



The Role of Community Health Promotion Programs in the prevention of Malaria in Cameroon

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**The Role of Health Promotion Programs in
the prevention of malaria in Cameroon**

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Malaria accounts for 22% of deaths that occur in health care facilities in Cameroon. Despite 66% reduction in mortality caused by malaria between the year 2000 and 2015, malaria still remains a major health issue in Cameroon with 45% of deaths of children under five linked to malaria. Cameroon has both tropical and equatorial climates hence favouring the breeding of mosquitoes.

Health promotion programs play a very vital role in the prevention of malaria in Cameroon. It is done through public sensitization and education that the community gets to understand the importance of their role and that of the health promotion programmes in rolling back malaria.

The purpose of this thesis was to describe the role of health promotion programmes in the prevention of malaria. The research question was: What is the role of health promotion program in the preventing malaria in Cameroon. To achieve this, a literature review was carried out. EBSCOhost, PubMed and science direct academic data bases were used in searching data. Article search was done using search words related to the research question and other keywords. The search resulted to 10 articles after subjecting the entire 760 articles through an inclusion and exclusion criteria. These 10 articles were further appraised using the CASP critical appraisal tool. The collected data was analyzed through inductive content analysis.

Three major themes emerged from the findings, imparting knowledge on the community to address health issues, Changing the Perceptions of the People about the Preventive Methods and addressing the challenges in Preventing Malaria. Health promotion programmes designed for the prevention of malaria were grouped under these areas. Despite the challenges encountered by health promoters in effecting these programmes, there was still an impact created by these programmes. Recommendations were made for further research on the effectiveness of health promotion programmes for better implementation by health promoters.

Keywords: Role, community, programs, prevention, malaria, Cameroon

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1 Introduction

The World Health Organization has identified malaria as a life-threatening disease caused by parasites transmitted to people through the bites of female *Anopheles* mosquitoes (WHO 2014). Though malaria is both preventable and curable, WHO's (2017) world malaria report revealed alarming results, where it stated that there were estimated 216 million cases of malaria in 91 countries in 2016, an increase of about 5 million from previous year's statistics. According to the 2017 WHO's report, malaria deaths reached 445 000 in 2016, a thousand fewer than in 2015. Sub-Saharan Africa was identified as the carrier of the global malaria burden. In 2016, the region was home to 90% of all malaria cases and 91% of malaria deaths on a global scale. The incidence of malaria is so significant that WHO has declared 25th April as World Malaria Day.

Despite the continuous efforts by various malaria control programs to reduce the incidence of malaria, malaria remains one of the main infectious diseases in Africa with Cameroon at the 11th position in the list of most malaria-endemic countries (WHO, 2013). The physical and climatic conditions of Cameroon, give good breeding grounds for malaria vector (the female *Anopheles* mosquitoes). In addition to the swamps and marshlands that occupy large sections of big cities giving these vectors natural habitat, rendering eradication efforts futile.

Cameroon is a West-Central African country situated at the Gulf of Guinea with a population of about 24,744,611 million as of August 2018 (latest UNO's estimates). The population density is 52 per km². The total land area is 472,710km². The population is highly concentrated in the cities and towns and sparsely concentrated towards the rural areas, a typical characteristic of developing countries. Life expectancy at birth is 58.1 years as of 2016 and child mortality was estimated at 79.9 deaths per 1,000 life birth. 21% of the total child mortality was caused by malaria (UNICEF, 2012).

Cameroon climate is highly on the geographical location of the country. The climate of Cameroon also depends on the physical geography of the country. Cameroon is characterized by a unique Eco climatic conditions and topography, with an annual rainfall of 250 to 400, 150 to 250,600 to 900 in coastal, inland and mountain areas respectively. Average temperature ranges from 22 to degrees Celsius in coastal regions. These climatic conditions coupled with poor sanitation, poor drainage system, deforestation and poor housing has resulted in the recent increase in incidences of malaria and other vector-borne diseases in Cameroon. It is to this effect that the writer developed an interest to investigate the role of health promotion programs in the prevention of Malaria in Cameroon

2 Health promotion programs

Health promotion refers to the process of enabling people to enhance the control over their health and its determinants hence improving the health. It could be said that the overall aim of health promotion is to guide and educate people and community on how to better manage their health conditions in order to minimise the occurrence of diseases and other unhealthy conditions. For health promotion to take place, it is always channelled through some educational or environmental programs. These programs are then referred to as health promotion programs. (Ottawa Charter, World Health Organization, 1986.)

Health promotion programs are those programs that are designed to enhance good health and wellbeing by increasing individual's and community's control over their health. Health promotion programs entail health education which is aimed at improving the health attitude, knowledge, behaviours, indicators, status and skills. Further, it entails environmental action to promote environmental change, social support, financial support, organisation development, legislation, resource development as well as community development. (Centres for disease control and prevention 2009.)

In Cameroon, the health promotion programs are undertaken in different settings to help improve the health of the population in different levels. A good example of the settings where the health promotion programs is undertaken in Cameroon include the following

Schools, here the health promotion programs that are carried out in Cameroon include educating the pupils and students on various ways of preventing disease and living a healthy life. This includes the importance of having proper diet, maintenance of person and environmental hygiene and proper diet. The education program is included in the school syllabus to allow all students get the knowledge on how to effectively control various diseases including malaria. (Ottawa Charter, World Health Organization, 1986.)

Work places, in Cameroon, employees are encouraged and supported to lead healthy life and practices. For instance, they are educated on the dangers of smoking, poor nutrition habits, and maintenance of their working environment which will help them avoid various diseases which may affect them. (Ottawa Charter, World Health Organization, 1986.)

Healthcare organisations, it includes the community health centres, physical offices, rehabilitation centres, physician offices and long term care facilities. All these facilities help educate the population on how to prevent certain diseases. (Ottawa Charter, World Health Organization, 1986.)

Communities, this refers to the places where people live or they have come together for a common purpose. Under this setting people work together to help address a common health issue which is affecting the population. (Ottawa Charter, World Health Organization, 1986.)

There are many different health promotion programmes carried out by the government of Cameroon and other NGOs in preventing the communities from contracting malaria. These programmes include: Environmental sanitation, Insecticides impregnated bed nets, vector control programmes, community education on malaria prevention, community mobilisation on malaria prevention, interacting factors such as man`s role. All these factors will be discussed in chapter 4, under malaria prevention and health promotion programmes.

3 Malaria in Cameroon

Malaria is caused by a Plasmodium parasite which is spread through the bite of a female Anopheles mosquito. The malaria vector, the female Anopheles mosquito transmits four types of Plasmodium that causes illness in their human host. These plasmodium species include Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale and Plasmodium malariae. Multiple infections with various species are possible and occur in the area where there are incidents of more than one species (Kimberly E. Mace; Paul M. Arguin and Katherine R. Tan 2015). However, two of the named species; Plasmodium falciparum and Plasmodium vivax are more treacherous. Plasmodium falciparum is prevalent in sub-Saharan Africa and it is responsible for most malaria-related deaths worldwide. Plasmodium vivax, on the other hand, is prevalent in most countries outside the sub-Saharan region (WHO 2018)

Malaria has been and still remains a public concern in Cameroon. As of 2013, the disease was responsible for 31% of all consultations and 44% of hospitalization in public and private health facilities. It accounted for 18% of deaths in Cameroon generally, and responsible for 41% of infant mortality within the same year (Eva Songue et al 20

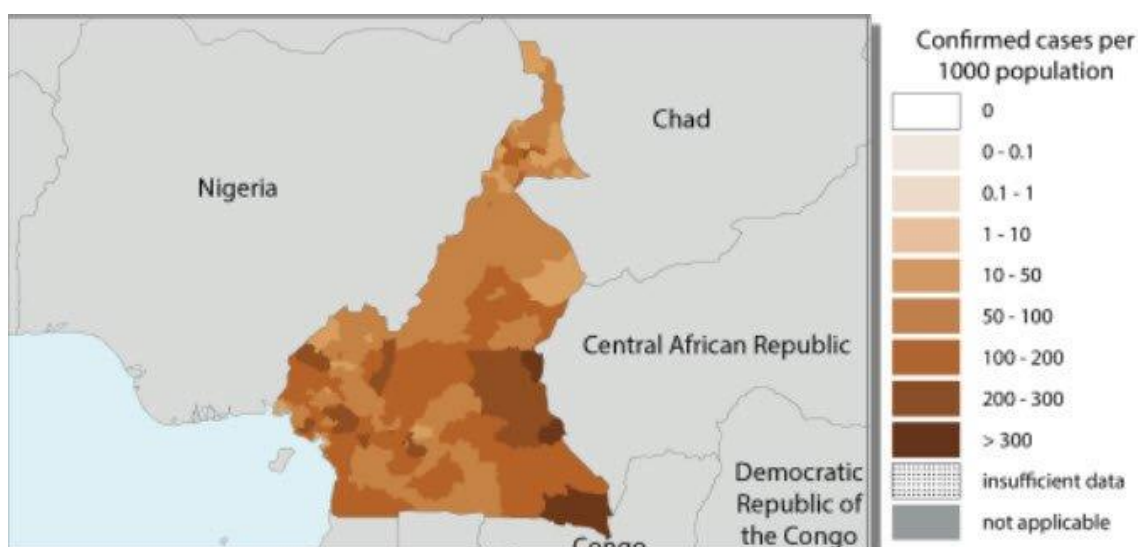


Figure 1: Distribution of Malaria cases (WHO 2017)

3.1 Modes of transmission

The WHO has identified over 400 hundred different types of anopheles mosquitos and about 30 different species are malaria vectors. When an infected mosquito bites a human, it transmits the Plasmodium parasite into the host. The parasite then travels into the liver of the host. Sometimes, the parasite may remain dormant in the liver for about a year where it matures. After maturity, the parasite replicates, multiplies and leaves the liver and infect the

red blood cells. At this stage, the host begins to develop malaria symptoms. If the host is bitten by an uninfected mosquito at this stage, the mosquito will then become infected with the Plasmodium parasite and can transmit them to the next person (Mayoclinic.org 2018).

