

**KNOWLEDGE AND PRACTICE OF PRIMARY PREVENTION OF
RHEUMATIC HEART DISEASE IN PARENTS OF CHILDREN WITH
ACUTE PHARYNGITIS AT KENYATTA NATIONAL HOSPITAL**

BY

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REQUIREMENTS OF THE UNIVERSITY OF NAIROBI FOR THE AWARD OF THE
DEGREE OF MASTER OF MEDICINE IN PAEDIATRICS AND CHILD HEALTH**

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DECLARATION

This dissertation is my original work and has not been presented for the award of a degree in any other University.



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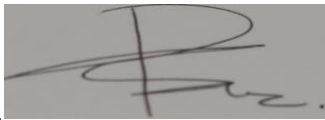
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DEDICATION

To my family for their patience and support throughout the research process.

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ABBREVIATIONS

ARI	Acute Respiratory Tract Infection
ARF	Acute Rheumatic Fever
ERC	Ethics and Research Committee
GAS	Group A Streptococcus
I/M	Intra Muscular
IMCI	Integrated Management of Childhood Illnesses
Kshs	Kenya shillings
KNH	Kenyatta National Hospital
PEU	Paediatric Emergency Unit
RF	Rheumatic Fever
RHD	Rheumatic Heart Disease
UON	University of Nairobi
URTI	Upper Respiratory Tract Infection
WHF	World Heart Federation
W.H.O	World Health Organization

DEFINITIONS

Acute pharyngitis; Symptoms of inflammation of the throat and/ or tonsils present less than one week.

Child: It refers to a young human being below the age of puberty or below the legal age of majority.

Parents: It refers to a person's father or mother.

Knowledge: Facts, information and skills acquired through experience or education.

Practice: Actual use of an idea, belief or method, as opposed to theories relating to it.

Rheumatic Heart Disease: refers to the major long-term sequel of acute rheumatic fever, which involves the cardiac valves leading to stenosis or regurgitation with resultant hemodynamic disturbance.

Sore throat: throat pain, scratchiness or irritation that worsens on swallowing.

Tonsillitis: inflammation of the tonsils.

Exudates: white/yellow material or spots covering the tonsils or the back of the throat.

Palatal petechiae: pinpoint erythematous spots on the soft palate.

ABSTRACT

Background: Group A Streptococcal pharyngitis is an important and common childhood infection with the potential to cause Acute Rheumatic fever and Rheumatic heart disease (RHD). The disease is highly preventable but children rely on their parents who are the primary care givers to meet this need. It is therefore important to know their knowledge and practice regarding primary prevention of RHD in their children.

Objective: To determine the level of knowledge and assess the practice of primary prevention of Rheumatic heart disease among parents of children with acute pharyngitis at Kenyatta National Hospital.

Methodology: Descriptive cross-sectional study design with participants recruited through consecutive sampling. Participants were parents of children aged 3-15 years with acute pharyngitis at Kenyatta national hospital paediatric emergency unit. A total of 330 parents consented, were enrolled and interviewed through a semi-structured questionnaire. Dependent variables were knowledge and practice while independent variables were age, sex, number of people in the house hold, number of shared bedrooms, employment status, source of income and monthly household income. All data collected was analyzed using IBM statistics.

Results: 67.3% of the respondents had poor knowledge. Overall mean score was 55.0%.

80.3% had previously practiced management sore throat in their children, with 86.8% seeking hospital treatment but with a substantial minority (30.4%) not completing treatment.

Conclusion: The participants had poor level of knowledge on primary prevention of RHD. However, majority had practiced sore throat management in their children and had preferred hospital treatment for that episode.

Recommendation: Sore throat awareness should be incorporated into every clinical consultation involving sore throat treatment especially in high risk groups aged 3-15 years.

1. INTRODUCTION

In most parts of the world, a sore throat (pharyngitis) is a frequent childhood ailment. The majority of sore throats are caused by brief viral infections that go away on their own. However, a bacterial infection is responsible for a significant portion of sore throats. Group A Streptococcus (GAS) is the most prevalent cause of bacterial sore throats (1).

GAS is a gram-positive, facultative coccus that lives in chains or pairs. It's a non-motile, non-spore-forming, catalase and oxidase-negative bacteria that causes a wide range of invasive and non-invasive infections. The organism is ubiquitous with human skin and mucous membranes as the only known reservoir.

GAS is responsible for a wide range of infections, but pharyngitis is by far the most important because of the risk of developing Acute Rheumatic Fever (ARF) and Rheumatic Heart Disease (RHD). According to the World Health Organization, there are roughly 616 million new cases of GAS pharyngitis per year worldwide. In the United States, up to 30% of pediatric consultations for Upper respiratory tract infections include sore throat as a symptom. GAS is responsible for 15-20% of all cases in children aged 5-15 years with viruses causing more than 60% of the cases. The main victims of GAS are children who live in poor socioeconomic situations, overcrowded housing, and lack of proper access to essential health services. (1).

Starting with an untreated or inadequately managed sore throat (pharyngitis), the disease advances over time to cause valvular damage of RHD and can cause mortality in some of the world's most vulnerable populations.

Every year, about half a million people suffer from RF, and at least 15 million people live with the consequences of valve damage of RHD (2).

The World Heart Federation has made the elimination of ARF and control of RHD one of the key goals in its strategic plan through 2015 (3).

1.1 Prevalence of GAS pharyngitis ARF and RHD

In a meta-analysis of 17 studies, Shaikh et al carried out in high income countries in 2010, determined the prevalence of GAS pharyngitis to be 37% and was common amongst children aged 5-15 years (4). In Kenya, Kunga et al in a cross-sectional study at Kenyatta national hospital (KNH) pediatric emergency unit in children aged 2 to 15 years presenting with acute pharyngitis, the prevalence of GAS was determined to be 38.4% which is way higher than the worldwide average of 12% (5). This is in keeping with the high prevalence of RHD in Kenya. Therefore, the study stressed the importance of primary prevention of ARF by early detection and treatment of GAS pharyngitis.

RHD is preventable but more than 15.6 million people around the world have been affected with 28, 2000 new cases and 23, 3000 deaths every year. Approximately 79% are from less industrialized countries (6).

1.2 Pathogenesis of GAS and ARF/RHD

Following pharyngeal colonization by GAS, immune cells are mobilized including; neutrophils, macrophages and dendritic cells which then phagocytose the organism and present its antigens to T cells. This leads to antibody production and then T cell activation. In high risk individuals, following a latent period (2-3 weeks), the host immune response against the organism results in an autoimmune reaction which targets the host tissues mainly, the heart, brain, joints and skin, through molecular mimicry. In ARF, the immune response that cross-reacts with the host tissues; will lead to a transitory migratory polyarthritis due to deposition of immune complexes in joints, Sydenham's chorea from the binding of antibodies to the basal ganglia and neurons, in the skin will cause erythema marginatum and subcutaneous nodules due to binding of antibodies to keratin and finally results into the inflammation of heart valves and myocardium. The myocardium usually heals but there can be permanent damage to the valves, leading to RHD (7).

