few high knowledge (6.5%) fig. 3. When asked about the source of their knowledge, majority of the students mentioned mass media mostly television and radio.
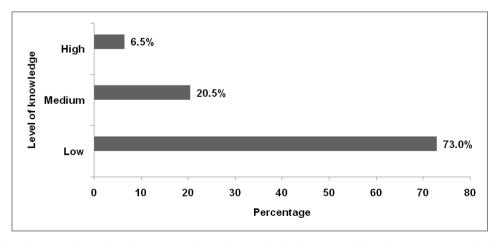

Fig. 3: Percentage distribution of knowledge levels regarding malaria and the dangers of self-medication among school students in dar es salaam (n=353)

The study also determined the knowledge of the students on malaria and dangers of self-medication based on different characteristics including gender, age, class level, school municipality and subject combination table 3. Chi-square test did not reveal any significant difference in levels of knowledge of the high school students on malaria and the effect of self-medication with anti-malarial medicines based on all respondents' characteristics.

Table 3: Association between knowledge regarding malaria and the dangers of self-medication and selected demographic variables among high school students in dar es salaam (n=398)

Variable	Knowledge count (%)			
	High level	Moderate level	Low level	P-value
Gender				0.491
Male	10 (7.8%)	29 (22.7%)	89 (69.5%)	
Female	15 (5.6%)	53 (19.6%)	202 (74.8%)	
Class Level				0.653
Form five	17 (6.7%)	50 (19.6%)	188 (73.7%)	
Form six	7 (4.9%)	32 (22.5%)	103 (72.5%)	
Age Group				0.232
16-18	3 (4.2%)	20 (28.2%)	48 (67.6%)	
19-21	18 (6.5%)	51 (18.4%)	208 (75.1%)	
22-24	4 (8.3%)	11 (22.9%)	33 (68.8%)	
25-27	1 (33.3%)	0 (0%)	2 (66.7%)	
Subjects combination				0.957
Science	15 (5.7%)	55 (21.0%)	192 (73.3%)	
Arts	9 (7.5%)	23 (19.2%)	88 (73.3%)	
Business	1 (7.7%)	3 (23.1%)	9 (69.2%)	
School municipality				0.118
Temeke	11 (8.3%)	30 (22.7%)	91 (68.9%)	
Ilala	5 (3.7%)	33 (24.6%)	96 (71.6%)	
Kinondoni	10 (7.5%)	19 (14.2%)	105 (78.4%)	
Participating School				0.165
Kibasila	6 (10.9%)	13 (23.6%)	36 (65.5%)	
Jitegemee	5 (6.5%)	17 (22.1%)	55 (71.4%)	
Tambaza	1 (1.6%)	12 (18.8%)	51 (79.7%)	
Azania	4 (5.7%)	21 (30.0%)	45 (64.3%)	
Makongo	8 (9.5%)	11 (13.1%)	65 (77.4%)	
Tegeta	2 (4.0%)	8 (16.0%)	40 (80.0%)	

n=398

DISCUSSION

The obtained prevalence of self-medication with anti-malarial medicines by high school secondary students in Dar es Salaam was high but relatively low (18.5%) when compared to other reports elsewhere in malaria endemic areas [2-6]. The level of knowledge of the students on malaria and the dangers of self-medication was inadequate whereby the majority scored low (73.0%). Artemether-lumefantrine (ALu) and malafin® a brand which contains sulfamethoxypyrazine/pyrimethanine (SMP) tablets were the most preferred medicines for self-medication.

In areas with low prevalence of malaria-like Dar es Salaam where there are reports on decline in malaria transmission, morbidity and mortality [16], the prevalence of 18.5% observed with anti-malarial self-medication could be regarded as high since there is a huge possibility that people might be treating a quite different disease with anti-malarial medicines. In these areas, the symptoms like fever and headache which are common symptoms of various other diseases are likely to be confused with symptoms of malaria leading to self-misdiagnosis and therefore improper self-treatment. Improper diagnosis of the disease might lead to increased morbidity and risk of emergence of multiple resistant strains of the causative organism. It has been reported that, among adults and in areas where malaria is less common, a policy calling for treatment of all fevers results in substantial overtreatment [22].

The reasons for self-medication were similar to those reported by many other studies conducted elsewhere whereby past experience in treating similar disease, lack of money and easy access to anti-malarial medicine emerged as the main factors influencing their self-medication practice [13, 15, 23]. The study revealed that ALu and SMP were the most common anti-malarial medicines used in the practice of self-medication, results which are supported by a study done in Kilosa district, Tanzania which reported similar antimalarials to be used for self-medication [8]. In Tanzania SP and SMP have been reserved by Tanzania Food and Drug Authority for intermittent preventive treatment in pregnancy (IPTp) and yet a substantial number of students in this study reported to use SP and SMP for treatment of malaria. These sulfonamide-based combinations were replaced by ACTs due to the development of resistance. The students reported that they easily obtained the anti-malarial medicines for self-medication from registered pharmaceutical outlets including pharmacies, accredited drug dispensing outlets (ADDO) and duka la dawa Baridi (DLDB). There is, therefore, a need for the stakeholders to implement strict policies to control the dispensing of these prescriptions only medicines so that they are used for the intended purpose only.

The knowledge on malaria and the dangers of self-medication was low, suggesting a need for responsible regulatory authorities and healthcare professionals to educate youth and all consumers in general, through public education, on the dangers that may arise from inappropriate medication use in the treatment of malaria and other diseases.

Limitations of the study

This study was limited to self-medication practices with anti-malarial medicines only. It did not expand to other groups of anti-microbial medicines. This limitation, however, does not affect the validity of the results with regard to the parameters assessed.

CONCLUSION

The prevalence of self-medication with anti-malarial medicines by high school students is high given the low prevalence of malaria in Dar es Salaam. Self-medication behaviour did not vary significantly with the majority of respondents' characteristics. The students

demonstrated a low knowledge on malaria and on the dangers of self-medication. Artemether/ lumefantrine and Sulfamethoxy-pyrazine/Pyrimethamine were the most common medicine of choice for self-medication and the main source of these medicines were the registered pharmaceutical outlets. Since most of the medicines used for self-medication were obtained from approved sources, there is a need for regulatory authorities to implement strict policies so that these prescription-only medicines are rationally dispensed.

AUTHORS CONTRIBUTIONS

Marealle and Kirutu had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Both Kirutu and Marealle. *Acquisition, analysis, or interpretation of data*: Both Kirutu and Marealle. *Drafting of the manuscript:* Marealle. *Critical revision of the manuscript for important intellectual content:* Both Marealle and Kirutu.

CONFLICT OF INTERESTS

Declared none

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