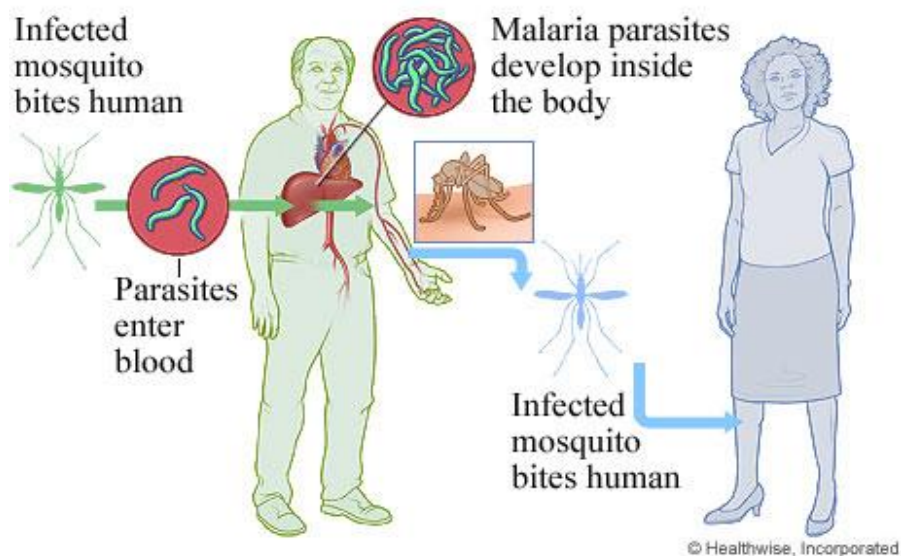


Figure 2: Transmission cycle (Medical Review: E. Gregory Thompson, MD - Internal Medicine & Anne C. Poinier, MD - Internal Medicine & W. David Colby IV, MSc, MD, FRCPC - Infectious Disease 2017)

After the Plasmodium parasites spread in the red blood cells, the female Anopheles mosquito ceases to be the exclusive transmitter. People can then get the malaria parasites from exposure to infected blood such as mother to unborn child, blood transfusion, and by sharing needles used to inject drugs or for other purposes (Mayoclinic.org 2018). This fact highlights one of the reasons why most programs aimed at curbing the spread of the malaria parasites in Cameroon do not usually achieve the desired results. The programs mostly target the main culprit meanwhile there are other secondary underlying causes which carry as much impact as the primary cause of malaria in Cameroon.

3.2 Symptoms and risk factors of Malaria

Malaria is said to be an acute febrile illness (WHO 2018), meaning it has a fever and high temperature as main symptoms. Symptoms usually appear between 10 to 15 days in non-immune persons after exposure to mosquito bites. Main symptoms such as fever, chills and headache are usually mild and not recognizable as malaria. If not treated within a day, it can become severe, complicated and ultimately leading to death.

Children with severe malaria usually develop one or more of symptoms such as severe anaemia, respiratory distress in relation to metabolic acidosis or cerebral malaria. Other symptoms may include vomiting, diarrhoea and sweating. In malaria-endemic countries, people usually develop partial immunity, giving room to asymptomatic infections to occur (WHO 2018).

Risk Factors; Living in or visiting tropical areas where malaria parasites are common is the biggest risk factor. The various parasites that cause the most death by malaria are common in African countries south of the Sahara Desert, the Asian subcontinent, Solomon Island, Haiti and Papua New Guinea (Mayoclinic.org 2018). It has also been claimed that factors such as poverty, lack of knowledge, the absence or poor social infrastructure and the absence of healthcare facilities contribute enormously to global death by malaria.

People at risk include children below five years of age, travellers from countries with no malaria, pregnant women and their unborn children and HIV/AIDS patients due to their suppressed immune system. People with other medical conditions such as renal or liver disease are at higher risks and these should be taken into consideration when planning a trip to malaria-endemic regions (Catherine Brewer 2014).

3.3 Diagnoses and Treatment

Malaria can be diagnosed through a blood test which can also detect the specific malaria parasite and tell if the parasite is the type resistant to drugs. The WHO recommends that suspected cases of malaria should be confirmed through a parasite-based diagnostics viz: microscopy or rapid diagnostic test (RDT). The results are available within half an hour or less. Any treatments based on symptoms should only be administered if diagnostic testing is not available or is not immediately accessible.

The European Medicines Agency (EMA) recommends Eurartessim, a medication combination consisting of dihydroartemisinin and piperaquine phosphate for the treatment of uncomplicated *Plasmodium falciparum* malaria in adults, children and infants six months or over, weighing 5 kilograms and above (WHO 2011). With time, the *Plasmodium falciparum* has become resistant to conventional drugs in most malaria-endemic countries of the world. However, WHO's 2010 Malaria Treatment Guidelines recommended Artemisinin combination therapies (ACTs) as the most effective treatment for malaria. In the European Union, this medication combination has been approved as 'orphan medicine' due to the rarity of malaria incidences in this region (WHO 2011).

3.4 Knowledge and Perception of Malaria

The perception of the community about the cause, transmission, treatment and prevention of malaria are among the main major socio-cultural malaria control measures (Agyepong, 1992). The success of measures and programs used for the control of malaria recently depend on the way the community perceives the disease where any inappropriate behaviour or incorrect beliefs can adversely affect the effectiveness of the control measures which compromise chemotherapy as well as the control of mosquito vectors (Deressa et al., 2002). These are the problems that can be seen mainly in the tropical regions where the options for controlling malaria are not effective due to issues which include vector and parasite resistance to both insecticides and antimalarial drugs respectively. For community anticipation to be effective in any community, the perspectives of the community should be included in the interventions aimed at controlling malaria. In this case, they should be made part of the stakeholders hence they will support any program that is aimed at reducing the cases of malaria in the community.

4 Prevention of Malaria and the Role of Health Promotion Programs

4.1 Prevention of Malaria

Disease prevention is the measures not only taken to prevent the occurrence of a disease, but also to stop its progress and also reduce its consequences once established (WHO 1984). There are three ways of preventing a disease: either primary, secondary or tertiary. Primary prevention aims at preventing the initial occurrence of a disease, secondary and tertiary methods on the other are aimed at arresting the progress of the disease and its effects through early detection and proper treatment (WHO 1984). In this case the latter is on the role of health promotion programs in the prevention of malaria in the community specified above which Cameroon is.

The most effective way of preventing malaria is vector control which directly prevents and reduces malaria transmission. The WHO recommends two forms of vector control for the protection of all people at risk of malaria infection. These include insecticide-treated mosquito nets and indoor residual spraying and they have proved effective in many circumstances. In addition, getting rid of mosquitoes' reproduction habitat such as ponds, puddle and all forms of stagnated water sources in a given environment is also an effective means of preventing the transmission of malaria.

For travellers from malaria-free regions, researchers have developed a tool aimed at eradicating the incidents of malaria among people travelling to danger zones. The ABCD approach, developed in England was aimed at keeping malaria at bay (Catherine Brewer 2014) and it is demonstrated on table 1 below.

A	B	C	D
Awareness of Risk	Bite avoidance strategies	Chemoprophylaxis	Prompt Diagnosis and Treatment
Precise destination(s) Date of travel Length of stay Travel style Personal factors (such as age, medical condition)	Insect repellent Clothing (socks, long sleeves, loose-fitting garments, long trousers) Bed nets Insecticide	Use of antimalarial medications Vaccinations	Communicating the signs and symptoms of malaria to travellers. Keeping them alert on symptoms such as flu-like illness, fever, jaundice, headache, diarrhoea and malaise Testing

Table 1: Keeping Malaria at bay the ABC approach by Catherine Brewer 2014

4.2 The Role of Health Promotion programs in Preventing Malaria

Role in social psychology is defined as the collection of expectations that accompany a particular social position. In this thesis, role refers to the part played by the health promotion programs in the prevention of malaria. How these programs aid in the prevention of malaria refers to their role.