The risk of acquiring ARF after untreated GAS sore throat ranges between 0.3 - 3% and for persons who have had Rheumatic Fever (RF) in the past, the risk rises to 50% (8).

ARF commonly presents in children between the ages of 5-15 years, according to Mayosi et al, with a global incidence of 19 per 100,000 school-aged children. ARF is substantially less common in developed countries, with about 2 instances per 100,000 school-aged children (9). Environmental factors such as overcrowding and poor ventilation, which

facilitate enhanced GAS transmission, are substantially to blame for the high incidence in economically deprived countries (10).

1.3 Diagnosis and treatment of acute pharyngitis

Clinical features due to GAS and viral pharyngitis tend to overlap, however GAS sore throat is usually of acute onset, with fever, headache, vomiting, and abdominal pain usually in the absence of cough. The pharynx appears red, tonsils enlarged and tender cervical lymph nodes (11). However, there is no one symptom or sign that reliably identifies GAS as the cause of pharyngitis, and clinical algorithms such as the modified centor criteria have shown useful in predicting GAS in children. (12).

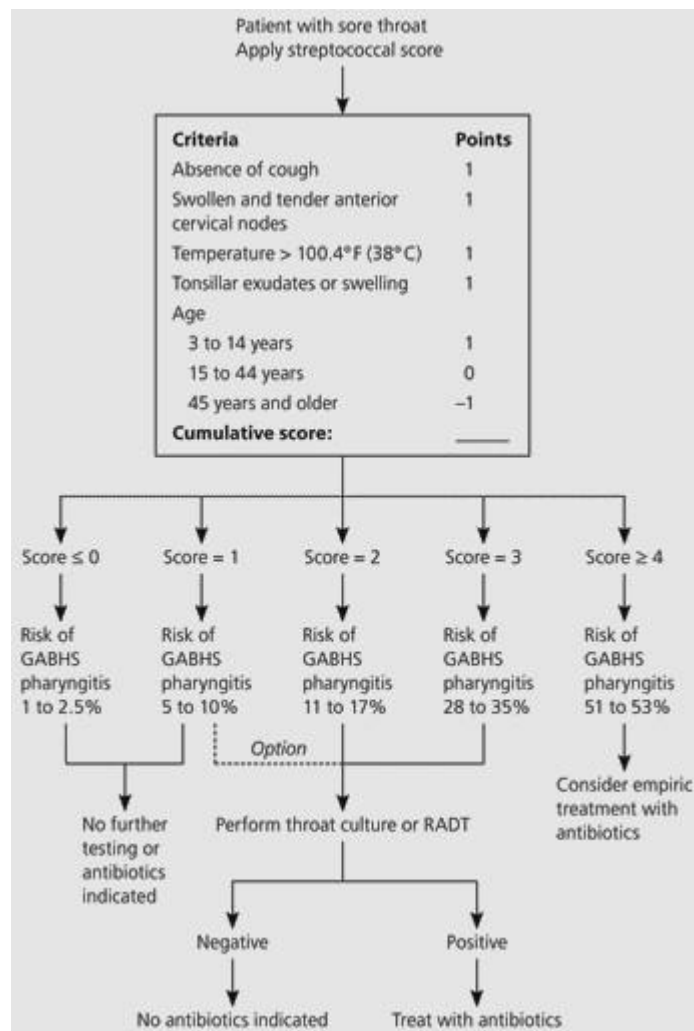


Figure 1: The modified centor criteria

Throat swab for culture and sensitivity remains the gold standard for isolation of GAS, with a sensitivity of between 90-95 % (13). Rapid antigen detection tests have specificity ranging from 90-99%, but sensitivity varies greatly from 72-91% (13).

Treatment of GAS sore throat is not only important to avert the severe complications (pneumonia, rheumatic fever, and tonsillitis) but also to stop the chain of transmission.

The drug of choice for the treatment of GAS is penicillin or amoxicillin administered for ten days and erythromycin for those with penicillin allergy (14). Penicillin is a beta lactam antibiotic which binds to penicillin binding proteins, preventing the formation of peptidoglycans, a main component of the bacterial cell wall, and thereby jeopardizing the bacterial cell's integrity.

1.4 PREVENTION OF RHEUMATIC HEART DISEASE

The prevention of RF/RHD has been divided into four distinct measures; primordial, primary, secondary and tertiary.

Primordial prevention deals with prevention of exposure to GAS and its infections by mainly reduction in overcrowding, poverty & malnutrition and improving access to healthcare. Primary prevention deals with the prevention of Rheumatic fever occurrences in individuals exposed to GAS by treating sore throats with antibiotics and development of a GAS vaccine. Secondary prevention entails regular antibiotics for people at risk of RF recurrences and the establishment of RF/RHD registers. Tertiary prevention deals with avoiding complications of RHD mainly through the medical management of symptomatic RHD and heart surgery to replace damaged valves.

Primary prevention includes educating the community on sore throat awareness, prompt diagnosis of GAS pharyngitis, maintaining GAS pharyngitis Register, developing practical guidelines for treatment of sore throat and maintaining a continuous flow of effective antibiotics, sore throat screening in schools and community health worker education.

Primary prevention as a strategy against RF/RHD has been further broken down into four levels, depending on where the responsibility lies; individual, house hold, community and

tertiary, with the care giver/parent being actively responsible at the first two levels respectively.

a. Individual level

Hand washing: Maintenance of proper hand hygiene, mainly after coughing and sneezing and before preparing foods or eating, and a good respiratory etiquette (including; covering your cough or sneeze). can help to prevent the spread of GAS infection.

Avoid transmissions - People with GAS pharyngitis should stay at home until they are afebrile and have started antibiotic therapy for at least 24 hours.

b. House hold level

Family-centered hygiene and sanitation, nutritional food promotion, reorganizing sleeping arrangements in the family to reduce the number of individuals sleeping in the same room, and supplying soap and water for hand washing, avoiding home based remedies and herbs for treatment of sore throat, stop ignoring sore throat and Complete any prescribed antibiotics for the given period even when the symptoms have subsided.

c. Community level

Community based integrated programs targeting both primary and secondary preventions, Sore throat clinic-in high endemic areas targeting oral and intramuscular treatments, Increase Patient/Community awareness, Sore throat screening programs and treatment in schools, avoid overcrowding in dormitories and classes and Targeted educational campaigns using televisions, pamphlets, workshops, open-air and roadshows.

d. Tertiary care

Integrating sore throat treatments with existing health care systems and into the Non-Communicable Diseases, Register based control programs and improving the knowledge practice gap, Engagement of the county governments, echocardiography screening for early detection and management of RHD may be effective if combined with sore throat screening and RHD as a notifiable disease.

In order to protect vulnerable individuals against GAS infection, public awareness should be created for improving living standards, personal hygiene, and minimizing overcrowding.

