

**KNOWLEDGE, ATTITUDES AND TREATMENT-SEEKING
BEHAVIOUR TOWARDS MALARIA AMONG ADULT
RESIDENTS OF BUSHBUCKRIDGE, MPUMALANGA
PROVINCE, SOUTH AFRICA**

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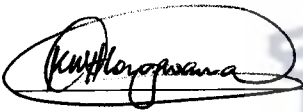
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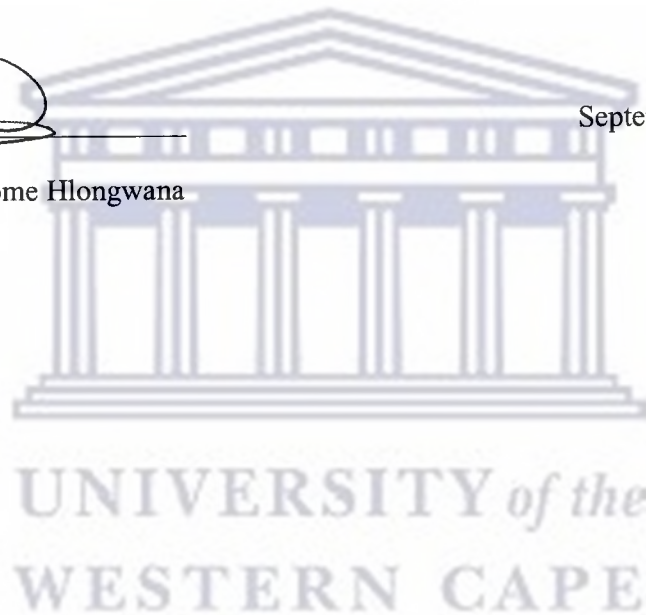
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DECLARATION: I declare that “Knowledge, attitudes and treatment-seeking behaviour towards malaria among adult residents of Bushbuckridge, Mpumalanga Province, South Africa” is my own independent work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.



Khumbulani Welcome Hlongwana

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ABSTRACT

Introduction

Highest-risk malaria areas in South Africa share borders with Mozambique, Swaziland and Zimbabwe. Ongoing migration between these neighbouring areas impacts on malaria control interventions. For example, 30% of the adult population in Bushbuckridge originate from Mozambique. Despite these dynamics, no studies were found which investigated knowledge, attitudes and behaviours towards malaria in Bushbuckridge.

Methods

This study was undertaken as a descriptive cross-sectional survey. A field-piloted structured questionnaire was administered to 602 randomly selected households, where only one household member was interviewed. Interviewees were heads of households, but in their absence, responsible adults above 18 years were included.

Results

Of 602 respondents, 93% (n=559, 95% CI: 90.4 – 94.7%) had heard about malaria, mainly from health facilities (29%, n=175) and radios (20%, n=119). Most respondents correctly associated malaria with mosquito bites. There were no differences in knowledge of the causes of malaria between males and females, whereas age and educational level influenced malaria knowledge. Younger and more educated respondents were more knowledgeable than their older and less educated counterparts. Despite 91% of respondents (n=546, 95% CI: 88.0 – 92.8%) knowing that malaria can kill if untreated; only 48% could identify one or two symptoms of malaria. Most (99%, n=595, 95% CI: 97.5 – 99.5%) of the respondents would seek treatment at health facilities, 82% (n=488) of whom would do so within 24 hours of onset of malaria symptoms.

Discussion and conclusion

Most respondents showed a fair amount of knowledge on the causes of malaria, but not enough people were able to correctly identify the key symptoms of malaria. Health facility and radio were the main sources of malaria information. Most respondents sought treatment at health care facilities, contrary to most African countries where treatment is first sought at non-public health facilities.

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Key words:

- Knowledge, attitudes and behaviours
- Malaria
- Communities
- Health education
- Information, education and communication
- Communication channels
- Signs and symptoms
- Treatment-seeking
- Malaria Control Programme
- South Africa



List of acronyms

ABET : Adult-based education and training

ACT : Artemisinin combination therapy

BCC : Behaviour change communication

CFR : Case fatality rate

CHW : Community health worker

DDT : Dichlorodiphenyltrichloroethane

HMIS : Health management information system

IEC : Information, education and communication

IRS : Indoor residual spraying

KAP : Knowledge, attitudes and practices

KAPB : Knowledge, attitudes, practices and behaviours

KZN : KwaZulu-Natal

MCP : Malaria Control Programme

MRC : Medical Research Council

MRP : Malaria Research Programme

SADC : Southern African Development Community

TV : Television

WHO : World Health Organisation



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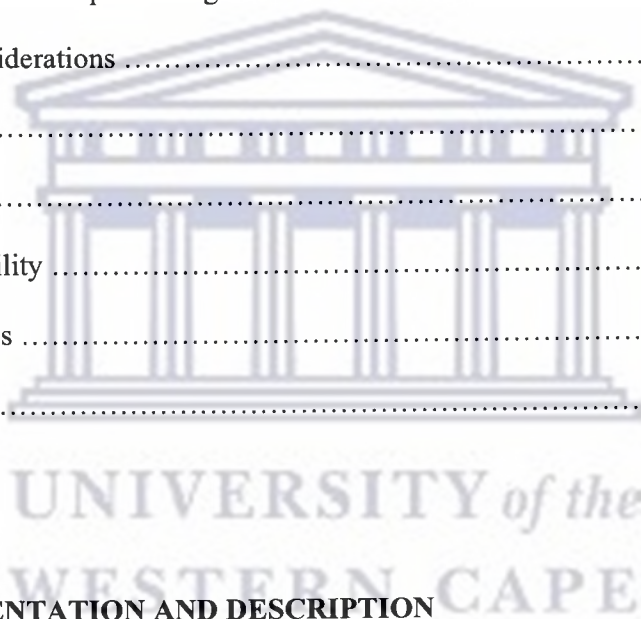
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CHAPTER 1

1.1 Introduction

In order to implement the locally relevant disease control strategies, which befit cultural conditions and context, a good understanding of the community's knowledge, attitudes, practices and behaviours (KAPB) towards that particular health problem is necessary (Deressa, Ali & Enquoselassie, 2003; Joshi & Banjara, 2008; Klein, Weller, Zeissig, Richards & Ruebush, 1995). Malaria is no exception; hence community's involvement is anticipated to yield useful results (Joshi & Banjara, 2008; Krogstad & Ruebush, 1996; Nieto, Mendez & Carrasquilla, 1999), thereby circumventing malaria burden (Tyagi, Roy & Malhotra, 2005). In Bohlabele Health sub-District, commonly referred to as Bushbuckridge, no studies were found which investigated knowledge, attitudes and behaviours towards malaria. Even more so, Bushbuckridge was only moved from Limpopo to Mpumalanga Province in June 2006.

The main rationale for this study was to provide information on the adult residents' KAPB regarding malaria in Bushbuckridge. This was achieved through investigating and describing the local adult residents' understanding of malaria transmission, recognition of signs and symptoms, perceptions of cause and treatment-seeking patterns. Now that the study has been successfully completed, it is anticipated that Malaria Control Programme (MCP) would use the results to inform its malaria health education activities, especially focusing on the gaps identified by the study results.