The community health promotion programs have helped a lot in the prevention of malaria in Cameroon by changing the perception of the population on the malaria prevention methods used in Cameroon. This has been achieved through education where new interventions that can be used in the control of malaria are taught to the population.

According to Nsagha et al., (2011), the community health promotion programs have helped the population in various ways of using the anti-malarial drugs such as traditional medicines. Further, the author's indicated that the community health promotion programs have helped in educating the population on symptoms to identify to allow them to seek appropriate medical attention. This is also in line with the assertions by Titanji et al., (2008) which indicates the need for the people to have proper knowledge about the appropriate antimalarial drugs by the population. Furthermore, Moyou-Somo et al., 2013 highlighted the steps that have been taken by the non-governmental organization along the Chad-Cameroon pipeline corridor which has changed the perception of the population on the way of addressing the issue of malaria among the population. This is shown by a significant drop in the cases of malaria among the population and the fact that the population have embraced the use of various malaria preventive methods.

4.2.1 Insecticides Treated Net (ITN)

The insecticides treated nets (ITNs) refers to a personal protection form which has been proved to significantly reduce the cases of malaria, severe diseases as well as deaths due to malaria in the regions that are hard hit by malaria. For instance, based on the community trials in different African environments, the insecticides treated net have had a significant impact in reducing the mortality rate of children under the age of 5 years by 20% as compared to those who use untreated nets. Cameroon being one of them. The ITN works by creating a barrier between the malaria agent and the host for the people sleeping under it. Nonetheless, it should be noted that the untreated nets are less effective as compared to the insecticides treated nets. The ITN is subsidized by the government of Cameroon and the World Health Organization to ensure that malaria vulnerable groups get these nets for effective control of malaria.

In most cases, the insecticides which are used to treat the mosquito nets kill other insects apart from mosquitoes. Nonetheless, the insecticides act as repellent due to their smell on insects thus lowering the number of insects which enters into the house to feed on the people

thus transmitting malaria. In the event where the use of mosquito treated nets is adhered by all members of the community, the population of mosquitoes will significantly reduce since they are starved thus the overall reduction in the cases of malaria among the population. In such a given scenario, all members of the community will be at a safer place even if they are no longer using the ITNs. Therefore for this objective to be attained there is a need for more than 50% of the people in the community to use the insecticides treated nets every night.

4.2.2 Long lasting Insecticide Treated Nets (LLINs)

Given the challenges that have been witnessed by the use of the insecticides treated nets which require periodical treatment, some companies have come up with the insecticides treated nets which are long-lasting. In this case, these insecticides treated nets can maintain a high level of insecticides for more than three years even if they are washed regularly by the user or exposed to the sunlight (Jato 2018). The world health organization under the pesticide evaluation scheme has given full or interim approval to about 15 long-lasting insecticides treated nets to be used in the control of malaria. However, the Centre for disease control (CDC) is in the process of evaluating some of these LLINs to determine their durability as well as performance in the field.

In the countries where the LLINs coverage is high, there has been a sharp decrease in the cases of malaria among the population. Due to this positive impact, the world health organization (WHO) has made recommendations that the LLINs be used in malaria regions but not necessarily on the vulnerable groups only (children under five years and the pregnant women). These nets are mainly distributed after every three years through mass campaigns in areas with significant issues of malaria affecting the population (Jato 2018).

In two years starting from 2008, there were 294 million of the LLINs which had been distributed in the sub-Saharan Africa which is known for the high prevalence of malaria. Funding for the provision of such mosquito nets increased gradually from 2004 where more than 5.6 million nets were delivered to various households. However, due to the current economic situations experienced in many countries, the funding for malaria may stagnate or decline. Therefore, one of the best ways to ensure that malaria is contained is to make sure that the lifespan of LLINs is increased significantly to avoid the periodical purchase of the nets which could be too costly to the users. A research that was carried out recently indicates that the use of the LLINs could help save more than \$3.8 billion for a period of ten years in the situation where the lifespan of the LLINs is increased from the current 3 years to 5 years (Demgne, Tamfor 2001.)

Getting the necessary resources to purchase all these nets is still a major challenge. This has elicited much debate across the globe where it has called for the interventions of the world health organization. In this case, the WHO has recommended that the LLINs be provided for free to the regions prone to malaria Cameroon included. This proposal by the WHO is supported by other organizations which include Global Fund against malaria, tuberculosis and HIV/AIDs as well as well as presidents' malaria initiative that the LLINs be purchased for any countries that are faced with the malaria threats. The government of Cameroon have partnered with different stakeholders to ensure that LLINs coverage is adequate as this helps in the reduction of malaria since it reduces the chances of malaria bites. This recommendation is ideal for the underdeveloped countries where most of their population is living below poverty level hence they cannot afford. To ensure that this objective is attained, the World health organization advised individual donors to make their contributions to nets through credible organizations such as the Centre for disease control foundation or Malaria No More (WHO 2015.)

4.2.3 Vector Control Programs

4.2.3.1 Repellents

According to the pesticide law, all insect repellents are pesticides. This is based on the definition of pesticide which is any substance or mixture of substance whose intention is to destroy, prevent, repel or mitigate any pest. However, most of the people have held a belief that pesticides only refers to something which kills insects but it is noteworthy to understand that pesticide includes those products which do not kill anything which in this case include insect repellents. In essence, pesticides which are indicated repellents are not meant to kill insects but instead, it creates unfavorable conditions from the area in which they are not wanted. For instance, the skin applied repellents products are not necessarily meant to kill pests but instead, it is meant to make people less attractive to the pests which feed on them. Due to this, the possibilities of pests feeding on people will decrease significantly due to the unpleasant smell or taste which is caused by the repellent (Jato 2017.)

The rise in the cases of mosquito-borne illnesses has necessitated identification of various ways of protecting people against mosquito bites which transmit diseases such as Zika, dengue, and malaria among other diseases. The insect's repellents which are registered under the EPA are ideal for repelling mosquitoes so long as the approved labeling indicates that the products are to be used in general protection against mosquitoes. However, this should be based on the evidence and there should be data that shows the effectiveness of the repellents when applied for repelling mosquitoes. By so doing, it will help in ensuring that the re-

pellents do not cause undesired effects on the user and it does not cause unfavorable environmental issues (Jato 2017.)

Use of repellents to control mosquitoes has proved to be one of the effective comprehensive programs to prevent dengue or Zika. This is due to the fact that repellents ensure that there are no mosquito bites which prevent the transmission of vector-borne diseases. There are various ways in which mosquitoes can be excluded from homes. For instance, one can use door and window screens which is not favourable for mosquitoes. Nonetheless, by dressing in clothing that is light coloured, long pants, avoiding areas with many mosquitoes, putting on long sleeved clothes and ensuring that there is no stagnant water around homestead can play a significant role in minimizing vector-borne diseases (Jato 2017.)

4.2.3.2 Insecticides and Net Materials

In essence, there could be a significant variation in the material, size, colour or the treatment status of the insecticides in the mosquito nets. The main materials that are used for making mosquito nets include the polypropylene, polyethene and polyester. This is due to their durability and easy to clean. However, regardless of the material that is used to make the mosquito nets, with the appropriate insecticide treatment, all nets are effective. The nets are mainly distributed by the government through the non-governmental organization and the world health organization (WHO) to the vulnerable groups.

The only insecticide that has been approved for treatment of the mosquito nets is pyrethroid. This is due to the attributes of the drugs which in this case poses a low health risk to the people and other animals though they are harmful to insects even at a very low dose. One of the significant property of pyrethroids which makes it preferred as compared to other insecticides is its inability to break easily lest it is exposed to the sunlight or washed away with the use of soap and water. Initially, ITNS were supposed to be treated after every six-twelve months or more frequently especially if they were washed to ensure that the insecticides are effective enough to kill the insects. In this case, the mosquito nets were treated by being dipped into the solution of the insecticides and allowed to dry under the shade before they are being used again. Due to ignorance and lack of fund to purchase the appropriate insecticides, the need for treating the mosquito nets frequently was the main hindrance to the wide usage of the ITNs in the malaria-endemic countries (Demgne, Tamfor 2001.)

However, the latest research which indicates the rise in the pyrethroids resistance among the mosquitoes may be a setback that will undermine the effectiveness of the nets not unless other insecticides are developed. Some of the initiatives that have been employed to ensure that this does not occur are the incorporation of the piperonyl butoxide (PBO) alongside the pyrethroid insecticides even though there is scant evidence to indicate that it will improve

the effectiveness of the nets especially in the regions where there is a high level of resistance. In addition, the world health organization (WHO) does not consider the nets treated with pyrethroids incorporated with PBO as the effective tool for managing resistance of pyrethroid.