In the absence of a GAS infection vaccine, primary prevention of ARF and RHD relies on preventing first attacks of ARF by treating patients with acute sore throat (pharyngitis) caused by GAS infection with a short-term oral or a single intramuscular (IM) penicillin injection. Robertson et al in a Meta-analysis concluded that oral antibiotic treatment of GAS throat infection lessened the attacks of ARF by 70% and by 80% with a single intramuscular penicillin injection (15). Yet primary prevention has been less widely adopted in developing countries including Kenya.

In comparison to secondary and tertiary prevention, primary prevention is the only economically viable alternative. Surgery is frequently required to repair or replace heart valves in individuals with severely damaged valves, which comes at a high cost and is a burden on impoverished countries' scarce health resources. In fact, focusing solely on secondary and tertiary preventions has been found to be financially unsustainable. It is proposed that primary prevention as a viable policy in the treatment of RF and RHD be advocated (16).

The incontrovertible evidence that primary prevention really works stems from Cuba's incredible success in almost fully eradicating RF with robust programs that include a primary prevention component. A comprehensive 10-year RF/RHD prevention programme between 1986 and 1996 was carried out in the Cuban province of Pinar Del Rio and its effectiveness evaluated five years later. The project included both primary and secondary prevention of RF/RHD, training of health personnel, health education, and dissemination of information, community involvement and epidemiological surveillance. Permanent RF/RHD registers were established at all hospitals, and educational activities and training workshops were organized at all health care facilities. Thousands of pamphlets and hundreds of posters were distributed, and special programmes were broadcast on the public media to advertise the project. The frequency and severity of acute RF and RHD gradually declined, with a marked decrease in the prevalence of RHD in school children from 2.27 patients per 1000 children in 1986 to 0.24 per 1000 children in

1996. The incidence and frequency of ARF in 5-25 year olds also showed a pronounced and gradual decrease from 18.6 patients per 100 000 in 1986 to 2.5 per 100000 in 1986 (17).

Measures of primary prevention of RHD have been gaining momentum in Kenya especially from Non- governmental organizations disturbed by the perpetual pervasiveness of ARF and RHD in the country. The Mater hospital in Nairobi runs a charitable community (primary and secondary schools of neighboring slum dwellings) project of RHD prevention and control activities under the following objectives; RF/RHD awareness, screening and treating sore throats, provision of secondary prophylaxis, surgical intervention planning, and follow-up care services.

The Kenyan heart national foundation established a school based ‘talking walls’ campaign-to educate school going children on prevention and control of RHD: A school wall painted with symptoms of a GAS sore-throat in 19 schools and A heart diagram with the aim of preventing RHD through early detection of GAS sore-throat followed by the correct treatment.

The government of Kenya through the ministry of health included treatment of sore throat in the 2018 cardiovascular guidelines with amoxicillin and cephalexin for penicillin allergy, and has advocated for sore throat awareness at all levels of health care.

2. LITERATURE REVIEW ON PARENTS' KNOWLEDGE AND PRACTICE OF PRIMARY PREVENTION OF RHD

Children usually depend on their parents/guardians to meet their health care demands. Indeed, primary prevention of Rheumatic heart disease puts a great burden and responsibility on the parent to not only be able to recognize the likely symptoms of sore throat in their children but also that adequate management is carried out, this involves presenting the child to a health facility in a timely manner and adhering to any treatment which is provided. Because of this responsibility, there is a concern regarding the level of knowledge and awareness of parents/guardians in this area.

However, a search of the literature shows that no local studies have been done to assess the parents' knowledge and practice on primary prevention of RHD in their children and only a few at the international level.

A cross-sectional study in Nepal by Bhattarai et.al to determine the knowledge and practice of sore throat among parents in the primary prevention of RHD: 72% of the respondents mentioned pain in swallowing as a symptom of sore throat and 38% said fever. On predisposing factors, 80% of participants said cold weather while only 4% said poor nutritious diet and only 42% said sore throat is communicable. 90% said treatment of sore throat is important, but only 13.5% mentioning RHD as a complication of sore throat (18).

In the same study, 82% of the participants had practiced sore throat management for their child in the past and 56% said their children had had pain in swallowing while 48.7% had had fever as the symptom. 55.5% used both home remedies (mainly honey and warm salt gargle) and hospital treatment but their first choice was home remedies, while 20% chose hospital treatment only.

In another cross-sectional study by Hailu et al in Northern Ethiopia to know the level of understanding of pharyngitis on RHD prevention in the community: 95% and 93% said pain in swallowing and fever were symptoms of sore throat respectively and only 6.2 % knew that sore throat is related to heart disease. Furthermore, 43.3% of the participants preferred hospital treatment for their children with sore throat but 13.4% would use only home remedies (19).

In a cross-sectional study in Guilan province of Iran by Kasmaei et al to determine Mothers' knowledge of sore throat in relation to RF and RHD: Among the 443 respondents, only 10.5 % knew heart disease as a complication of sore throat but 86% of participants would seek hospital treatment for sore throat (20).

Nkoke et al in a cross-sectional study to determine the awareness levels on sore throat in the prevention of RHD in patients attending Buea regional Hospital outpatient services in South West Cameroon: up to 71.1% did not know the consequences of not correctly treating sore throat and above 70% of the respondents were unaware of the association between sore throat and heart disease. 35.8% of the respondents would rely on a health care worker for sore throat treatment (21).

3. STUDY JUSTIFICATION AND UTILITY

The best preventive measure against Rheumatic heart disease is early diagnosis and appropriate timely treatment of GAS pharyngitis. Local studies have confirmed the high prevalence of GAS pharyngitis in Kenya. No studies have been done locally on the parents' level of knowledge and practice of primary prevention of RHD and a few done internationally cannot be applied to the local population due to cultural and economic differences.

The first step in the development of an effective educational program for parents related to primary prevention of RHD in their children is to determine which mothers are in greatest need of an educational program.

On the basis of this evidence, health care providers, government and other responsible bodies will plan origination and provision of culturally relevant interventions aimed at improving parents' knowledge and practice of primary prevention of RHD and this will go a long way in reducing the incidence of RHD in the country.

4. RESEARCH QUESTION AND STUDY OBJECTIVES

4.1 Research question

What is the knowledge and practice of primary prevention of Rheumatic heart disease in parents of children with acute pharyngitis at Kenyatta National Hospital?

4.2 Primary objective

To determine the knowledge and assess the practice of primary prevention of Rheumatic heart disease in parents of children with acute pharyngitis at Kenyatta National Hospital.

4.3 Secondary objective

To determine the association between socio- demographic factors of the parents and satisfactory knowledge of acute pharyngitis

5. STUDY METHODOLOGY

5.1 Study design

Descriptive cross-sectional.

5.2 Study population

Parents of children aged 3-15 years, diagnosed with acute pharyngitis at Kenyatta National Hospital pediatric emergency Unit.