This study came into effect following the MCP personnel's acknowledgement that the absence of KAPB baseline data in Bushbuckridge was a shortcoming and needed to be addressed. The existence of this gap gave impetus for this study to be undertaken and provided the basis for

effective collaboration between a researcher and the MCP. Noting the long history of a close working relationship between MCP and other local stakeholders, such as the traditional leaders and the councillors, the researcher and MCP collaboration instrumentally helped in three ways: (1) it created an easy access to local stakeholders to discuss the importance of the study, (2) it provided a platform through which the results could reach to the stakeholders through MCP, and (3) most importantly, MCP can, with the full involvement of stakeholders, use the results in information, education and communication (IEC) intervention activities or even to develop behaviour change communication (BCC) strategy.

It is expected that strengthening IEC intervention activities will help the community to improve an uptake of available malaria control interventions. If IEC interventions assist people in implementing preventive measures and seek prompt treatment at the appropriate health care facilities whenever they suspect malaria infection, this should contribute to helping the MCP prevent malaria induced mortality, thereby keeping malaria case fatality rate (CFR) below 0.5% as advocated by the national Department of Health. Goals set by the national Department of Health remain a challenge, noting that 316 cases were notified in Bushbuckridge with a CFR of 1.6% during the period - July 2006 to June 2007 (Unpublished data, Provincial Malaria Information System).

Despite malaria infection being a medical condition, knowledge, attitudes and treatment-seeking behaviour towards it would, inadvertently affect the rate of infection and CFR. Studies have shown that if people have adequate information about malaria, they tend to favour application of preventive methods and seek proper treatment at health care facilities whenever they observe

malaria signs and symptoms in themselves and their dependants (Tyagi *et al.*, 2005; Ahorlu, Koram, Arholu, De Savigny & Weiss, 2006).

1.2 Summary of the chapters

Chapter one presents the introductory information which justifies the basis of the current study. This information provides the context through which KAPB can play a meaningful role in malaria control activities. Rationale for the study is clearly described in this chapter. Furthermore, collaborations are outlined, including what the study hopes to achieve, while fully appreciating the value of these collaborations.

In chapter two, the literature review begins by providing an overview of the malaria situation globally and further focuses on the African region and ultimately to South Africa and the Southern African Development Community (SADC), taking cognisance of KAPB surveys. Subsequently, findings by other studies on malaria knowledge and its source of transmission are appraised, taking into cognisance the age of studies, approaches and methods used, study design applied, sample frame and sample size selected, study settings in which these studies took place, as well as strides made by malaria control programmes to date in those settings/ countries. Patterns of malaria information dissemination in terms of the sources are identified and reviewed. Treatment-seeking behaviours in various countries of the world are evaluated against the WHO recommendation and Abuja Summit, focusing mainly on promptness in seeking treatment and the facilities used to acquire treatment.

Chapter three describes the study area with the support of a clear map showing the position of Bushbuckridge in South Africa and the distribution of all the study sentinel sites. Aim and

objectives of the study are described. Details of household and population distributions are presented. Choice of study design is explained. Detailed step-by-step sampling procedure and sample size are elucidated. Data collection processes, as well as ethical considerations are presented. Issues of validity, reliability and generalisability are addressed. Data analyses together with limitations experienced are described.

In chapter four, the results of the study are presented and described. Frequency tables and figures are used for data description and illustrations. Percentages are used to present descriptive statistical analysis, while chi-squared tests are applied to compare between proportions. The 95% Confidence Intervals are used to assess the association between variables.

In the final chapter, the discussion interprets the current study findings, while comparing the results to other similar study findings undertaken elsewhere in the world and African region in particular. Both the knowledge and gaps concerning malaria among the adult residents of Bushbuckridge are highlighted. Overall conclusions of the study are drawn, while advancing recommendations on how to utilise these findings to improve behaviour change communication strategies. The main findings and gaps in malaria information are summarised for the attention of the Malaria Control Programme personnel.

CHAPTER 2

LITERATURE REVIEW

2.1 Global overview of malaria

Malaria is still regarded as one of the world's greatest challenges (Mabaso, Sharp & Lengeler, 2004), with about half (3.3 billion) of the world's population exposed to malaria risks (Rugemalila, Ogundahunsi, Stedman & Kilama, 2007; WHO, 2008). By the year 2006, 109 countries were reportedly affected by malaria (WHO, 2008). Malaria kills over one million people per year (Joshi & Banjara, 2008) and up to 500 million clinical malaria cases occur, globally (Onwujekwe, Akpala, Ghasi, Shu & Okonkwo, 2000; Rugemalila *et al.*, 2007). The World Health Organisation Malaria Report estimated that 247 million malaria episodes occurred, globally, in the year 2006 (WHO, 2008).

Africa accounts for over 90% of malaria burden worldwide (Snow, Graig, Deichmann & Marsh, 1999; Borah, Dutta, Phukan & Mahanta, 2004; Breman, Alilio & Mills, 2004; Agyepong & Kangeya-Kayonda, 2004; Ahorlu *et al.*, 2006). Agyepong and Kangeya-Kayonda (2004) insist that malaria episodes in Africa are underestimated, as they believe that a lot more cases never reach health facilities, and therefore not captured by the health management information system (HMIS). Several studies illustrate that sub-Saharan Africa is the worst malaria afflicted region in the world (De Savigny, Mayombana, Mwageni, Masanja, Minhaj, Mkilindi *et al.*, 2004; Goodman & Mills, 1999; Macintyre, Keating, Sosler, Kibe, Mbogo, Githeko *et al.*, 2002; Müller, Traore, Becher & Kouyate, 2003), and malaria is the number one killer (Deressa *et al.*, 2003).

In South Africa, malaria transmission is restricted to the north-eastern border areas with Mozambique, Swaziland and Zimbabwe (Barnes, Durrheim, Little, Jackson, Mehta, Allen *et al.*,

2005), affecting mainly the three Provinces (KwaZulu-Natal, Limpopo and Mpumalanga). The World Malaria Report compiled by the WHO (2008) showed that in South Africa, 32 530 malaria cases were recorded in the year 2006 at a national scale. However, worse conditions in terms of malaria incidence rates have been reported among other Southern African Development Community (SADC) countries. For example, malaria is endemic and a leading cause of death in Zambia (Sharp, van Wyk, Sikasote, Banda & Kleinschmidt, 2002), with an annual four million clinical cases and 8 000 deaths, (Chanda, Castillo-Riquelme & Masiye, 2009) in a population of about 12 million people. Similarly, in Mozambique, malaria represents the main cause of paediatric outpatient consultations and admissions at health care facilities (Bassat, Guinovart, Sigauque, Aide, Sacarlal, Ngampossa *et al.*, 2008). Almost the entire Mozambican population and about half of the Namibian population are at risk of malaria (Teklehaimanot, McCord & Sachs, 2007).

2.2 Scope of KAPB surveys

Studies on the behavioural aspects of malaria through KAPB surveys have been conducted in many malarious countries of the world (Booth & MacLean, 2001; Joshi & Banjara, 2008; Klein *et al.*, 1995; Nieto *et al.*, 1999; Rodriguez, Penilla, Henry-Rodriguez, Hemingway, Betanzos & Hernandez-Avila, 2003; Sanjana, Barcus, Bangs, Ompusunggu, Elyazar, Marwoto *et al.*, 2006; Unnikrishnan, Jaiswal & Reshmi, 2008; Vigneron, Deparis, Deharo & Bourdy, 2005), including the African region (Alilio & Bammek, 1998; Deressa *et al.*, 2003; Erhun, Agbani & Adesanya, 2005; Oguonu, Okafor & Obu, 2005; Nkuo-Akenji, Ntonifor, Ching, Kimbi, Ndamukong, Anong *et al.*, 2005).