4.2.4 Environmental Sanitization

The main cause of mortality and morbidity in third world countries and sub-Saharan Africa is the poor environmental sanitization (Amoran et al., 2014). Due to this, it played a significant role in the transmission of diseases particularly on endemic diseases which include malaria. In Cameroon for instance which is part of the third world countries, environmental sanitization has been given priority as one of the interventions that are used to control various diseases which include malaria. This has been shown by the efforts undertaken by the urban planning and sustainable programs which ensures that there is efficient drainage use and proper rubbish collection which include proper disposal of non-biodegradable plastic materials where water stagnates and forms conducive breeding grounds for the mosquitoes (Jato et al., 2017). For instance, there is a community human investment in the northwestern part of Cameroon where male and female work together which brings about gender equality hence it is highly acceptable in the region. In this case, the communities have a monthly program where they take part in cleaning of cities to ensure that there is no litter around and ensure that the drainage system is working efficiently (Nsagha et al., 2011). The programs have been undertaken by the government of Cameroon and has seen a significant decline in the mortality rate as a result of malaria and other diseases.

4.2.5 Community Mobilisation on Malaria Prevention

Community mobilization entails formation of support groups and engaging the community to take part in the health interventions. In this case, community mobilization helps in promoting the active participation of the community by changing their own norms to enhance health and this is ideal for the community-based interventions in a low resource environment. According to Jato et al., (2017, 99), community mobilisation is a community based facilitative process which is sustainable and applicable in developing countries in the expansion of the new concepts in enhancing the behaviour change in various groups using various strategies. Nonetheless, the mobilisation of the affected community in the rural setting to take part in health shows the significance of social justice and this enhances their contributions to the decisions which impact on them (Rifkin, 2009) as cited by Jato et al., (2009). The community mobilisation in Cameroon is undertaken by both the non-governmental organisation and the department of health. Its impact in the prevention of various diseases has been felt in the country.

4.2.6 Community Education

According to Jito et al., 2017, there is an interconnection between the healthcare system, individual behavior and the governance structure. The author's indicated that these factors interact in the process of educating the community on various issues relating to the community health promotion programs. In this case, the governance structure, the individual behavior and the healthcare system are related in areas to do with the mobilization and health promotions and education of community is significantly impacted by the perception, willingness to change as well as the behavior of an individual (Panter-Brick et al., 2006). On the other hand, a good governance structure and political commitment play a significant role in making sure that there is an effective healthcare system. Nonetheless, the healthcare system is vested with the responsibility of delivering quality care services for better healthcare delivery and also for emergency preparedness. These interacting factors play an important role in the education of the community since the education program should be aligned with these factors for effective education. The community education in Cameroon is undertaken by the non-governmental organization as well as the government department of health and has significantly helped in addressing various health issues.

4.2.7 Knowledge and Perception of Malaria

The perception of the community about the cause, transmission, treatment and prevention of malaria are among the main major socio-cultural malaria control measures (Agyepong, 1992). The success of measures and programs used for the control of malaria recently depend on the way the community perceives the disease where any inappropriate behavior or incorrect beliefs can adversely affect the effectiveness of the control measures which compromise chemotherapy as well as the control of mosquito vectors (Deressa et al., 2002). These are the problems that can be seen mainly in the tropical regions where the options for controlling malaria are not effective due to issues which include vector and parasite resistance to both insecticides and antimalarial drugs respectively. For community anticipation to be effective in any community, the perspectives of the community should be included in the interventions aimed at controlling malaria. In this case, they should be made part of the stakeholders hence they will support any program that is aimed at reducing the cases of malaria in the community.

4.3 Challenges in the Prevention of malaria

The community health promotion programs in Cameroon have identified the challenges that affect the population in the process of tackling malaria menace among the population. Moyou-Somo et al., (2013) asserts that there is a low level of knowledge among the population about the malaria and their attitude is not good about fighting the disease. Due to this, it has hampered the fight against the disease. However, with the help of the non-governmental organization, the population have learned various ways in which they can apply to prevent

malaria. Further, Sougoufara et al., (2014) indicated that there is a challenge of daylight bite by mosquitoes even after sleeping under the ITNs. This has therefore called for the community health promotion programs to educate people on how they can ensure that they have a clean environment free from mosquitoes by embracing sanitation. Additionally, Hill et al., (2013) assert that the provision of pregnant women with the insecticides treated nets during antenatal visits has significantly helped in the prevention of malaria in Cameroon. This is so because many of the people tend not to visits healthcare facilities especially when they are not sick and this has adversely affected the distribution of the ITNs. Finally, the community health promotion programs have helped in addressing a challenge where most of the school going children were most affected by malaria. Nankabirwa et al., (2013) indicated that the use of the chemoprevention has been effective in controlling anaemia and improving performance in school. However, the authors proposed the use of other interventions which include vaccinations to help children stay safe from malaria. Therefore, by so doing, it will ensure that the community s free from malaria. Figure 4 below presents the ladder of participation of the community in malaria prevention.

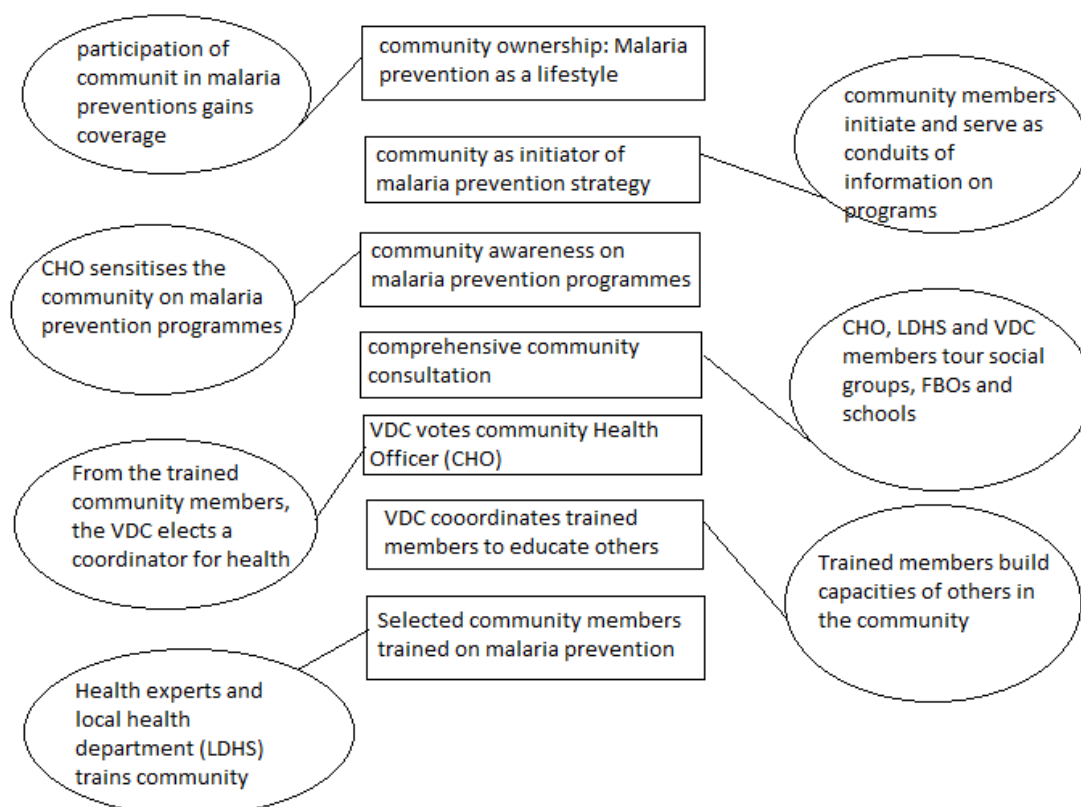


Figure 3: Ladder of community participation in Malaria prevention (Jato 2017)

5 Purpose of the study and the Research question

The purpose of this thesis is to describe the role of community health promotion programs in the prevention of malaria in Cameroon.

Research Question is

What is the role of community health promotion programs in the prevention of malaria in Cameroon?

6 Methodology of the study

The methodology used in this thesis is the literature review. Literature review refers to the comprehensive study and assessment of the existing literature that is related to the specific topic under the study (Aveyard 2010,). The literature review starts with the identification of the research questions, find the relevant articles which can answer the questions. The method (literature review) was chosen because it offers an insight into the previous research studies that investigated the same topic or related topic under the study.

6.1 Literature search

This is a literature review study which was carried out by the use of a qualitative research method. This method was chosen by the author as the ideal method for addressing research questions since the research is qualitative. Furthermore, the qualitative research method gave an opportunity to the author to assess the chosen texts, form an opinion and carry out analysis of themes which are appropriate in answering the research questions adequately. Therefore for this study, the role of community health promotion programs in preventing the spread of malaria in Cameroon is the main theme which was analysed based on the selected articles.