5.3 Sample size.

This was determined using the sample size formula for estimating proportions by Cochran W. G. (1963)

$$n = \frac{z^2 * N * p(1 - p)}{ME^2 * (N - 1) + (z^2 * p(1 - p))}$$

Where;

$Z^2 = 1.96$ (critical value at 95% confidence)

$N = 2100$ (estimated target population)

$p = 50\%$ estimated proportion of parents with correct practice for the management of RHD

$ME = 0.05$ (Margin of error of the estimate)

$n = 325$ **Parents.**

5.4 Sampling method

Participants were enrolled through consecutive sampling

5.5 Inclusion criteria

1. Parents who had a child aged 3-15 years, with acute pharyngitis.
2. Parents who consented to the study.

5.6 Exclusion criteria

Parents who had a child with recurrent pharyngitis due to a predisposing medical condition, for example, adenoid hypertrophy, cleft palate etc.

5.7 Study setting

The study was done at the Pediatric Emergency Unit (PEU), a pediatric outpatient unit of KNH, which is a specialized referral and teaching tertiary level hospital, the largest in Kenya, located in Nairobi's Upperhill area, the capital of Kenya. Approximately 50,000 children are seen annually at the Unit, this is where triage is done.

The unit has both paediatric registrars (doctors specializing in pediatrics) who see patients requiring urgent/emergency care and clinical officers specialized in pediatrics who see mainly stable patients. An estimated 700 patients presenting with Pharyngitis are seen monthly at the unit by a specialized pediatric clinical office

5.8 Study period

November 1st 2020 to January 31st, 2021

5.9 Operational definition

Acute pharyngitis; at least two of the following symptoms/signs present for less than one week; absence of cough, temperature above 38⁰C, swollen and tender anterior cervical nodes and tonsillar exudates or swelling. This gives a modified centor score of at least 3.

5.10 Study procedures

Study approval was sought from the Ethics and Research Committee of Kenyatta National Hospital –University of Nairobi (KNH-UON ERC).

Following the necessary approval to carry out the study, two assistants who were qualified pediatric clinical officers underwent a half day training by the principal investigator on how to examine patients for presence of; fevers, tender anterior cervical nodes and tonsillar exudates or swelling, and data collection.

A research assistant was stationed at the consultation room and was alerted by the treating clinician after a diagnosis of acute pharyngitis had been made. The children were then re-examined by the research assistant for a modified centor score of at least 3 for acute pharyngitis. Parents whose children satisfied the criteria for acute pharyngitis were asked for consent to participate in the study, only one parent or guardian per child was selected. The investigator led the consent talk and verified that the informant had comprehended the material on the consent form. Before completing the consent form, the informant was given the opportunity to ask any important questions about the study. The consent was given voluntarily and without coercion. It was made clear that participation in the study was entirely voluntary, and that not doing so would have no negative implications. A brief introduction, information on the study, its objective, and the potential benefits and hazards of participating in the study were all included on the consent forms. It also included details on how to protect the participants' anonymity and how the study's findings would be shared.

5.11 Materials

5.11.1 Examination materials

Disposable Gloves, Surgical Masks and Goggles, Examination Torch, Tongue Depressors, Alcohol based hand sanitizer and non-contact Digital thermometer.

5.11.2 Questionnaire (Appendix 1)

The questionnaire (Adopted from past study) was pre-tested and semi-structured.

The tool included a section on the socio-demographic data of the participants: age, sex, address, and number of people in the household, number of shared bedrooms, level of education, employment status and monthly household income.

A section on participants' knowledge had 7 questions regarding signs and symptoms, predisposing factors, communicability and complications of acute pharyngitis (sore throat) and 5 questions on the section on their practice regarding previous episode of acute pharyngitis in the child.

5.12 Data collection and analysis

The questionnaires were administered via interview by the investigators.

Data was collected using Kobo Collect system and entered into a password protected Kobo Toolbox Database. The consent forms from the study participants were stored in a

lockable cabinet during collection and after analysis. Upon completion of Data collection, hard copy consent forms were compared with the entered data to confirm synchrony.

The knowledge component was graded, with each correct response receiving one point and each incorrect response receiving a zero. Percentages were calculated from the total scores. Original Bloom's cut off points (appendix IV) were used to categorize level of knowledge for subsequent assessment: Good knowledge ranges from 80 to 100 percent; moderate knowledge ranges from 60 to 79 percent; and poor knowledge is from 60 to 100 percent. In the analysis, the first two categories were grouped together as "sufficient knowledge."

Bloom's original cut off points
80 – 100% - Good Knowledge
60- 79% - Moderate Knowledge
<60% - Poor Knowledge

Table 1: Bloom's original cut off points

Descriptive statistics were used to summarize discrete data using frequencies and percentages, and continuous variables using measures of central tendency and dispersion like mean, median, and standard deviation.

Individual independent variables were evaluated in connection to knowledge using stepwise logistic regression. For all significance tests, a 0.05 alpha level was employed.

All analysis was done using IBM Statistics Software Version 21.

6. ETHICAL CONSIDERATIONS

A written legal permission regarding the study was obtained from KNH-UON ERC prior to the study.

Confidentiality of the participants was maintained during the study and will be maintained during dissemination of results. Participants were given study identification numbers and no personal identifiers like names were used.

The participants were required to give informed consent after carefully explaining to them the study procedures and purpose of the study.

The investigators made it clear that the study was voluntary and non-participation would have no consequences.

The information gathered will only be used to improve health-care delivery and for academic reasons. As a result, the findings of this study will only be shared with relevant stakeholders, such as the University of Nairobi, Kenyatta National Hospital's Department of Paediatrics, and Kenya's Ministry of Health's Division of Child Health, in order to improve service delivery. The information you provide will only be used for the intended purpose.

The raw surveys will be safely destroyed by shredding and burning after the data has been extracted.

7. RESULTS

A total of 670 children were screened, out of which 357 parents were eligible but 27 declined to consent and 330 parents met the inclusion criteria and were enrolled as participants.