By and large, these KAPB surveys covered most or all of the following aspects: knowledge on malaria and its source of transmission, sources of malaria information dissemination, preventive measures, attitudes towards and patterns in seeking treatment, adherence to treatment and indoor residual house spraying (IRS), including social practices, such as replastering, which compromise the residual efficacy of an insecticide. However, for the purpose of this study, this review will exclude aspects, such as, preventive measures, adherence to treatment, as well as IRS.

2.3 Knowledge on malaria and its source of transmission

An improved knowledge and the awareness of malaria and its source of transmission remain among the important preventive strategies to circumvent malaria problem (Tyagi *et al.*, 2005). For example, knowing that mosquito transmits malaria was found to promote the use of personal protective measures. For example, the use of bednets among the southern Ghanaians was associated with the knowledge that mosquito transmits malaria (Ahorlu *et al.*, 2006). Validating this view are numerous studies on the malaria knowledge conducted in many malarious settings, the majority of which have been used to develop appropriate behaviour change communication strategies (Mushi, Schellenberg, Mrisho, Manzi, Mbuya, Mponda *et al.*, 2008). Taking it a step further, a study conducted in Southeast Nigeria found a close association between improved knowledge and practice about malaria and high levels of education (Dike, Onwujekwe, Ojukwu, Ikeme, Uzochukwu & Shu, 2006).

In South Africa two studies conducted in north-eastern KwaZulu-Natal (Mnzava, Ntuli, Sharp, Mthembu, Ngxongo & le Sueur, 1998) and Tonga, Mpumalanga Province (Govere, Durrheim, la Grange, Mabuza & Booman, 2000) revealed that over 90% of the respondents in KwaZulu-Natal and 72% in Mpumalanga Province had heard about malaria. In Enugu, Nigeria, malaria

knowledge among caregivers reflected the rural-urban dichotomy, whereby 99% of the respondents in urban Enugu compared to 74% in rural Enugu ($P \leq 0.05$) knew about malaria (Oguonu *et al.*, 2005). In rural Bolifamba, southwest Cameroon, a two-phase cross-sectional intervention study by Nkuo-Akenji *et al.* (2005), found that about 80% of the participating people had knowledge of malaria prior to intervention; the prevalence increased to 96.9% post-intervention.

Knowledge of association between malaria and mosquito bite showed mixed responses in different countries of the world, i.e. 57% in Assam, India (Borah *et al.*, 2004), 98% in rural Sri Lanka (Konradsen, van Der Hoek, Amerasinghe, Amerasinghe & Fonseka, 1997), 96% in French Guiana (Vigneron *et al.*, 2005), 95.3% in Mbarara (Nuwaha, 2002), 85% in Buenaventura, a port on the Pacific Coast of Colombia (Nieto *et al.*, 1999), 80.5% in coastal south India (Unnikrishnan, Jaiswal & Reshmi, 2008), 73% in Nepal (Joshi & Banjara, 2008), 69% in Central Java (Sanjana *et al.*, 2006), 66% in Butajira district, southern Ethiopia (Deressa *et al.*, 2003), 58.5% in Baringo district, Kenya (Munguti, 1998), 90% in Guatemala (Klein *et al.*, 1995), 48% in southern Mexico (Rodriguez *et al.*, 2003) and only 34% in Zanzibar (Alilio & Bammek, 1998), and 87.2%, 98.2%, 97.6%, 96.9% and 91.2% in five rural communities of Enugu State, South-eastern-Nigeria, i.e. Mbano, Ugwogo, Orba, Alor-uno and Ibagwa-ani, respectively (Onwujekwe *et al.*, 2000).

Except for the studies conducted in Assam, Baringo, Mexico and Zanzibar, other published articles reviewed in this study showed that more than two-thirds of the respondents correctly associated malaria and mosquito bite. It is also important to note that the studies which are an exception were conducted at the different time periods and malaria knowledge and situations in

these countries may have changed considerably. For example, Zanzibar study was conducted in more than ten years ago (Alilio & Bammek, 1998). Community knowledge of malaria may have changed in Zanzibar considering that a significant progress towards elimination has been made mainly through the introduction of Artemisinin combination therapy (ACT) and effective vector control interventions (Greenwood, 2008; Takken & Knols, 2008). No recent studies were found in Zanzibar, which provided up to date information on behaviour change progress made as the country moves towards malaria elimination. Malaria elimination is defined as the cessation of local transmissions (Greenwood, 2009).

The study conducted in Nigeria only focussed on caregivers in both rural and urban areas, with interviews taking place in the clinic settings. The study excluded non-caregivers and those who were not at the clinic facilities during a time of the interviews. In addition, convenience sampling technique was used, thus making results unrepresentative and not generalisable. The knowledge and practices study conducted by Nkuo-Akenji *et al.* (2005) in Cameroon only focused on the mothers of children under 5 years and therefore a larger population was not eligible to participate. Views from the broader segment of a population were therefore missed.

Notably, of the studies conducted in South Africa, the KwaZulu-Natal study took place more than a decade ago and its core focus was on the house replastering and the shift from Dichlorodiphenyltrichloroethane (DDT) to synthetic pyrethroids. Despite a reasonable sample size (n=539) and the credible sampling procedure, community knowledge of malaria was only included as an additional issue and hence did not encapsulate all the issues, which a well focused KAPB study would normally address.

Although the study undertaken in Mpumalanga was a descriptive cross-sectional survey, its sample size (n=299) and the fact that it only included female heads of the selected households, were areas of concern and raised questions about the generalisability of results to a broader population. Therefore, views of other adult households members, including male head of the households were not heard. In Tonga, Mpumalanga, Govere *et al.* (2000) found a close association between knowledge of the role of mosquito in malaria transmission and the knowledge of disease symptoms ($P<0.001$).

It is important to note that most studies which are part of the literature appraisal took place in different settings with varying degrees of malaria endemicity and also using the different approaches. For example, Nuwaha (2002) used qualitative approaches in his study, which included focus group discussions and semi-structured interviews. Interestingly, the study involved both heads of households and spouses in both low and high income areas of south-western Uganda. Due to the qualitative approach taken in the study, issues of validity, representativity and generalisability akin to quantitative research, are not applicable.

The survey undertaken in Butajira followed credible survey design and sampling technique with a sufficient sample size (n=630) (Deressa *et al.*, 2003). This study took place in six peasants' associations (Pas), which were selected based on the endemicity of malaria. However, it is not clear whether the degree of endemicity in Butajira had any bearing on the study results. The studies by Munguti in Baringo district - Kenya (1998) and Alilio and Bammek (1998) in Zanzibar are considered obsolete as they were undertaken in more than 12 years ago and the situation might have changed considerably.

Community knowledge of malaria signs and symptoms remains among the important factors determining early diagnosis and treatment (Nkuo-Akenji *et al.*, 2005). Most reviewed studies consistently showed reasonable community knowledge of at least three signs and symptoms (headache, chills and high temperature/ fever) of malaria (Deressa *et al.*, 2003; Dunyo, Afari, Koram, Ahorlu, Abubakar & Nkrumah, 2000). In most studies more than 70% of the respondents were able to identify these malaria signs and symptoms.

The inclusion of fever in the frequently mentioned signs and symptoms remains an interesting dimension given the fact that fever is often viewed as one of the most useful diagnostic clues of malaria infection (Einterz & Bates, 1997; Greenwood, 1996). Some malaria endemic countries in Africa continue to provide antimalarials to people who present with fever symptoms, as it is seen as a proxy for malaria (Deressa, 2007; Chanda, *et al.*, 2009). Strikingly, the study by Vigneron *et al.* (2005) found that 80% of the interviewed people in French Guiana believed that malaria and fever were different diseases with different treatments.