6.2 Data search

Different academic databases were used to obtain relevant articles which could answer the research questions and meet the objectives of the study. Various factors were taken into consideration by the author including inclusion and exclusion criteria. In this regard, the exclusion column comprised of the factors that were checked which makes the articles not suitable for the study. On the other hand, the factors on the inclusion column were considered relevant for the study hence were included. For instance, articles that were written in English were included while those that were not written in the English language were excluded. Nonetheless, the collection of data was based on the suitability and reliability of the data for the study taking into consideration the adequacy of the data provided. This method was followed in all the articles that were used for analysis. Therefore, for this study, the author searched different databases which include science direct, EBSCO and PubMed.

Three databases were used to collect data for this thesis; these were PubMed, EBSCO and science direct. The first inclusion was limited to peer-reviewed (because they are evidence based articles) articles written in English and French (for the author's ability to understand) and between 2008 and 2018 (For the purpose of relevancy). The search was done by breaking down the topic into subheadings that could lead to articles covering the research topic. These area were Cameroon and malaria, malaria prevention and Cameroon, health promotion programs and Cameroon, malaria health promotion and Cameroon. Using "malaria and Cameroon" the results were N =391. Then using "malaria prevention programs and Cameroon", the

results were N= 51. The search terms “malaria health promotion and Cameroon” and “health promotion programs and malaria and Cameroon” resulted to N=299 and N=19 hits respectively, making a total of 760. Out of the 760 articles gotten in total, only 42 qualified for further review. These 760 articles were further scrutinized by reading the abstract, the topics of the articles and a fast look at the body of the articles. This procedure reduced the resulted to 42 articles. Table 2 below present the procedure through which the author arrived at the 42 articles.

	PUBMED	ScienceDirect	EBSCO HOST	Total num- ber of arti- cles	Discarded articels	Articles for further review
Malaria and Cameroon	92	24	275	391	380	11
Malaria pre- vention pro- grams and cameroon	9	16	26	51	46	5
Malaria health pro- motion and Cameroon	9	280	10	299	282	17
health pro- motion pro- grams and malaria and Cameroon	2	14	3	19	10	9
TOTAL	112	334	314	760	718	42

Table 2: Data search hits

6.3 Data inclusion and Exclusion criteria

After arriving at 42 articles there was need to further scrutinize the search in order to arrive at the maximum but credible article that answers the research question and aim partially or completely. Out of the 42 articles only 10 qualified for the study. These 10 articles were arrived at using the inclusion and exclusion criteria below. Some articles were rejected not because they were appeared in more than one or two databases. After a thorough look at the abstract, aims and applying the inclusion and exclusion criterions , 10 articles were chosen for the final phase of the methodology. Table 3 below presents the inclusion and exclusion criteria and figure 3 below shows the data extraction process.

Inclusion	Exclusion
<ul style="list-style-type: none"> • Articles are written within the last ten years • The language used in writing the articles is English or French. • the Role of Community Health promotion programs in the prevention of malaria in Cameroon • Applied to most malaria-prone regions • peer reviewed because we need evidence based • Focus is in Cameroon • Malaria prevention • Full text 	<ul style="list-style-type: none"> • Not academically written • Not applicable to the setting • Not written in English • Articles not available for free • Articles that is not relevant to the research question. • Focusing on pregnant women, children or other specific groups. • Duplicate or repetition • Focus in Africa or other areas in the world • focused on diagnosis • Relating to other diseases

Table 3: Data inclusion and exclusion Criteria

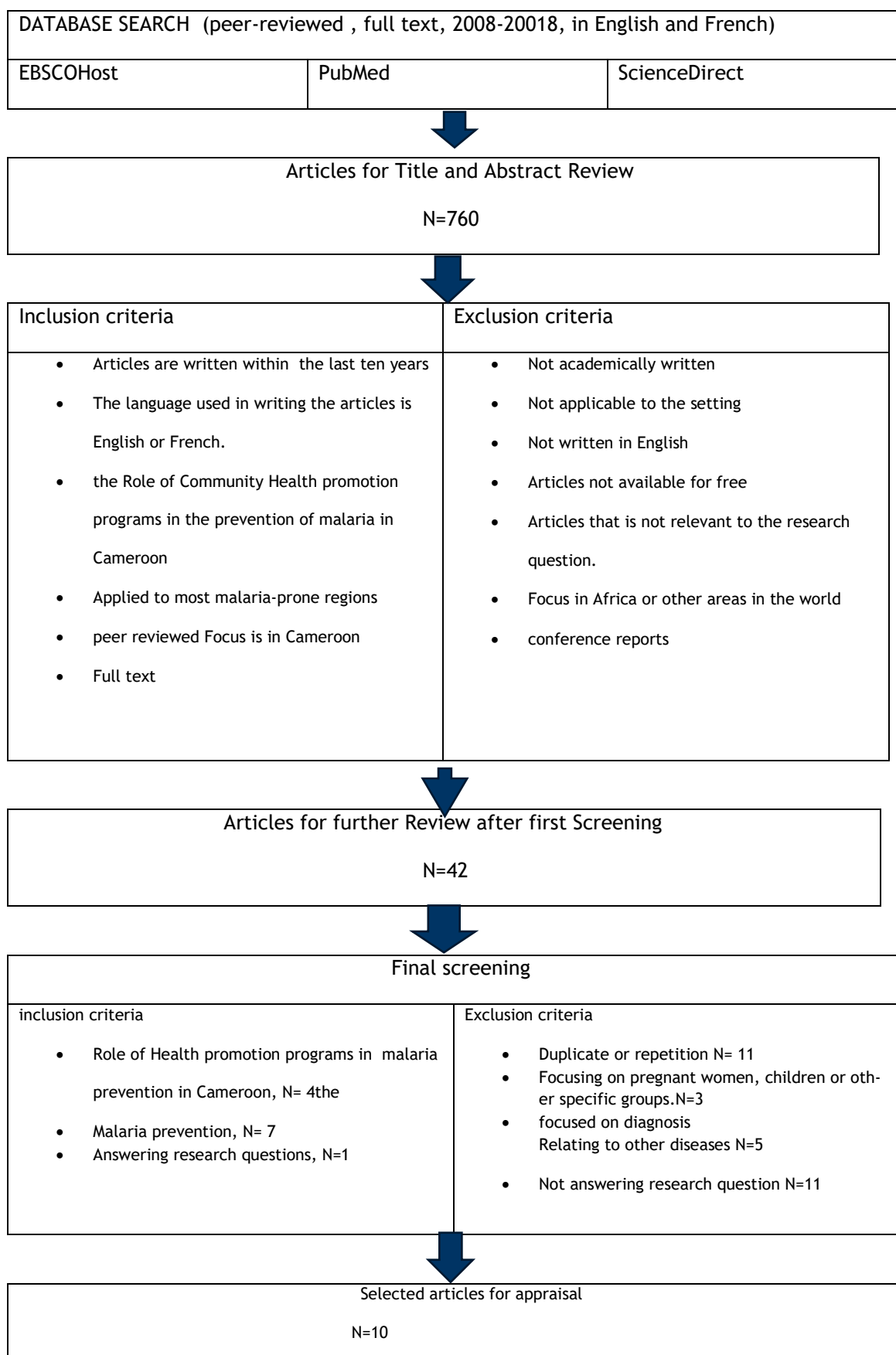


Figure 4: Data extraction Process

6.4 Data Appraisal

After obtaining the above data, it was very essential to appraise the data. That is to determine the quality of the articles, their strength and weakness and also the level of relevance to which they can answer the research question. The entire process of proving the relevance of the articles and their liability is referred to as data appraisal (Aveyard 2010, 90). This therefore signifies that not all papers or article published on creditable data bases are of good quality. Critical appraisal therefore, is a systematic process through which the strength and weaknesses of an article is been assessed in order to determine the usefulness and validity of the findings (Aveyard 2010)

The critical appraisal tool used in this thesis is the CASP critical appraisal tool. The CASP critical appraisal tool was used in thesis to determine the trustworthiness, relevance and quality of the articles used. This appraisal is done using a checklist. There are different CASP checklist but the checklist that best suit qualitative research and literature review was used for this thesis. After haven gone through the articles generally, the checklist below was used to appraise and assess the quality of the articles one after another. The checklist is a set of questions designed for the purpose of credibility and reliability. In this case the checklist used was that for systematic reviews as all the selected article were literature reviews.

From the above presentation, two out of ten articles did not meet the criterion 4. This is because the recruitment strategies were not clearly presented in the articles. On the other hand, three out the ten articles did not meet criterion six, because the relationship between the researcher and the participants was not clearly established. Just one article did not meet the criterion 8, it is because the data analyses was a bit lax and easy.

6.5 Data analysis

There are many approaches for analyzing qualitative data, content analysis being one of the most used methods in nursing (Elo & Kyngäs 2008). Aveyard (2010) reveals that data can be analyzed in many different ways such as meta-analysis, meta-ethnography, content analysis and meta study, but these all depends on the methods and approaches used. Data analysis crudely refers to the process of coding data and giving more meaning to it than in its original form (Kevin D 2015). The purpose of data analysis is to shape and extract meaning from the collected data and draw realistic conclusions (Elo & Kyngät 2008). The data analysis method used in this thesis is the content analysis. Content analysis can be either qualitative or quantitative. The qualitative content analysis was deemed necessary for this thesis and the inductive content analysis was preferably the best. The qualitative approach may take three different forms namely conventional, directed or summative, all three approaches only differ in the threats of trustworthiness, the origins of codes and the coding schemes (Kevin D 2015).

what makes a good literature review is the analytical phase of each piece of literature (Paul Oliver, 2012).