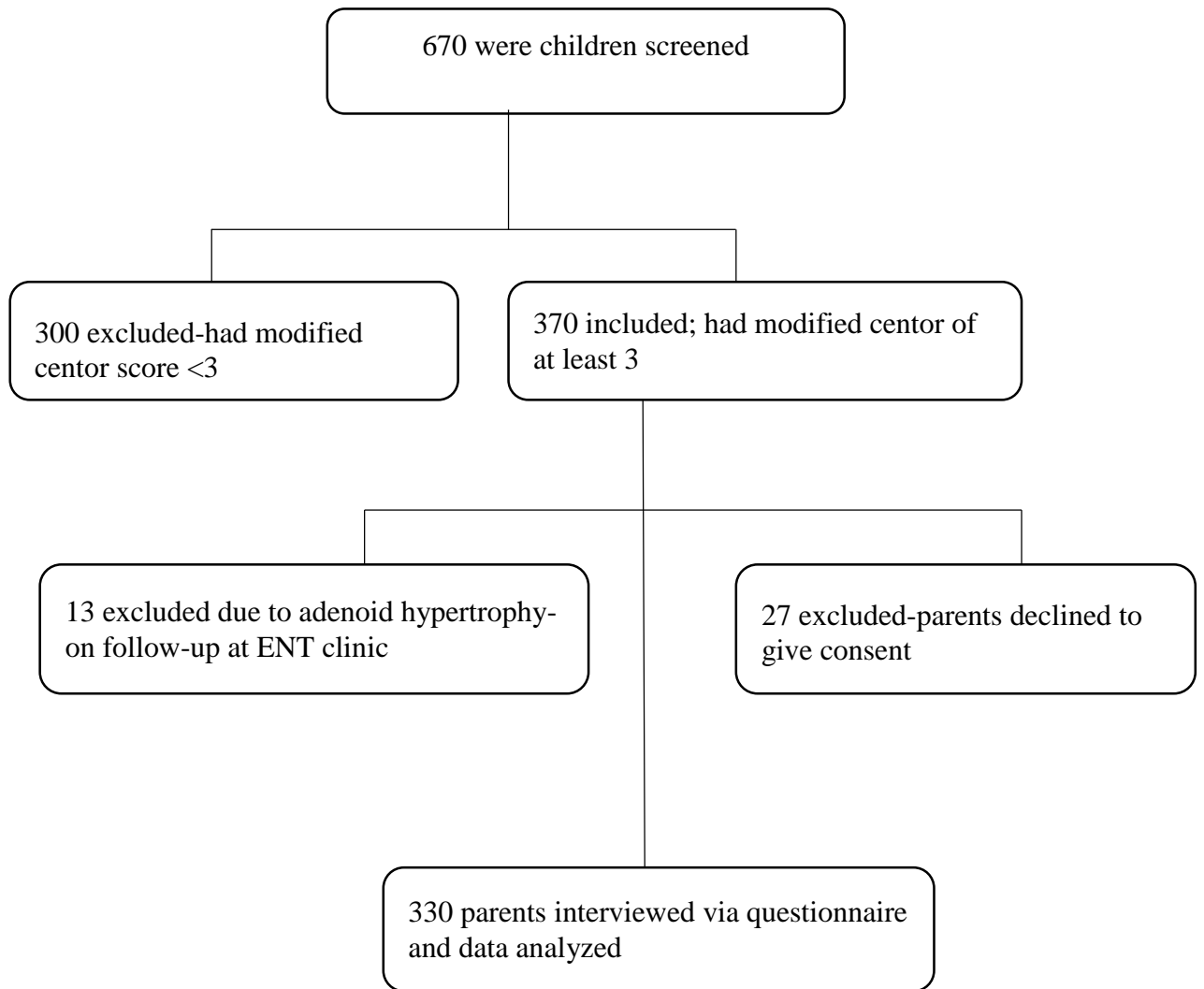


Figure 2: Flow chart of data collection

Table 2 Demographic data

CHARACTERISITICS (N=330)		n/(%)
Age (mean age-31 years)	Up to 30 years	144(43.6)
	30 - 40 years	150(45.5)
	> 40 years	36(10.9)
Sex	Male	178(53.9)
	Female	152(46.1)
Residence	Urban	256(77.6)
	Rural	74(22.4)
Number of people in household (average 5 people)	< 5 people	116(35.2)
	At least 5 people	214(64.8)
Number of bedrooms (average 2 bedrooms)	< 3 bedrooms	330(100)
	At least 3 bedrooms	0(0)
level of education	None	0(0)
	Primary	50(15.2)
	Secondary	190(57.6)
	Tertiary	90(27.3)
Employment status	Employed	229(69.4)
	Unemployed	101(30.6)
Source of income	None	28(8.5)
	Formal employment	108(32.7)
	Informal	194(58.8)
	employment	
House hold monthly Income	Upto Ksh 3000	30(9.1)
	Ksh 3001-10000	74(22.4)
	Ksh 10001-20000	90(27.3)
	Ksh 20001-30000	64(19.4)
	Over Ksh 30000	72(21.8)

Mean age of parents was 32 years, of these, 178 (53.9%) were male, 152 (46.1%) were female, with an average of five (5) persons living in the household and an average of 2 shared bedrooms per home. Highest level of education attained was secondary (57.6%), majority were employed (69.4%) but in the informal sector (58.8%) and with a house hold monthly income of below 20,000 Ksh.

Table 3: knowledge on sore throat

Characteristics (N=330)	Yes: n (%)
Signs and symptoms of sore throat	
Painful swallowing	326(98.7)
Headache	187(56.7)
High fevers	294(89.0)
Nausea and vomiting	134(40.6)
Abdominal pain	32(9.7)
Predisposing factors of sore throat	
Poor ventilation	94(28.5)
Cold weather	320(97.0)
House hold crowding	111(33.6)
poor nutritious diet	4(1.2)
Communicability of sore throat	171(51.8)
Is treatment of sore throat important?	310(93.9)
Can sore throat result into heart disease?	165(50)
Is information of sore throat important?	304(92.1)
Where can we get information on sore throat	
Health personnel	313(94.8)
Media	172(52.1)
Others	5(1.5)

Commonest symptom was painful swallowing (98.7%) and commonest predisposing factor was cold weather (97%).

Others (a); Family/friends)

Treatment of sore throat was stated to be important (93.9.0%). Half (50%) knew that sore throat can lead to heart disease and majority (92.1%) said information on sore throat was important.

Table 4: Categorization of participants' knowledge level according to bloom's cut off points.

Cut off point (N=330)	N (%)
Poor Knowledge (<60%)	222 (67.3%)
Moderate Knowledge (60-80%)	87 (26.4%)
Good Knowledge (80-100%)	21 (6.4%)

The average score was 55.0% (SD 14%)

Most (67.3%) of participants had a poor level of knowledge.

Table 5: Practice related to sore throat management in the child

Characteristics	n (%)
Previous episode of sore throat? (N=330)	265(80.3)
What signs and symptoms did the child have (N=265)	
Painful swallowing	284(97.4)
Headache	99(34.7)
High fevers	263(87.9)
Nausea and vomiting	58(20.8)
Abdominal pain	4(1.1)
How was this sore throat treated (N=265)	
Home remedies alone	27(10.2)
Hospital only	150(56.6)
Home remedies & Hospital	80(30.2)
Pharmacy	7(2.6)
Not done	1(4)
If hospital, treatment used? (N=230)	
Analgesics	185(80.4)
Antibiotics	182(79.1)
Don't know	48(20.4)
Did you complete the dose as prescribed? (N=230)	160(69.6)

Majority of respondents (80.3%) had practiced sore throat management in the child before and painful swallowing was the commonest symptom in children (97.4%), majority 86.8% preferred hospital treatment but a substantial minority (30.4%) did not complete any form of the prescribed treatment.

Table 6: Univariate logistic regression assessing the association between satisfactory knowledge on sore throat and socio-demographic factors.