2.4 Sources of malaria information dissemination

Studies on knowledge, attitudes, practices and behaviours hardly report on how people receive malaria information. If they do, identification of people's preferred malaria information communication routes is often ignored. Information, education and communication (IEC), a programme to educate communities and enforce behavioural change, is an integral part of malaria control strategies (Teklehaimanot *et al.*, 2007), and as such, should be regularly evaluated. Despite dearth of KAPB literature covering information dissemination aspect, studies conducted in Uganda (Ndyomugenyi, Magnussen & Clarke, 2007) and Nepal (Joshi & Banjara, 2008) revealed radio as the main source of malaria information dissemination. In addition to the radio,

Health Workers were also found to be common sources of malaria information dissemination in Uganda (Ndyomugenyi, Magnussen & Clarke, 2007) and in Central Java, Indonesia (Sanjana *et al.*, 2006).

2.5 Attitudes towards and patterns in seeking treatment

Early diagnosis and treatment of malaria, as crucial malaria control component, is dependant on health seeking behaviour (Giao, de Vries, Binh, Nam & Kager, 2005), which in turn is also dependant on the quality of behaviour change malaria education activities (Owusu-Agyei, Awini, Anto, Mensah-Afful, Adjuik, Hodgson *et al.*, 2007). KAPB studies are known to have played a pivotal role in identifying gaps to focus the malaria health promotion strategies, and Northern Ghana is an example of this (Owusu-Agyei *et al.*, 2007), whereby surveys were used to monitor and evaluate improvement in malaria knowledge and improvement in treatment-seeking behaviour. Knowledge of the causes of malaria, signs and symptoms as well as its potential fatal consequences are, inevitably, expected to influence the community attitudes towards treatment, including the promptness and the choice of treatment facility.

The study conducted by Ndyomugenyi and colleagues found that promptness in treatment-seeking remains relatively low in Uganda (Ndyomugenyi *et al.*, 2007). WHO (2000) stipulates that, 'at least 60% of those suffering from malaria should seek treatment within 24 hours of the onset of symptoms.' The study conducted by Deressa (2007) among 12,225 people in 2,253 randomly selected households in rural Ethiopia found that, out of the 14% of the people who had suffered from malaria during the 14 days preceding the study, only 13% sought treatment within the first 24 hours of symptom onset. Unfortunately, most of those (13%) who sought treatment

within 24 hours visited community health workers (CHWs) and practiced home treatment other than visiting public health facilities (Deressa, 2007).

In Ghana, only 11% of the children suspected to be malaria infected received timely and appropriate treatment (Ahorlu *et al.*, 2006), consistent with the WHO (2000) recommendation. Studies in other parts of the world found that early treatment-seeking at health facility were associated with the distance between their residential places and the location of health facility. For example, in the highlands of south-western Uganda, 65% of adults who lived within 5 km of the health facility sought treatment within the 24 hours of symptom onset (Ndyomugenyi *et al.*, 2007). Notably, this study was a retrospective study conducted during the epidemic and a prospective study conducted during low malaria season may have produced different results.

The study conducted by Sumba and colleagues in August – September 2002 found that promptness in seeking treatment in a highland area of Kenya was commensurate with the Abuja target, since 68% of the adult people were found to seek treatment within one day of onset of symptoms (Sumba, Wong, Kanzaria, Johnson & John, 2008). Abuja Summit had put the 2005 as a year in which at least 60% of those suffering from malaria would be able to have an easy access to appropriate and affordable treatment within 24 hours of onset of malaria symptoms. Many African countries are still battling to achieve the target set in the Abuja Summit.

Early treatment-seeking behaviour alone is not adequate, unless if people seek treatment at the appropriate health care facilities. Studies conducted in South Africa, Mozambique, Swaziland and Kenya (Castillo-Riquelme, McIntyre & Barnes, 2008; Hlongwana, Mabaso, Kunene,

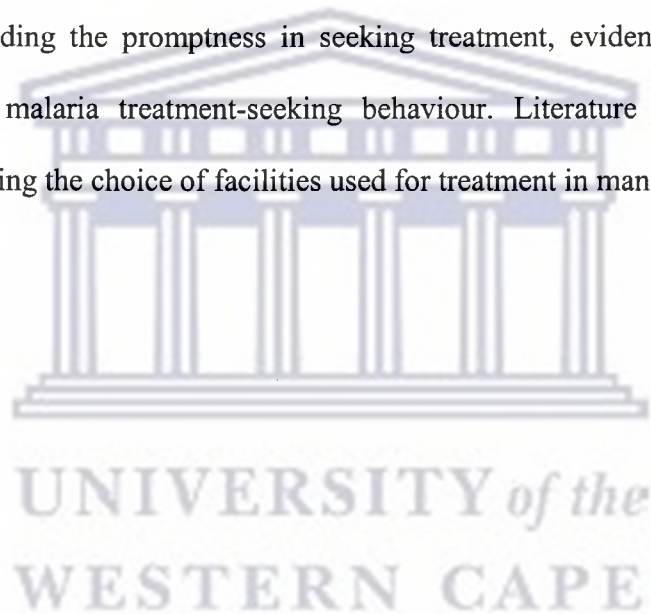
Govender & Maharaj, 2009; Sumba *et al.*, 2008) found that most people would normally choose the public healthcare facilities as their treatment option of choice.

The treatment-seeking pattern found in Mozambique, Swaziland and South Africa was considered a different context to the rest of Africa. This pattern could be attributed, largely, to the effectiveness of country Malaria Control Programmes as well as the successes of the Lubombo Spatial Development Initiative (LSDI), a collaborative approach to malaria control between Mozambique, Swaziland and South Africa (Sharp, Kleinschmidt, Streat, Maharaj, Barnes, Durrheim *et al.*, 2007). Compounding the disparities in treatment practices among African countries is the lack of adequate health infrastructure as well as limited financial and human resources (Mabaso *et al.*, 2004).

It is evidenced that even if malaria has occurred, death can still be prevented through early diagnosis and early treatment at healthcare facilities (De Savigny *et al.*, 2004; Kilian *et al.*, 2003; Linhua, Manderson, Da, Kaichen, Xianzheng, Changxiong *et al.*, 1995). Early treatment does not only help to prevent death, but it is also known for interrupting a parasite transmission (Lindblade, O'Neill, Mathanga, Katungu & Wilson, 2000). Although early diagnosis and treatment of malaria are attributed to the treatment seeking-behaviour and the quality of the health care service (Giao *et al.*, 2005), in south-western Nigeria, religious beliefs were identified as additional factors influencing the choice of malaria treatment and preventive methods (Erhun *et al.*, 2005). Belief in witchcraft also does affect treatment-seeking pattern in certain communities (Nkuo-Akenji *et al.*, 2005). Inevitably, prompt treatment is likely to be influenced by the correctness of the individual's knowledge and attitudes towards malaria.

2.6 Conclusion

In conclusion, with the exception of rural Enugu, all studies reviewed here showed that more than 80% of the respondents were reported to know the causes of malaria. Radio and health workers were the key malaria information disseminators in many studies. There were no consistencies among different studies regarding the respondents' knowledge of the association between malaria and the mosquito bites. Generally, three signs and symptoms of malaria, i.e. headache, chills and high temperature/ fever, appeared to be widely known across the countries. In view of the WHO recommendation regarding the promptness in seeking treatment, evidence from the literature demonstrates a poor malaria treatment-seeking behaviour. Literature has also shown that challenges exist regarding the choice of facilities used for treatment in many African countries.