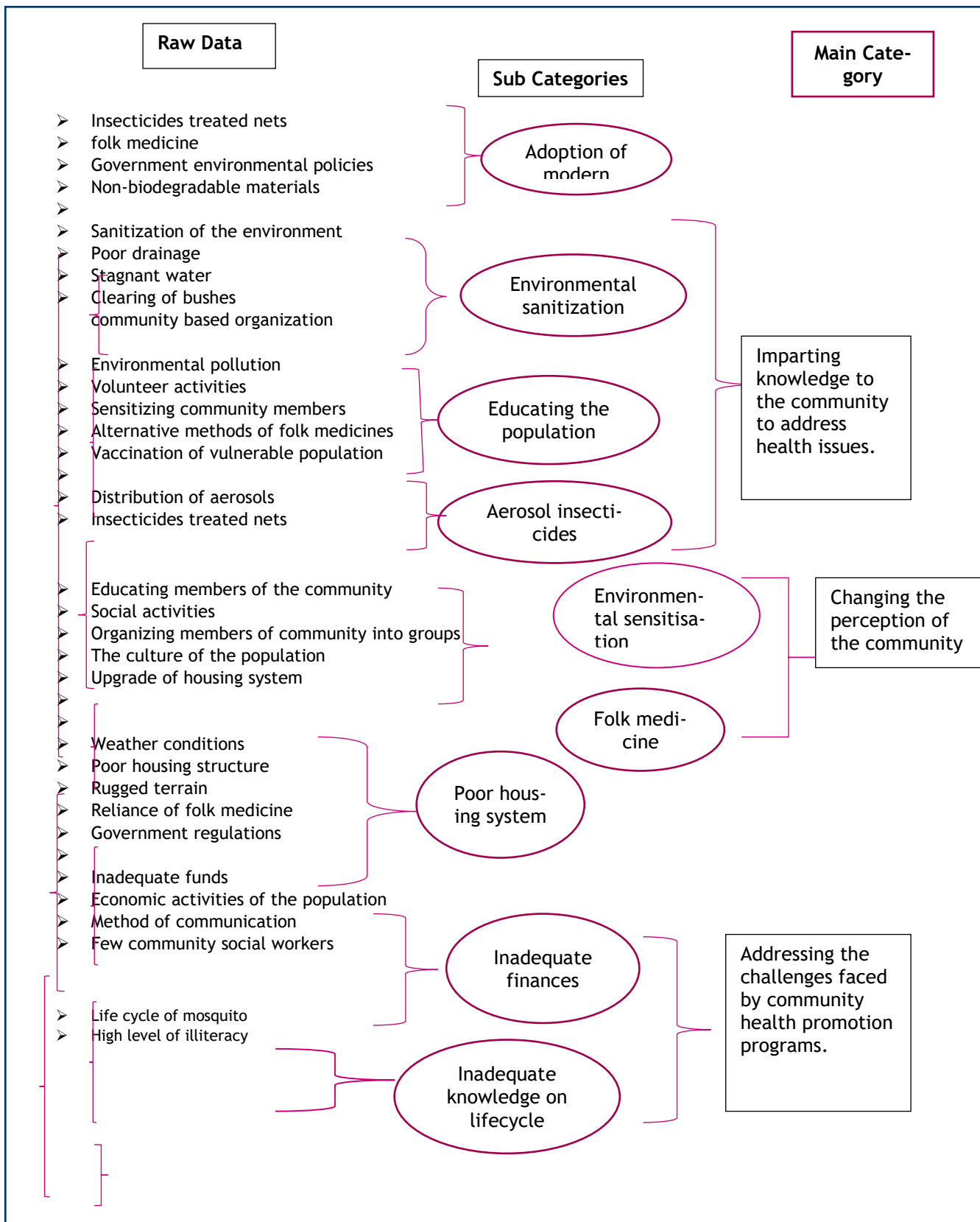
Content analysis is a research method that systematically and objectively describes and quantifies a phenomenon (Sandelowski 1995). In inductive content analysis data are analysed through coding, creating categories and abstraction (Elo & Kingäs 2008). The inductive content analysis was chosen in this thesis because there has not been any previous study addressing same phenomenon unlike the deductive approach where the aim is to test previous theories.

The main principle of a content analysis is to explore meaning and develop understanding of the research topic (Aveyard 2010).

The content analyzes process was broken down into four steps by Bengtsson (2016) namely; decontextualisation, contextualization, categorizing and compilation. These were the steps followed in analyzing the literature. In decontextualisation, the first thing that was done in this phase was read through the article again very kindly and taking down overall impressions from the articles, all the articles were thoroughly read and repeatedly for better understanding. While reading these articles, small notes were taken, identifying meanings and labeling them with codes and meaning units that relates to the context. At this phase a coding list or sheet is created where all the jotted phrases and coding or headings are transferred to and explanations are given to the codes.

The next stage is the recontextualisation. At this phase the meaning units identified in the decontextualisation phase are then compared to the original text to see if the content is ok. Then, all the derived meaning units are cross-checked to ensure that they answer the aim of the thesis.

The next step was categorization. After identifying these overall impressions, it was now necessary to break them down into categories and even subcategories. The intension here was to make them easier to understand by coding them into themes. Similar codes were grouped together to form sub-categories. From these sub-categories, major categories and themes are formed bearing in mind that they are generated from the data where they arose. Once themes were formed compilation of the finding started. Figure 4 below presents the entire process.



Kuva 5: Data analysis process

7 Findings

7.1 Imparting knowledge on the community to address health issues

7.1.1 Distribution of ITN

During the review of the literature, Ndo et al., 2011 indicated that there is a high level of awareness of the population about malaria and ITNs. However, there is still some negative attitudes which adversely affect the utilization of the insecticides treated nets or associated with

the management of the clinical cases requires more attention. Also in the study by Hill et al., 2013, it was established that the delivery of the insecticides treated nets during antenatal clinics presents fewer issues as compared to the delivery of the IPTp. Further, the study found out that most of the obstacles to the IPTp delivery are simple which can be addressed in a short period.

7.1.2 Environmental sanitization

In the study by Nsagha et al., (2011), the common practices for the control of malaria include environmental sanitation, use of aerosol insecticides, use of mosquito coils, chemoprophylaxis, use of traditional medicines and the use of the mosquito treated nets. The prevention of malaria was associated with the status of education. Improper health education about malaria also hindered the control and prevention of the disease.

7.1.3 Folk medicine

In the study by Titanji, Zofou, & Ngemenya (2008), it was established that the Cameroonian flora has a higher potential for the antimalarial compounds. Due to this, local communities have capitalized on the resources and use it in the treatment of malaria and other diseases that are affecting the population. The methods were found to be applied at different levels depending on the region, the level of education, as well as the level of income of the individual, were the main determinants. The use of folk medicine proved to be effective among the users though some used the other methods interchangeably or concurrently to ensure the issue of malaria was completely prevented in the different regions of Cameroon.

7.1.4 Aerosol insecticides

In the study by Nankabirwa et al., (2014), it was found that chemoprevention has been effective in controlling anaemia and improving performance in school. Nonetheless, there is also a known effective way which can be used to control malaria. The study further found out that

vaccines against malaria play a significant role in controlling malaria among the school going children. Further, the study indicated that regardless of the approach employed, it is also imperative to include the overall program or measures which are aimed at improving the health of school going children in Africa. The community health promotion program, therefore, aligned their policies towards these methods and provided people with the necessary drugs, INTNs and aerosols which have helped in the control of malaria in Cameroon.

7.2 Changing the Perceptions of the People about the Preventive Methods.

7.2.1 Adoption of the Modern Methods

The study by Bowen (2013) indicates that the mass media play a significant role in communicating interventions that support malaria control among the population in Cameroon which include the LLINS. This is through the education of the population on the modern methods of controlling malaria. The study, indicated that the community health promotion program uses the mass media in educating people about the necessary drugs, INTNs and aerosols which have helped in the control of malaria in Cameroon.

7.2.2 Educating Members of the Public

The study by Nsagha et al., (2011) identified common practices for the control of malaria include environmental sanitation, use of aerosol insecticides, use of mosquito coils, chemoprophylaxis, use of traditional medicines and the use of the mosquito treated nets. The study further found out that the prevention of malaria was associated with the status of education. Another article by Tchinda et al., (2012) found out that with the universal coverage of the LLIN where two people use one net, it is possible to attain the desired results in the households. The study, therefore, advocated for Education of the population on malaria to ensure that the members of the public use nets among adolescents, school children and the members of the households. Nonetheless, the study identified that there is a need for effective environmental management and improvement.