Characteristics		Knowledge category		OR(95%CI)	P-value
		0%-60% n=222	Above 60% n=108		
		n (%)	n (%)		
Age group	Up to 30	106(47.7)	38(35.2)	ref	
	31 - 40	95(42.8)	55(50.9)	1.615(0.982-2.656)	0.059
	Above 40	21(9.5)	15(13.9)	2.092(0.973-4.497)	0.059
Sex	Male	116(52.3)	62(57.4)	ref	
	Female	106(47.7)	46(42.6)	0.838(0.528-1.331)	0.455
Residence	Urban	156(70.3)	100(92.6)	ref	
	Rural	66(29.7)	8(7.4)	0.181(0.079-0.415)	<0.001
Number of people in household	Less than 5 people	80(36.0)	36(33.3)	ref	
	At least 5 people	142(64.0)	72(66.7)	1.129(0.694-1.835)	0.626
Number of bedrooms	< 3 bedrooms	222(100.0)	108(100.0)	ref	
	At least 3 bedrooms	0(0)	0(0)		
Level of education	None	0(0)	0(0)		<0.0001
	Primary	48(21.6)	2(1.9)	ref	
	Secondary	138(62.2)	52(48.1)	9.217(2.163-39.276)	0.003
	Tertiary	36(16.2)	54(50.0)	36.000(8.228-157.516)	<0.001
Employment status	Employed	140(63.0)	89(82.4)	ref	
	Unemployed	82(36.9)	19(17.6)	0.360(0.205-0.633)	<0.001
Source of income	None	23(10.4)	5(4.6)	ref	
	Formal employment	53(23.9)	55(50.9)	3.980(1.345-11.781)	0.013
	Informal employment	146(65.8)	48(44.4)	1.231(0.426-3.557)	0.701
House hold monthly Income	Upto Ksh 3000	25(11.3)	5(4.6)	ref	
	Ksh 3001-10000	59(26.6)	15(13.9)	1.167(0.377-3.614)	0.789
	Ksh 10001-20000	69(31.0)	21(19.4)	1.292(0.432-3.869)	0.647
	Ksh 20001-30000	39(17.6)	25(23.1)	2.800(0.929-8.442)	0.067
	Over Ksh 30000	30(13.5)	42(38.9)	6.222(2.091-18.519)	0.001

***Satisfactory = Good + Moderate knowledge**

Residency, level of education, employment status, source of income and house hold monthly income, all had a statistically significant association with satisfactory knowledge.

8. DISCUSSION

GAS pharyngitis is a common childhood affliction in resource scarce settings around the world, and when untreated or inadequately treated it progresses over time to cause RF/RHD with significant valvular damage. Local studies have confirmed the high prevalence of GAS pharyngitis at 38.4% (5), way higher than the world wide average of 12%. This study sought to determine the parents' knowledge and practice of acute pharyngitis in their children to enhance understanding of the role they play in averting RF/RHD.

Up to 330 parents met the eligibility criteria and were enrolled into the study. The median age of the respondents was 32 years with 54% being male, and 46% female. Majority, 77.6% lived in the urban areas. Each home had an average of five (5) persons living in the household with an average of 2 shared bedrooms per home. All respondents had some level of education with 15.2% being primary, 57.6% being secondary and 27.2% having tertiary level. Over two thirds, 69.4% were employed with 30.6% being unemployed. A small proportion 8.5% reported having no source of income, 32.7% getting income from formal employment while 58.8% getting income from informal employment. About a fifth 21.8% of the respondents had a monthly income of over KES 30,000 while a small proportion 9.1% were earning a monthly income of below KES 3,000.

In terms of signs and symptoms of sore throat, painful swallowing (98.7%), and high fevers (89.0%) were the commonest features mentioned which was similar to the study by Hailu et al carried out in Ethiopia (21). This was attributed to the closeness of the two countries geographically, making populations almost similar. Abdominal pain at 9.7%, was the least mentioned among the signs and symptoms, this may be because it is perceived to mostly be related to diarrheal disease yet GAS is also known to cause gastrointestinal symptoms.

Regarding knowledge on predisposing factors of sore throat, cold weather was the most frequent predisposing factor mentioned at 97%, while the least common was poor nutrition at 1.2%. This was the same trend seen in a study by Bhuttarai et al in Naples. This can be attributed to the high spread of GAS infections during cold weather as many people crowd in small rooms for warmth. Good nutrition improves the child's immune

system and hence resistance to infections but almost all participants were unaware of this.

On knowledge regarding communicability of sore throat, only half at 51.8% of the respondents answered in the affirmative and this also reflects on only a third (33.6%) mentioning household crowding as a predisposing factor. However, this is less compared to the study by Bhuttarai et al in Naples, this might have been attributed to response bias since there was household crowding in majority of them.

On whether knowledge regarding information on treatment of sore throats was important, majority (93.9%) agreed, just like in the study by Bhuttarai et al in Naples. This will promote participation in awareness programs on sore throat, especially that majority (94.6%) also said they would get information on sore throats from a health personnel. However, this was way higher compared to 35.8% in a study by Nkoke et al in Cameroon, this is probably because it was a community study with poor awareness compared to Bhuttarai et al study which was a hospital based study.

In other knowledge related aspects, only half (50%) indicated that sore throat could lead to heart disease, this is way higher than studies by Bhuttarai et al in Naples (13.5%), Nkoke et al in Cameroon (30%), Kasmaei et al in Iran (10.5%) and Hailu et al in Ethiopia (6.2%). This can be attributed to the mass campaigns by the Non-governmental organizations, which mainly educate on the association of sore throat and heart disease (RHD).

When classified as per Bloom's original cut-off points, majority of respondents in our study (67.3%) had poor knowledge levels (table 4). The average score both in our study (55.0 %, SD 14) and in the study by Bhuttarai et al (58.0%) fall in the category of poor knowledge as per blooms cut of points. It's possible that there is low level of awareness in both settings on sore throat. Logistic regression in our study revealed that; participants in rural areas were unlikely to have satisfactory knowledge compared to the ones residing in urban areas, those with education level higher than primary were more likely to have satisfactory knowledge, those unemployed were unlikely to have satisfactory knowledge compared to the employed, and formal employment and a household monthly income of more than 30,000ksh were also associated with satisfactory knowledge of primary prevention of RF/RHD. This is because residing in urban areas gives one greater

accessibility to information, including health information and also that most campaigns against RF/RHD are based in the poor settlements of the metropolitan area, from where most clients to the study setting come from. Also the higher the level of education, the better the knowledge, including health knowledge, and this is a proxy of employment and a higher household monthly income.

Assessment of participants' practices related to sore throat management, over four fifths (80.3%) reported a previous episode of sore throat in the child, similar to a study by Bhuttarai et al in Naples. Among the symptoms recognized in their children; painful swallowing was the commonest at 97.4%, while abdominal pain was the least at 1.1%, this again being influenced by their knowledge on signs and symptoms of sore throat as above.