CHAPTER 3

RESEARCH METHODOLOGY AND DESIGN

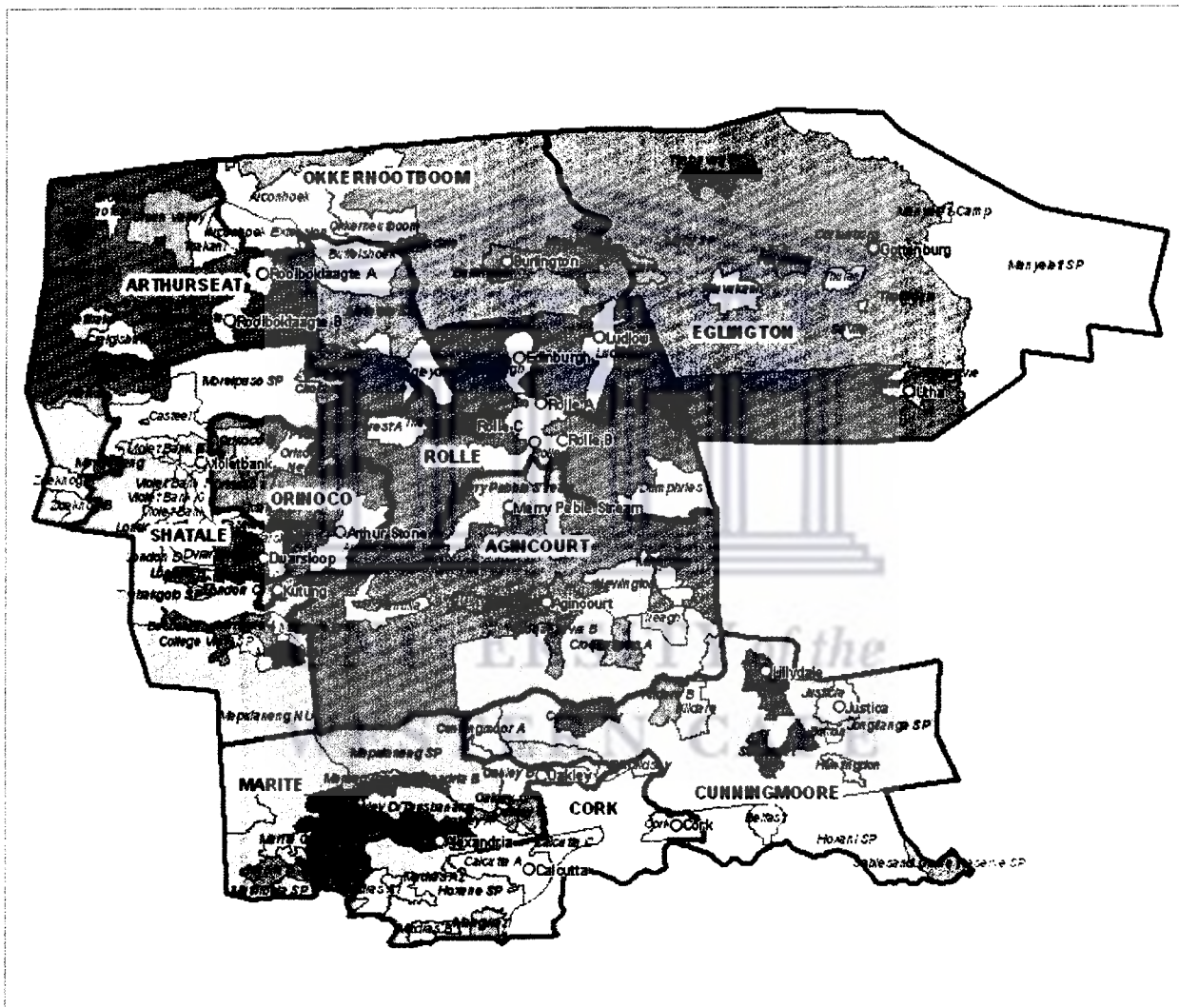
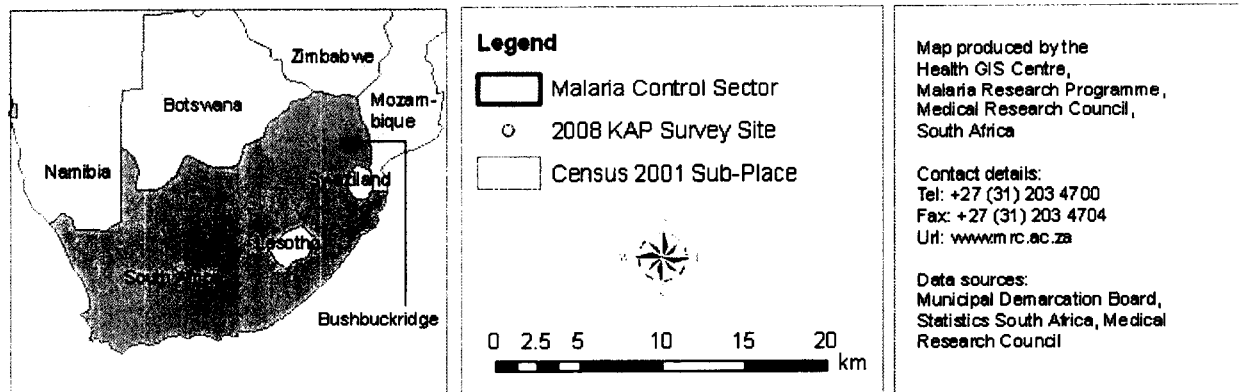
3.1 *Study area*

In South Africa, malaria has a history of affecting, mainly, north-eastern areas bordering Mozambique, Swaziland and Zimbabwe (Sharp, & Le Sueur, 1996). Despite major successes achieved through multiple interventions, including cross-border programmes, such as the LSDI, these border areas are not completely free from the scourge of malaria (Sharp *et al.*, 2007). In all malarious areas in South Africa, malaria transmission is seasonal, with an annual peak from January to May (Craig, Kleinschmidt, Nawn, Le Sueur & Sharp, 2004; Gerritsen, Kruger, van der Loeff & Grobusch, 2008; Govere *et al.*, 2000). Mpumalanga Province is situated between Mozambique in the east, Swaziland in the south, Limpopo Province in the north and Gauteng Province in the west, and occupies 6% of the surface area of the country (Statistics South Africa, 2004). It is the province with the third smallest population in South Africa.

Bushbuckridge has an areal size of 2 400km² (Pérez de Mendiguren, 2003) and the population was already exceeding half a million people, with an estimated 110 000 households by the late 1990s (Tollman, 1999; Statistics South Africa, 2004). Although the exact current population is not known, it is estimated to range between 700 000 and one million, with about 30% of the adult population originating from Mozambique (Du Toit, Yeatman & Andreasen, n.d.). These populations and households are distributed among 67 villages commonly referred to as localities of which all are malarious at almost similar intensities. For operational reasons, MCP has divided Bushbuckridge into ten malaria control Sectors, namely: Cunningmore, Cork, Agincourt, Rolle and Eglington (in the east); Shatale, Orinocco, Marite, Arthurseat and Okkernootboom (in the west). Sectors are bigger areas constituted of different villages, usually less than 10 villages.

These are not familiar concepts across the different departments, but are exclusively used by the Malaria Control Programme for its operational needs. The 67 localities are distributed among the above-mentioned ten sectors. For the interest of this study, the map focuses on the selected localities in all ten sectors.