7.3 Addressing the challenges in Preventing Malaria.

7.3.1 Inadequate knowledge on the life cycle of the mosquito

During the literature review the study by Sougoufara et al., (2014) established that having a clear understanding of the vectors behaviour is important in determining its transmission capacity. In this case, the study indicated that the changing behavior of the mosquito has significantly increased the risk of malaria and has presented a new challenge in the process of controlling malaria. Therefore, the study made recommendations for better strategies to be put in place to control the vector for effective malaria control.

7.3.2 Inadequate finances

The study by Moyou-Somo et al., (2013) found that the prevention of malaria in the whole year was adversely affected by limited access to media and housing features which made the sensitization campaigns difficult and this was attributed to inadequate finances. The study further found out that the malaria drugs that were used were inappropriate as they were cheaply available. Nonetheless, the study recommended helping in guiding the implementation of control measures by providing adequate finances to run health promotion programs in Cameroon.

7.3.3 High level of illiteracy

During the literature review, the study by Kimbi et al., (2014) established that those respondents that do not have formal education had a poor knowledge about malaria. It, therefore, suggested the use of new approaches for sensitizing the community on the need to actively get involved in prevention methods. Furthermore, the study by Nankabirwa et al., (2014) established that the use of the chemoprevention has been effective in controlling anaemia and improving performance in school. The study, however, indicated that there is no known effective way which can be used to control malaria. In overall vaccines against malaria play a significant role in controlling malaria among the school going children.

8 Discussion

8.1 Discussion of the findings

From the above literature review, it is seen that community health promotion programs play a significant role in the prevention of malaria in Cameroon. This is through their tireless efforts in helping the community to effectively prevent the spread of the disease which has claimed a good number of people in the country. One of the ways in which the community health promotion programs has helped in the prevention of malaria in Cameroon is shown by Ndo et al., (2011) which indicates that the community health promotion programs have ensured that the community embrace the use of the LLNIS, the ITNs and also change their attitudes towards tackling the disease.

This was also emphasized by Bowen, (2013) which indicates that media have played a significant role in educating members of the public on the best ways of preventing malaria such as the use of the insecticides treated nets and importance of ensuring sanity in the environment. Further, Kimbi et al., (2014) assert that there is a need to have proper education among the vulnerable groups in Cameroon to ensure that there is effective control of malaria among the population. Nonetheless, Titanji et al. (2008) indicated that the use of traditional malaria medicine has proved to be effective in the prevention of malaria in Cameroon. Therefore, the community health promotion programs can help in educating the population on the proper use of antimalarial drugs. This has thus helped in the attainment of the desired results in terms of the healthcare outcome among vulnerable groups in the region.

The community health promotion programs have also helped in the prevention of malaria in Cameroon by changing the perception of the population on the malaria prevention methods used in Cameroon. This has been achieved through education where new interventions that can be used in the control of malaria is taught to the population. According to Nsagha et al., (2011), the community health promotion programs have helped the population on various ways of using the antimalarial drugs such as traditional medicines.

In addition, the authors indicated that the community health promotion programs have helped in educating the population on symptoms to identify to allow them to seek appropriate medical attention. This is also in line with the assertions by Titanji et al., (2008) which indicates the need for the people to have proper knowledge about the appropriate antimalarial drugs by the population.

Furthermore, Moyou-Somo et al., 2013 highlighted the steps that have been taken by the non-governmental organization along the Chad Cameroon pipeline corridor which has changed the perception of the population on the way of addressing the issue of malaria among the popula-

tion. This is shown by a significant drop in the cases of malaria among the population and the fact that the population have embraced the use of various malaria preven-tive methods.

Finally, the community health promotion programs in Cameroon have identified the challenges that affect the population in the process of tackling malaria menace among the population. Moy-ou-Somo et al., (2013) asserts that there is a low level of knowledge among the population about the malaria ad their attitude is not good about fighting the disease. Due to this, it has hampered the fight against the disease.

However, with the help of the non-governmental organization, the population have learned various ways in which they can apply to prevent malaria. Further, Sou-goufara et al., (2014) indicated that there is a challenge of daylight bite by mosquitoes even after sleeping under the ITNs. This has therefore called for the community health promotion programs to educate people on how they can ensure that they have a clean environment free from mosqui-toes by embracing sanitization.

Additionally, Hill et al., (2013) assert that the provision of preg-nant women with the insecticides treated nets during antenatal visits has significantly helped in the prevention of malaria in Cameroon. This is so because many of the people tend not to visits healthcare facilities especially when they are not sick and this has adversely affected the distribu-tion of the ITNs.

Finally, the community health promotion programs have helped in addressing a challenge where most of the school going children were most affected by malaria. Nankabirwa et al., (2013) indicated that the use of the chemoprevention has been effective in controlling anaemia and improving performance in school. However, the authors proposed the use of other inter-ventions which include vaccinations to help children stay safe from malaria. Therefore, by so doing, it will ensure that the community s free from malaria.

8.2 Ethical Consideration of the thesis

During the writing of this thesis, the writer took into consideration all the ethical standards which include accountability, integrity as well as transparency. In this case, the guidelines for writing a thesis as provided by Laurea University of Applied Science (2015) were read and followed to the later. Due to this, there was no conflict of interest that was encountered. The ethical aspect of transparency was attained by outlining every step of the research process. Nonetheless, all data that were used in the development of thesis were presented correctly without any misrepresentation or fabrication as this is against the ethical standards as stipulated by the university.

There was no bias in the whole process. Credibility is what informed the decision to choose EBSCOhost, ScienceDirect and CIHNAL from the Laurea online library. There was also a well-established exclusion and inclusion criteria which played a significant role in reducing bias during the process of data collection. Furthermore, the credibility of the data which was used in the thesis was enhanced through the use of peer-reviewed articles.

All the materials which were utilised in this thesis were accredited to their studies by use of in-text and end text referencing according to the referencing guidelines that were provided by Laurea which helped in avoiding plagiarism (King 2013). Duplicates elimination ensured maintenance of copyrights.

8.3 Trustworthiness of the thesis

Given the fact that personal interpretations are the main concerns of the qualitative research, the trustworthiness of the thesis was upheld by upholding the principles of credibility, dependability, conformability as well as transferability according to Panday and Patnaik (2014).

The credibility of the thesis was upheld through the use of Science direct, PubMed and EBSCO host from the online library of Laurea University. To ensure that credibility was maintained to later, a well laid out exclusion and inclusion criteria were created to reduce the possibilities of bias in the process of collecting research data. Nonetheless, the credibility of the research data was enhanced by the use of peer-reviewed articles. Any material that was used in the thesis was accredited to their researchers and authors through the in-text citation as per the guidelines provided by the Laurea university referencing which therefore helped in the elimination of plagiarism as well as copyright issues (Cheong, Lau & King, 2013).

Transferability requires that the research findings are applicable to other situations. The aspect of transferability in this thesis was therefore attained by an extensive description of the results and the confirmation of the external validity of the research findings (Pandey and Patnaik 2014). The findings of the research articles from different countries under the same economic level or geographical region with Cameroon were the same. Nonetheless, the results of the articles selected from the study showed that the role of community health promotion programs is similar in almost all countries.

Dependability: The thesis is dependable in the sense that the research findings are repeatable and consistent. In this thesis, the author verified the consistency of the findings by comparing it with the raw data that she collected from the research articles (Thomas, 2006). The researcher, therefore, ensured that if any other person would have used the same data the

same findings, the conclusion, as well as interpretation, would have been similar hence confirmability.

8.4 Limitation

The study does not present statistics that show the role of the health promotion programs in Cameroon with regards to malaria.

The study does not also show the relationships between the clinical specialities, employment as well as the knowledge score of nurses in the control of malaria/.

The study does not indicate the relationships between the spread of malaria and the economic status of the population.

The study does not present the challenges that affect nurses in helping patients in the control of malaria.

The study did not include those articles that were written in another language apart from English and which they could be having important information about the topic/

The study did not take into consideration those articles that were written more than 10 years. Meaning that those articles that were written earlier than 2008 were not considered in the study.

The role of health promotion programs was not directly presented in the articles. Articles that directly address the role of health promotion programs were not found.

8.5 Recommendation

The population should be trained on specific issues which are related to malaria to give them an opportunity to reflect on how to effectively control the disease.

The community health promotion programs should use different media especially social media which will ensure that the initiatives of controlling malaria are well understood by all the population.

The community health promotion programs should embrace the use of technology in sensitizing the community on various methods of controlling malaria to ensure effective communication.

The government should allocate adequate resources to the community health promotion programs to ensure that the disease is well addressed among the population.

Further research should be undertaken to ascertain the effectiveness of various methods that are preferred by the population so that a proper recommendation on the most effective method can be proposed based on the evidence. Also further research on malaria prevention is recommended to define the role of health promotion programs.