Majority (86.6%) had preferred hospital treatment for the sore throat, this is similar to the studies by Kasmaei et al in Iran and Bhuttarai et al in Naples, and this is probably due to response bias as these studies were hospital based. However, a substantial minority (10.2%) used home remedies alone, similar to a study by Hailu et al in Ethiopia, probably due to some similarities in culture as Ethiopia borders Kenya.

In terms of hospital treatment, a great majority (79.1%) received antibiotics higher than in the study by Bhuttarai et al in Naples, this large disparity is due to the increased tendency of parents to demand antibiotics for their children with URTIs, yet the commonest causative agents are viruses and this has propelled antibiotic resistance in our setting, more so that almost a third (30.4) were noted not to complete treatment. This inadequate treatment of GAS pharyngitis can lead to RF/RHD.

9. CONCLUSIONS

1. Majority; more than two thirds (67.3%) of participants had poor knowledge on primary prevention of RHD.
2. Majority of parents recognized that painful swallowing was a major symptom of sore throat, poor ventilation, predisposed the children to sore throat and the importance of treatment; however only 50% recognized that it could lead to RHD.
3. Residency, level of education, employment status, source of income and house hold monthly income, all had a statistically significant association with satisfactory on primary prevention of Rheumatic heart disease.
4. Majority (80.3%) had prior history of sore throat management, where painful swallowing was a major presentation: most (86.8%) had preferred hospital treatment but almost a third (30.4%) did not complete treatment and a substantial minority had used home remedies alone.

10. STUDY LIMITATIONS

1. The study was carried out during a period which is outside the cold season of the geographical location of the study site when GAS pharyngitis is highest, and hence many children present with their first episodes of the infection and this would have given diverse information related to practice of sore throat.
2. A multicenter study would provide more information especially for the rural populations which differ in many aspects of the demographic characteristics.

11. RECOMMENDATIONS

Sore throat awareness should be part and parcel of every clinical consultation involving sore throat/acute pharyngitis treatment especially in high risk groups (3-15 years), this will improve sore throat awareness and go a long way in reducing the incidence of rheumatic fever/rheumatic heart disease

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13. APPENDIX I QUESTIONNAIRE

PART I: Demographic data

1. Date.....
2. Study ID.....
3. Age (completed years)
4. Sex: Male { }
Female { }
5. Residence: urban { }
Rural { }
6. Number of people living in the home.....
7. Number of shared bedrooms in the house.....
8. Highest level of education
None
Primary
Secondary
Tertiary
9. Employment status
Employed
Unemployed
10. Source of income
None
Formal employment
Informal employment
11. House hold monthly Income
Upto Ksh 3000

Ksh 3001-20000

Ksh 10001-20000

Ksh 20001-30000

Over Ksh 30000

PART II: knowledge related questions

1. Signs and symptoms of sore throat
 - A. Painful swallowing
 - B. headache
 - C. high fevers
 - D. nausea and vomiting
 - E. abdominal pain
2. Predisposing factors of sore throat
 - A. Poor ventilation
 - B. Cold weather
 - C. House hold crowding
 - D. poor nutritious diet
3. Communicability of sore throat
 - A. YES
 - B. NO
 - C. DON'T KNOW
4. Is treatment of sore throat important?
 - A. YES
 - B. NO
5. Can sore throat result into heart disease?

- A. YES
- B. NO
- 6. Where can we get information on sore throat
 - A. Health personnel
 - B. Media
 - C. Others.....
- 7. Is information of sore throat important?
 - A. YES
 - B. NO

PART III: practice related questions.

- 1 Have you practiced sore throat management in the past?
 - A. YES
 - B. NO
- 2 If YES, what signs and symptoms did the child have
 - A. Painful swallowing
 - B. headache
 - C. high fevers
 - D. nausea and vomiting
 - E. abdominal pain
- 3 How was this sore throat treated
 - A. Home remedies alone
 - B. Hospital
 - C. Both
 - D. Pharmacy
 - E. Not done

4 If hospital, what type of medicines were used?

A. Analgesics

B. Antibiotics

C. reassurance

D. Don't know

5 Did you complete the dose as prescribed?

A. No

B. Yes

14. APPENDIX II: CONSENT FORM

Study Title: Knowledge and practices of primary prevention of RHD in parents of children with acute pharyngitis at KNH

Study Number:

Investigator; DR. ISMAIL MUKRAISH, MBChB Paediatric Resident, University of Nairobi

Tel; 0723178654

Supervisors: Prof. CHRISTINE Y. JOWI

Professor, department of paediatrics, University of Nairobi.

DR, MARTIN J, ALUVAALA

Lecturer, department of paediatrics, University of Nairobi.

Address: (Department of paediatrics; school of medicine; college of health sciences; University of Nairobi, P.O. BOX 30197, 00100, Nairobi)

Investigator's declaration

This dissertation proposal is my original work and has not been presented for the award of a degree in any other university.

Signed.....Date.....

Dr. Mukraish Ismail (MBChB)

Department of Paediatrics and Child Health, University of Nairobi

Introduction

The prevalence of Rheumatic Fever is still high among children and it typically presents 2-3 weeks after GAS sore throat infection. Therefore, early diagnosis and prompt effective treatment is the best way to prevent RF/RHD. Parent's knowledge and practice regarding management of sore throat (primary prevention) influences the success of this strategy.

Research purpose:

Researchers from the University of Nairobi will conduct the study on parents of children with acute pharyngitis at PEU.

The study aims to determine the knowledge and practices of primary prevention of RHD among parents of children with acute pharyngitis.

Your participation will enable us inform policies on providing information regarding primary prevention of RHD.

Selection of participants:

All parents accompanying children aged between 2 to 15 years of age with acute pharyngitis at KNH are invited.

Voluntary participation and right to refuse:

Your participation in this research is voluntary and no remuneration or compensation will be given to the participants of the study, it's your choice to either participate or not, and regardless of your choice your child will continue to receive all the services as needed.

Duration

The study will be conducted over 90 days, but it will only take no more than 10 minutes to collect the required information from you.

Procedure

The study will involve use of pre-tested structured questionnaires for the parents of children with acute pharyngitis

Safe guarding privacy and confidentiality

The interviewer will keep all the information about you secure. Your name will be deleted from all the records in the study.

A study number will be assigned to the survey questionnaire instead of your name

Risks and benefits

The study has no direct or indirect risks involved.

The information gathered from you will be used to inform policy for the creation of an effective educational program on primary prevention of RHD and this will go a long way in reducing the incidence of the disease.

Problems or questions

If you have any questions about this research or about the use of the results, you can contact the principal investigator:

Dr. Ismail Mukraish by calling 254-723178654.

If you have any questions on your rights as a research participant, you can contact Professor Chindia M.L, secretary, KNH/UoN- ERC by calling Tel. 2726300, ext. 44102, Nairobi.

Certificate of consent

I have read the foregoing information, or it has been read to me and I have had the opportunity to ask questions about it and any questions that I have asked have been satisfactorily answered.