Study Map: KAP Survey Sentinel Sites and Malaria Control Sectors in Bushbuckridge

3.2 Aim and objectives

3.2.1 Aim

The aim of this study was to describe adult residents' knowledge, attitudes and treatment-seeking behaviour towards malaria in Bushbuckridge in 2008.

3.2.2 Objectives

The objectives of this study were:

- To describe the level of knowledge of malaria, including causes and symptoms among adult residents of Bushbuckridge, Mpumalanga.
- To identify the key sources of malaria information.
- To describe the Bushbuckridge adult residents' attitudes towards malaria and treatment.
- To determine the usual first-line health facility that is used when an adult patient is suspected of having malaria.
- To describe the Bushbuckridge adult residents' promptness in seeking treatment when suspecting malaria.

3.3 Study design

The study was undertaken as a quantitative cross-sectional descriptive survey (Beaglehole & Bonita, 1997; Katzenellenbogen, Joubert & Abdool Karim, 1999). Cross-sectional surveys are known as descriptive studies because they only describe the phenomenon and conclusions about the cause and effect are hard to reach (Bowling, 1997; Katzenellenbogen *et al.*, 1999). However, they are still considered to be economical (Beaglehole, Bonita & Kjellstrom, 1993), especially since all variables are measured at the same time. The main strength of cross-sectional studies is

that they are helpful in assessing community health needs (Bowling, 1997). This study, in particular, is anticipated to help identify malaria health information and educational needs.

3.4 Sampling

All household heads in the selected localities were eligible for inclusion into this study, irrespective of their gender. In cases of child-headed households, only children above the age of 18 years were considered for inclusion into the study. Similarly, in the absence of household head, his/ her proxy (above the age of 18 years) was selected to participate into the study. Household members below the age of 18 years were excluded, irrespective of their status in the household. The principal researcher spent the duration of field work working with data collectors to ensure that help was availed in cases where data collectors faced sampling challenges. All ten sectors that constituted Bushbuckridge participated into the study (refer to Table 1 below). However, only two localities per sector were randomly selected.

The sample consisted of household heads and or their proxies who had to be above 18 years of age. Assuming that the number of households had increased from 110 000 to 130 000 and 70% (91 000) of the household heads and adults acting for household heads in Bushbuckridge knew the causes of malaria and sought treatment at health facilities, a sample size was calculated using Survey Random Sample Calculator. The values used in calculating the sample size were 91 000 households and an error margin on 4 at a Confidence Level of 95%. This resulted to the overall sample size of 596, which was rounded-off to a sample size of 600 participants from the equivalent number of households, meaning that only one person per household participated into the study.

As illustrated by Table 1 below, the sample represented all ten sectors. However, sampling was not proportional to the size of each sector or locality. Between 29 and 33 households were systematically selected in each of the 20 randomly selected localities (Table 1). Given the fact that sampling started by randomly selecting localities, continued to systematically identify households in each locality and finally recruited individuals within the households, the approach can therefore be referred to as a multi-staged sampling strategy.

Table 1: Sample distribution

SECTORS	LOCALITIES	SAMPLE
AGINCOURT	Merry Pebble Stream	30
	Agincourt	30
EGLINGTON	Gottenburg	30
	Utah	30
CORK	Cork	30
	Calcutta	30
SHATALE	Violetbank	30
	Dwarsloop	30
ORINOCCO	Arthurstone	29
	Kutung	33
ARTHURSEAT	Rooiboklaagte	30
	Dingledale	30
OKKERNOOTBOOM	Ludlow	31
	Burlington	29
MARITE	Oakly	30
	Alexandra	30
CUNNINGMORE	Lillydale	31
	Justicia	29
ROLLE	Rolle	30
	Edinburg	30
TOTAL SAMPLE	20 Localities	602

3.5 Data collection and processing

Data collection was done using a standardised interviewer-administered and pre-tested structured questionnaire. The questionnaire included closed-ended, partially closed and open-ended questions, covering the following aspects: knowledge concerning malaria, its transmission, signs and symptoms, attitudes towards and patterns of treatment-seeking behaviour. The questionnaires had checkboxes for possible answers and these checkboxes were not read out to the research participants to prevent bias of answers. Data collection process was done in November 2008 and lasted for two weeks. Six competent local people (three fluent in XiTsonga and the other three fluent in SePedi) administered questionnaires in XiTsonga and SePedi, respectively.

Recruiting local people was helpful in two ways: acceptance by community members, as well as better comprehension of local languages. Staff members from Malaria Control Programme in Bushbuckridge translated the questionnaire into XiTsonga and SePedi, prior to being presented to field workers. Field workers, who were competent in both English and their vernacular languages studied copies in their vernacular languages against an English version to improve the quality of translation. After everyone had studied both copies the discussion was held to agree on the most accurate and appropriate translations. MCP staff members participated in the discussion which ran until the consensus was reached on what had to be changed to improve the quality of translation.

The same procedure was used in the translation of the consent form and participant information sheet from English to these (XiTsonga and SePedi) languages. Following the final translation into XiTsonga and SePedi languages, a questionnaire was field piloted in Rolle C locality based in Rolle Sector. Rolle C was used for pilot, since it was not part of the selected localities. The

researcher went through all 18 completed questionnaires to check if there were any irregularities or ambiguous questions. After that process was completed, he held the meeting with data collectors to discuss how they experienced the process and present their concern or challenges. No major challenges were raised except that few questions had to be re-worded. However, changes made did not affect the content of the questionnaire. Subsequently, data collection, under the supervision of the researcher was conducted.

3.6 Ethical Considerations

This study was granted ethics approval by the University of the Western Cape' Research Ethics Committee. As a commitment to sound ethical standards, local community leadership was consulted prior to the introduction of the study to the residents. Identified respondents were given informed consent forms prior to commencing the study. Signed consent forms were returned to field workers prior to commencing the interviews. Respondents were not coerced to answering questions. Participation was entirely voluntary and respondents were entitled to stop at any time without consequences. Provision of names by the research participants was entirely voluntary and was only done to allow for follow ups should the need arose. All potential participants were informed that names were not going to be used to victimise participating individuals and they would not even appear on any official reports.

3.7 Validity

To ensure the validity of the tool, the questionnaire was field-piloted before it was used for the actual data collection. The likelihood that the respondents gave true account of their knowledge and attitudes towards malaria and treatment was high, given anonymity of information in the questionnaire. The level of accuracy in the filled questionnaires was impressive and confirmed an

assumption that the higher the quality of training provided to data collectors the higher the level of accuracy in filling the questionnaires. Sample size determination was calculated using Survey Random Sample Calculator based on the Confidence Limit of 95% (which is a gold standard) and a relatively low degree of error (4%). The sample size was considered large enough (602) to minimise the possibility of the findings being the result of chance. Errors in data capturing were reduced through double-entry of data by data capturers. Subsequently, data cleaning and the running of data queries further gave an assurance that good quality data had been collected.

3.8 Reliability

In the context of survey design, reliability is the extent to which a survey will provide the same results with repeated measurements. To minimize recording bias, data were collected by trained field workers under supervision of the researcher and a pre- tested standardized questionnaire in the vernacular was used.

3.9 Generalisability

The results of this study would, expectedly, apply to the study population. However, these results may still have relevance to other malaria epidemic prone settings with similar population characteristics and the living conditions.

3.10 Data analysis

Survey data were entered directly into an electronic data collection system using Microsoft Access and checked for accuracy, prior to the processing of the analysis. Data were imported from Access, and Analysis was performed using Epi-info version 3.3.2 statistical software program. Firstly, a descriptive statistical analysis was carried out. Bivariate analysis (chi-squared

test) was applied to compare between proportions. Statistical significance of the association between variables was assessed using 95% Confidence Intervals. Knowledge of malaria was also correlated with gender, age and level of education. Similarly, treatment seeking pattern was correlated with gender, age and education level.