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Appendix 1: selected articles for data collection

Article Number	Author and the Year of publication	Title of the Article	Journal, Volume, and Page	Findings of the article
1-	Ndo, C., Menze-Djantio, B., & Antonio-Nkondjio, (2011).	Awareness, attitudes and prevention of malaria in the cities of Douala and Yaoundé (Cameroon).	Parasites & vectors, 4(1), 181.	The study showed a high level of awareness of the population about malaria and ITNs. However, there is still some negative attitudes which adversely affect the utilization of the insecticides treated nets or associated with the management of the clinical cases requires more attention.
2-	Bowen, H. L. (2013).	Impact of a mass media campaign on bed net use in Cameroon.	Malaria Journal, 12(1), 36.	The study indicates that the mass media play a significant role in communicating interventions that support malaria control among the population in Cameroon which include the LLINS.
3-	Kimbi, H. K., Nkesa, S. B., Ndamukong-Nyanga, J. L., Sumbele, I. U., Atashili, J., &	Knowledge and perceptions towards malaria prevention among vulnerable groups in the Buea	BMC Public Health, 14(1), 883.	The study established that those respondents that do not have formal education had a poor knowledge about malaria. It,

	Atanga, M. B. (2014).	Health District, Cameroon.		therefore, suggested the use of new approaches for sensitizing the community on the need to actively get involved in prevention methods.
4-	Titanji, V. P., Zofou, D., & Ngemenya, M. N. (2008).	The antimalarial potential of medicinal plants used for the treatment of malaria in Cameroonian folk medicine.	African Journal of Traditional, Complementary, and Alternative Medicines, 5(3), 302.	The study indicated that the Cameroonian flora has a higher potential for the antimalarial compounds.
5-	Nsagha, D. S., Njunda, A. L., Kamga, H. L. F., Assob, J. C. N., Wiysonge, C. S., Nsagha, S. M., & Njamnshishy, A. K. (2011).	Knowledge and practices relating to malaria in Ndu community of Cameroon: Signs and symptoms, causes and prevention.	Journal of Public Health and Epidemiology, 3(6), 294-300.	The identified common practices for the control of malaria include environmental sanitation, use of aerosol insecticides, use of mosquito coils, chemoprophylaxis, use of traditional medicines and the use of the mosquito treated nets. The prevention of malaria was associated with the status of education. Therefore, proper health education about malaria is necessary to better understand how to control the disease.

6-	Tchinda, V. H. M., Socpa, A., Keundo, A. A., Zeukeng, F., Seumen, C. T., Leke, R. G. F., & Moyou, R. S. (2012).	Factors associated to bed net use in Cameroon: a retrospective study in Mfou health district in the Centre Region	Pan African Medical Journal, 12(1).	The study found out that with the universal coverage of the LLIN where two people use one net, it is possible to attain the desired results in the households. Education of malaria should also be undertaken to ensure that the members of the public use nets among adolescents, school children and the members of the households. Nonetheless, the study identified that there is a need for effective environmental management and improvement especially during construction of houses
7-	Moyou-Somo, R., Essomba, P., Songue, E., Tchoubou, N. N., Ntambo, A., Hiol, H. N., ... & Millet, P. (2013).	A public-private partnership to fight against malaria along the Chad-Cameroon pipeline corridor: I. Baseline data on socio-anthropological aspects, knowledge, attitudes and prac-	BMC public health, 13(1), 1023.	The study found that the prevention of malaria in the whole year was adversely affected by limited access to media and housing features which made the sensitization campaigns difficult. Generally, most of the households were are of the

	tices of the population concerning malaria.		disease presence and its mode of transmission. The study however, found out that the malaria drugs that were used were inappropriate. Nonetheless, the study recommended helping in guiding implementation of control measures.	
8-	Sougoufara, S., Diédhiou, S. M., Doucouré, S., Diagne, N., Sembène, P. M., Harry, M., ... & Ndiath, M. O. (2014).	Biting by <i>Anopheles funestus</i> in broad daylight after use of long-lasting insecticidal nets: a new challenge to malaria elimination.	Malaria journal, 13(1), 125.	The study established that having a clear understanding of the vectors behaviour is important in determining its transmission capacity. In this case, the study indicated that the changing behaviour of the mosquito has significantly increased the risk of malaria and has presented a new challenge in the process of controlling malaria. Therefore, the study made recommendations for better strategies to be put in place to control the vector for effective malaria control.
9-	Hill, J., Hoyt,	Factors affecting	PLoS medi-	The study established

<p>J., van Eijk, A. M., D'Mello-Guyett, L., ter Kuile, F. O., Steketee, R., ... & Webster, J. (2013).</p>	<p>the delivery, access, and use of interventions to prevent malaria in pregnancy in sub-Saharan Africa: a systematic review and meta-analysis.</p>	<p>icine, 10(7), e1001488.</p>	<p>that the delivery of the insecticides treated nets during antenatal clinics presents fewer issues as compared to the delivery of the IPTp. Further, the study found out that most of the obstacles to the IPTp delivery are simple which can be addressed in a short period. However, there are other barriers which are linked to the overall healthcare system or the cultural contexts which need both medium term to long-term strategies to address effectively.</p>
<p>10- Nankabirwa, J., Brooker, S. J., Clarke, S. E., Fernando, D., Gitonga, C. W., Schellenberg, D., & Greenwood, B. (2014).</p>	<p>Malaria in school-age children in A Africa: an increasingly important challenge.</p>	<p>Tropical medicine & international health, 19(11), 1294-1309.</p>	<p>The use of the chemoprevention has been effective in controlling anaemia and improving performance in school. However, there is no known effective way which can be used to control malaria. In overall vaccines against malaria play a significant role in controlling malaria</p>

			among the school going children. Further, the study indicated that regardless of the approach employed, it is also imperative to include the overall program or measures which are aimed at improving the health of school going children in Africa.
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No	Casp checklists	Ndo, C., Menze-Djantio, B., & Antonio-Nkondjio, (2011).	Bow-en, H. L. (2013)	Kimbi, H. K., Nkesa, S. B., Ndamukong-Nyanga, J. L., Sumbele, I. U., Atashili, J., & Atanga, M. B. (2014).	Titanji, V. P., Zofou, D., & Ngemenya, M. N. (2008).	Nsagha, D. S., Njunda, A. L., Kamga, H. L. F., Assob, J. C. N., Wiysonge, C. S., Nsagha, S. M., & Njamshishy, A. K. (2011).
1	Was there a clear statement of the aims of the re-search?	Y	Y	Y	Y	Y
2	Is a quali-tative methodolo-	Y	Y	Y	Y	Y

	gy appropriate?					
3	Was the research design appropriate to address aims of the research?	Y	Y	Y	Y	Y
4	Was the recruitment strategy appropriate to the aims of the research?	Y	Y	N	Y	Y
5	Was the data collected in a way that addressed the research issue?	Y	Y	Y	Y	Y
6	Has the relationship between the researcher and participants been adequately considered?	Y	Y	C/T	Y	Y
7	Have ethical issues been taken into considerations?	Y	Y	Y	Y	Y
8	Was the data analysis sufficiently rigorous?	Y	Y	Y	Y	Y
9	Is there a clear statement of findings?	Y	Y	Y	Y	Y
10	How valuable is the research?	Y	Y	Y	Y	Y

No	Casp checklists	Tchinda, V. H. M., Socpa, A., Keundo, A. A., Zeukeng, F., Seumen, C. T., Leke, R. G. F., & Moyou, R. S. (2012).	Moyou-Somo, R., Essomba, P., Songue, E., Tchoubou, N. N., Ntambo, A., Hiol, H. N., ... & Millet, P. (2013).	Sougoufara, S., Diédhiou, S. M., Doucouré, S., Diagne, N., Sembène, P. M., Harry, M., ... & Ndiath, M. O. (2014).	Hill, J., Hoyt, J., van Eijk, A. M., D'Mello-Guyett, L., ter Kuile, F. O., Steketee, R., ... & Webster, J. (2013).	Nankabirwa, J., Brooker, S. J., Clarke, S. E., Fernando, D., Gitonga, C. W., Schellenberg, D., & Greenwood, B. (2014).
1	Was there a clear statement of the aims of the research?	Y	Y	Y	Y	Y
2	Is a qualitative methodology appropriate?	Y	Y	Y	Y	Y
3	Was the research design appropriate to address aims of the research?	Y	Y	Y	Y	Y
4	Was the recruitment strategy appropriate to the aims of the research?	Y	Y	Y	Y	N
5	Was the data collected in a way	Y	Y	Y	Y	Y

	that addressed the research issue?					
6	Has the relationship between the researcher and participants been adequately considered?	N	C/T	Y	Y	Y
7	Have ethical issues been taken into considerations?	Y	Y	Y	Y	Y
8	Was the data analysis sufficiently rigorous?	Y	Y	Y	N	Y
9	Is there a clear statement of findings?	Y	Y	Y	Y	Y
10	How valuable is the research?	Y	Y	Y	Y	Y

Appendix 2: Data Appraisal Process by CASP Tool

Abbreviations Y= yes, N= no, C/T= Can't Tell