I consent voluntarily to participate as a participant in this research.

Name of participant... Researcher name: Dr. Ismail Mukraish

Signature of participant.....Researcher signature.....

Date Date

Who to Contact

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact any of the following: I understand that if I have questions about this survey or my rights in taking it, I may contact

Name: Dr Ismail Mukraish (Primary Researcher) Mobile Number: 0723178654

Email: kraishysmail@students.uonbi.ac.ke

Kenyatta National Hospital/University of Nairobi Ethics and Research Committee, College of Health Sciences

P. O. Box 19676 00202 Nairobi Tel. (254-020) 2726300-9 Ext 44355

Email: uonknh_erc@uonbi.ac.ke

15. APPENDIX III: FOMU YA IDHINI

Kichwa cha Somo: Ujuzi na mazoea ya kuzuia msingi wa RHD kwa wazazi wa watoto walio na uchungu wa koo huko kwa sibatari kuu ya kenya.

Nambari ya utafiti:

Mtafiti Mkuu Dr. Ismail Mukraish MBChB Nambari ya Simu: - 0723- 178654

Wasimamizi: Prof Christine Yuko-Jowi

Chuo Kikuu Cha Nairobi

Dr. Jalemba Aluvaala

Chuo Kikuu Cha Nairobi

Utangulizi

Kuenea kwa ugonjwa wa homa ya Rheumatic bado uko juu kati ya watoto na kawaida huonyesha wiki 2-3 baada ya maambukizo ya koo ya koo. Kwa hivyo, utambuzi wa mapema na matibabu ya haraka ndiyo njia bora ya kuzuia RF / RHD. Ujuzi na mazoezi ya mzazi kuhusu usimamizi wa koo (kuzuia kuu) huathiri mafanikio ya mkakati huu.

Kusudi la utafiti:

Watafiti kutoka Chuo Kikuu cha Nairobi watafanya uchunguzi juu ya wazazi wa watoto walio na pharyngitis ya papo hapo huko PEU.

Utafiti unakusudia kuamua maarifa na mazoea ya kuzuia msingi wa RHD kati ya wazazi wa watoto walio na pharyngitis ya papo hapo.

Ushiriki wako utatuwezesha kujua sera juu ya kutoa habari kuhusu kuzuia msingi wa RHD. Uteuzi wa washiriki;

Wazazi wote wanaoandamana na watoto wa miaka kati ya miaka 3 hadi 15 walio na pharyngitis ya papo hapo kwa KNH wamealikwa

Kushiriki kwa hiari na haki ya kukataa;

Ushiriki wako katika utafiti huu ni wa hiari na hakuna malipo yoyote au fidia atakayopewa washiriki wa utafiti, ni chaguo lako kushiriki au sio, na bila kujali chaguo lako mtoto ataendelea kupokea huduma zote zinahitajika.

Muda

Utafiti utafanywa kwa zaidi ya siku 90, lakini itachukua sio zaidi ya dakika 10 kukusanya habari inayotakiwa kutoka kwako

Utaratibu

Utafiti huo utajumuisha matumizi ya dodoso zilizopimwa kabla ya majaribio kwa wazazi wa watoto walio na pharyngitis ya papo hapo

Usalama salama wa faragha na usiri

Mhojiwa ataweka habari zote kuhusu wewe salama. Jina lako litafutwa kutoka rekodi zote kwenye utafiti.

Nambari ya masomo itapewa kwa dodoso la uchunguzi badala ya jina lako.

Hatari na faida

Utafiti hauna hatari za moja kwa moja au zisizo za moja kwa moja zinazohusika.

Habari iliyokusanywa kutoka kwako itatumika kufahamisha sera ya kuunda mpango mzuri wa elimu juu ya kuzuia ugonjwa wa msingi wa RHD na hii itaenda mbali katika kupunguza matukio ya ugonjwa huo.

Matatizo au maswali

Ukiwa na maswali yoyote kuhusu utafiti au matumizi ya matokeo unaweza kuwasiliana na mpelelezi mkuu, Daktari M. Ismail kwa kupiga nambari 0723 178654. Kama una maswali yoyote juu ya haki zako kama mshiriki katika utafiti huu, unaweza kuwasiliana na Professor Chindia M.L, katibu, KNH/UoN- ERC, simu.2726300, Ext. 44102, Nairobi

Kukubali kwa muhojiwa

Nimeelezwa vizuri juu ya utafiti huu na nimeelewa. Nimepata fursa ya kuuliza maswali na kujibiwa. Najua kushiriki katika utafiti huu ni kwa hiari yangu na nikikataa sitanyimwa matibabu yoyote ninayopokea. Ninajua kwamba kama nikona swali lolote ninaweza kuuliza Daktari M. Ismail nambari ya simu 0723-178654, ama Professor Chindia M.L, katibu, KNH/UoN- ERC, simu. 2726300, Ext. 44102, Nairobi

Sehemu ya 2: **hada ya Idhini Nambari Maalum:_____**

Nimesoma maelezo yote ya utafiti huu au nimesomewa maelezo haya na nimekuwa na fursa ya kuuliza maswali ambayo yamejibiwa kadri na matarajio yangu kwa njia ya kuridhisha.

Kwa hio, kama mzazi wa: _____ningependa kupeana idhini yangu na pia kujitolea kushiriki kwa utafiti huu.

Jina la mshiriki: _____Sahihi la mshiriki: _____Tarehe: _____

Mtafiti mkuu: Dkt Ismail Mukraish Sahihi ya mtafiti mkuu: _____Tarehe: _____



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13th October 2020

Dr. Ismail Mukraish
Reg. No.H58/11159/2018
Dept. of Paediatrics and Child Health
School of Medicine
College of Health Sciences
University of Nairobi

Dear Dr. Mukraish

RESEARCH PROPOSAL – KNOWLEDGE AND PRACTICE OF PRIMARY PREVENTION OF RHEUMATIC HEART DISEASE IN PARENTS OF CHILDREN WITH PHARYNGITIS AT KENYATTA NATIONAL HOSPITAL (P147/03/2020)

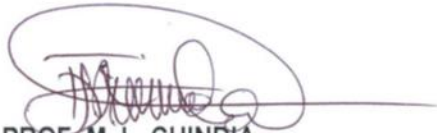
This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 13th October 2020 – 12th October 2021.

This approval is subject to compliance with the following requirements:

- a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- g. Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'M. L. Chindia', enclosed within a large, hand-drawn oval. A horizontal line extends from the right side of the signature.

PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

- c.c. The Principal, College of Health Sciences, UoN
 The Senior Director, CS, KNH
 The Chairperson, KNH- UoN ERC
 The Assistant Director, Health Information, KNH
 The Dean, School of Medicine, UoN
 The Chair, Dept.of Paediatrics and Child Health, UoN
 Supervisors: Prof. Christine Jowi, Dept.of Paediatrics and Child Health, UoN
 Dr. Jalemba Aluvaala, Dept.of Paediatrics and Child Health, UoN