3.11 Limitations

The study documented the respondents' sources of malaria information and their preferred malaria information communication routes, without necessarily understanding the interaction between sources and preferences. Reasons for preferring particular communication routes were not investigated, which weakens the strength of argument when the recommendation is made to use a particular communication route over the other. Since only one person in each household participated into the study, views of other household members, especially younger people were not heard. This was an important limitation, but it could not be avoided, since this is a mini-thesis and therefore it would not be possible to broaden the scope to include all adult members of the households.

Broadening the study would have posed both time limitation challenge and resource constraints. However, it is hoped that, considering anonymity of interviews, respondents provided valuable information as they were likely to be responsible for making treatment-seeking decisions for themselves and their dependants. The researcher's reliance on the respondents' self-reporting regarding their health-seeking behaviour was another very serious limitation, hence other studies have found that, at times, research participants tell the researchers/ data collectors what they think they expect to hear.

Sample size calculation did not take into consideration the design effect, which is inherent in cluster sampling. For example, this study took place in different sectors and localities with different population sizes. Conducting studies in many settings is likely to cause clustering effect, which this study did not take into consideration during sample size determination. This was another important limitation of this study.



CHAPTER 4

RESULTS PRESENTATION AND DESCRIPTION

4.1 *Introduction*

This chapter presents the findings based on the summary and analysis of the empirical data. A description of demographic data is summarised using frequency distributions and presented in tables and graphs, and appropriate statistical measures of association calculated.

4.2 *Demographic characteristics of the respondents*

Three quarters of the heads of households or their proxies were females (n=451, 75%). The average median age for females was 35 years (SD = 14) and that of males was 38 years (SD = 17). About one-third of the respondents were 30 years old and below. More females (n=40, 8.9%) did not know their ages compared to male respondents (n=5, 3.3%). Most of the respondents (58.8%) had completed secondary education.

More than two-thirds of the respondents were either unemployed or housewives (n=403, 66.9%). The study constituted 10.1% of the pensioner respondents. It was not investigated what proportion of the respondents were Old Age pensioners, Disability and or Child Care Grant pensioners. On overall, 11.5% (n=69) of the respondents had reportedly tested for malaria within the past 12 months preceding the survey. Testing was high among the females (n=62, 13.7%) as opposed to male counterparts (n=7, 4.6%). However, reasons for testing were not established. Similarly, the facilities where the respondents got tested were not investigated. Only 4.2% (n=25) of the respondents reported that they had suffered from malaria within the period under investigation.

Table 2: Demographic characteristics and malaria experience of adult respondents from Bushbuckridge from September 2007 to August 2008

Characteristics	All N=602 (100%)	Males N=151 (25.1%)	Females N=451 (74.9%)
Age in years	Frequency (%)	Frequency (%)	Frequency (%)
< 30	196 (32.6)	49 (32.5)	147 (32.6)
30 – 39	136 (22.6)	32 (21.2)	104 (23.1)
40 – 49	97 (16.1)	22 (14.6)	75 (16.6)
50 – 59	76 (12.6)	21 (13.9)	55 (12.2)
60 or more	52 (8.6)	22 (14.6)	30 (6.7)
Unknown	45 (7.5)	5 (3.3)	40 (8.9)
Highest level of education attained			
No education	124 (20.6)	23 (15.2)	101 (22.4)
Primary education	95 (15.8)	20 (13.2)	75 (16.6)
Secondary education	353 (58.8)	100 (66.2)	254 (56.3)
Post matric qualification	15 (2.5)	5 (3.3)	10 (2.2)
Other	14 (2.3)	3 (2.0)	11 (2.4)
Relationship to the Household head			
Household head	273 (45.3)	87 (57.6)	186 (41.2)
Spouse	88 (14.6)	3 (2.0)	85 (18.8)
Daughter/ son	170 (28.2)	51 (33.8)	119 (26.4)
Grandchild	23 (3.8)	7 (4.6)	16 (3.5)
Parent	26 (4.3)	0	26 (5.8)
Other	22 (3.7)	3 (2.0)	19 (4.2)
Occupation			
Unemployed/ housewife	403 (66.9)	78 (51.7)	325 (72.1)
Farm worker	6 (1.0)	0	6 (1.3)
Civil servant	29 (4.8)	15 (10.0)	14 (3.1)
Private sector	28 (4.7)	13 (8.6)	15 (3.4)
Entrepreneur	7 (1.2)	4 (2.6)	3 (0.7)
Pensioner	61 (10.1)	20 (13.2)	41 (9.1)
Student	38 (6.3)	15 (9.9)	23 (5.1)
Other	30 (5.0)	6 (4.0)	24 (5.3)
History of malaria testing over September 2007 to August 2008			
Tested for malaria	69 (11.5)	7 (4.6)	62 (13.7)
Not tested for malaria	524 (87.0)	144 (95.4)	380 (84.3)
Forgot	9 (1.5)	0	9 (2.0)
History of malaria infection over September 2007 to August 2008			
Suffered from malaria	25 (4.2)	3 (2.0)	22 (4.9)
Not suffered from malaria	572 (95.0)	148 (98.0)	424 (94.0)
Forgot	5 (0.8)	0	5 (1.1)

4.3 Malaria information and IEC

The study found that about 93% (n=559, 95% CI: 90.4 – 94.7%) of the respondents had heard about malaria. As illustrated by the Figure 1 below, most respondents (80.4% (n=484, 95% CI: 77.0 – 83.5%) correctly associated malaria with a mosquito bite.

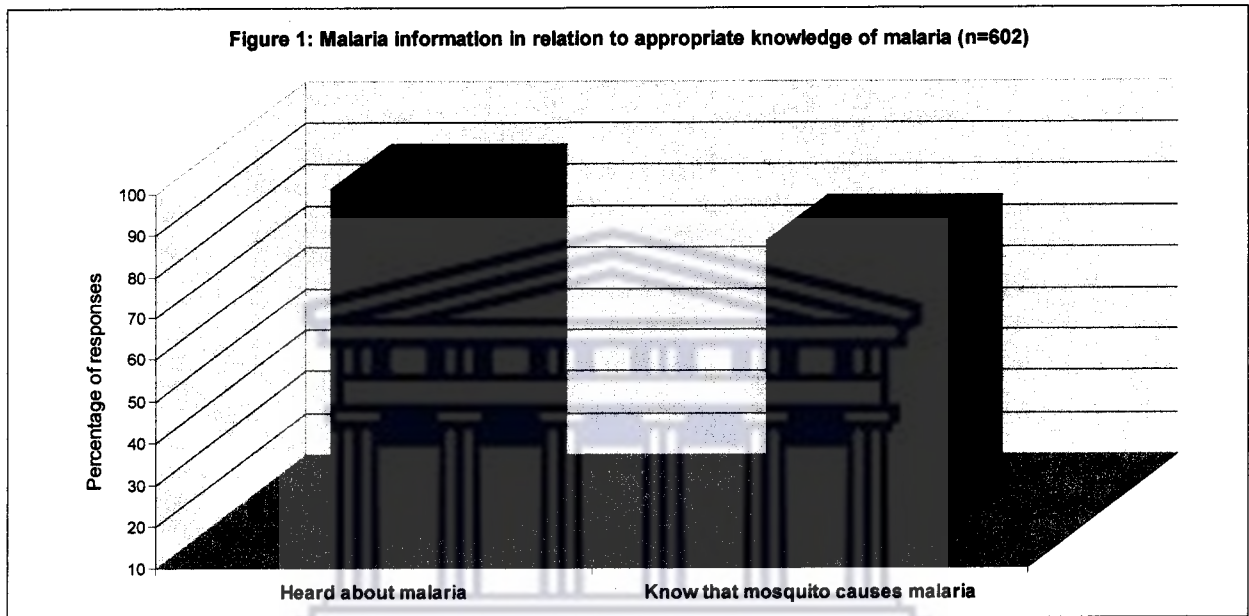
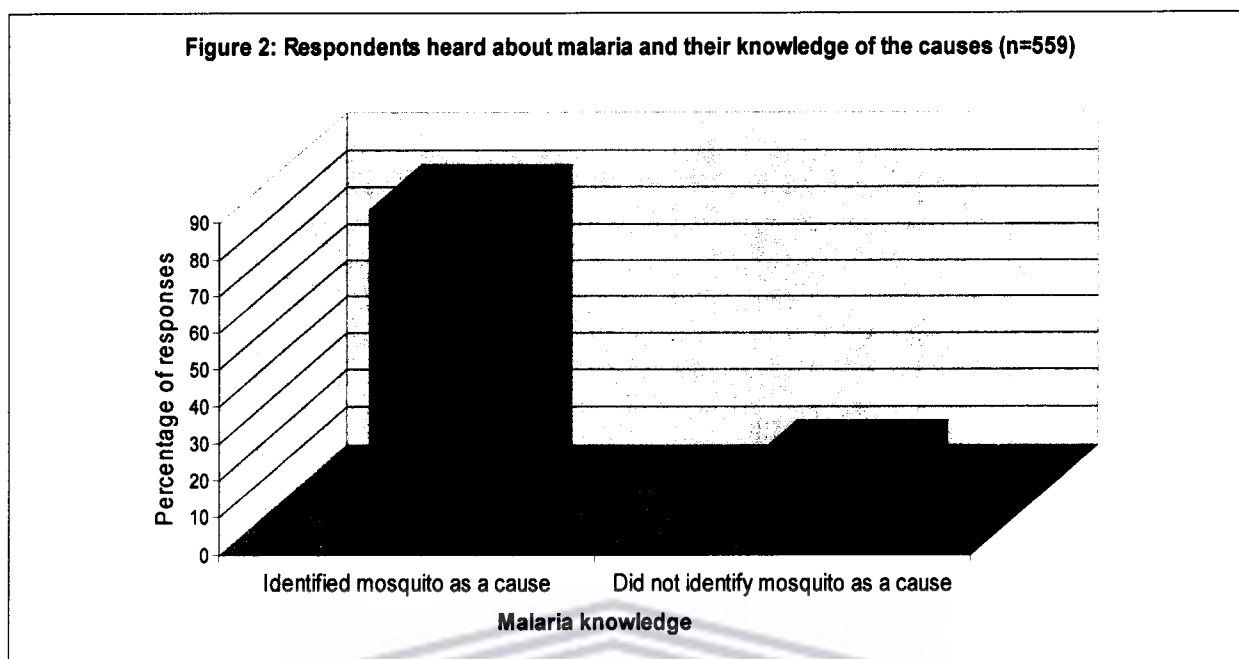


Figure 2 below illustrates that 84.6% (n=473, 95% CI: 81.3 – 87.5%) of the respondents (n=559) heard about malaria, knew that malaria is caused by a mosquito bite. This means that 15.4% of the respondents heard about malaria did not have the primary knowledge that malaria is caused by a mosquito bite.



It is important to note that people classified as having knowledge about malaria are those who were able to identify mosquito bite as the cause of malaria infection. Ability to identify mosquito bite as a source of malaria infection was regarded as basic information, in as far as, malaria knowledge is concerned. Information on mosquito species was not part of this assessment, since knowledge of mosquito involvement is considered sufficient to inspire personal protection and preventive behaviours. Table 3 below compares the respondents' knowledge of malaria along gender lines.

Table 3: Gender and knowledge of the association between malaria and mosquito bite (n=602)

Gender	Frequency	Percentage
Male (n=151)	120	79.5
Female (n=451)	364	80.7

Table 3 above shows that males and females who knew that malaria is caused by the bite of a mosquito were of almost equal proportions. Furthermore, knowledge of the cause of malaria was stratified by age groups as illustrated by Table 4 below.

Table 4: Respondents' knowledge of malaria stratified by the age groups (n=602)

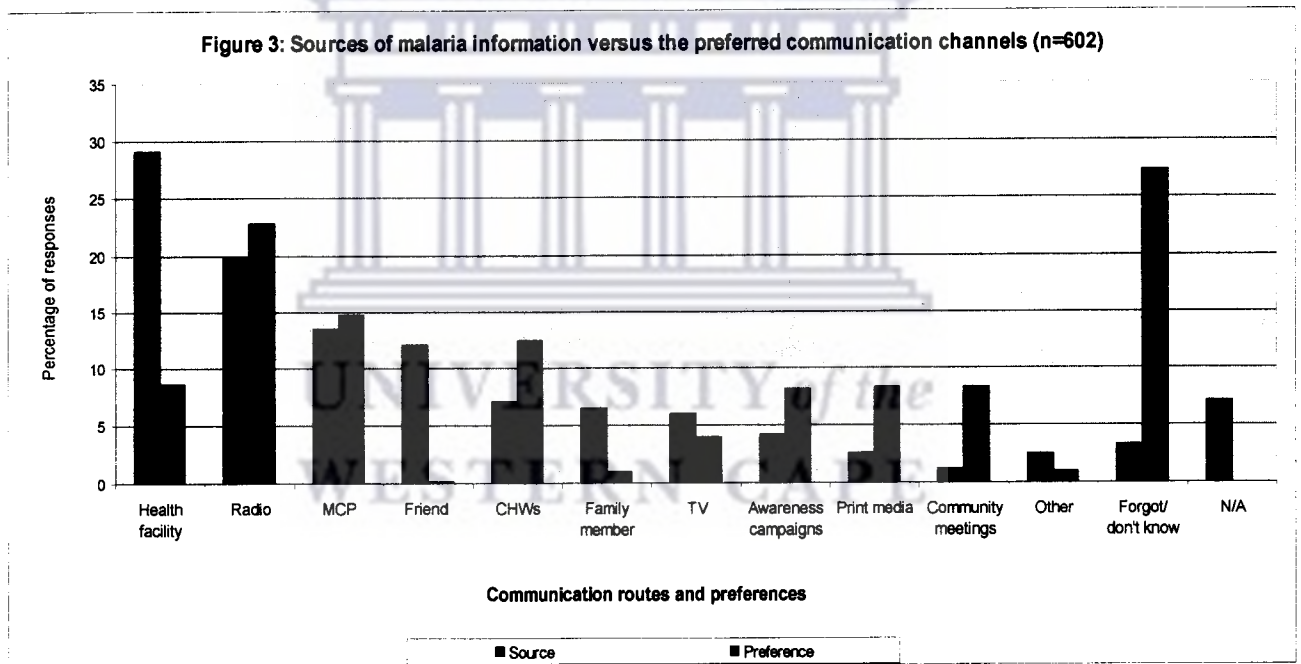
Age groups in years (n)	Frequency	Percentage	95% CI
< 30 (n=196)	171	87.2	81.7 – 91.6
30 – 39 (n=136)	110	80.9	73.3 – 87.1
40 – 49 (n=97)	81	83.5	74.6 – 90.3
50 – 59 (n=76)	58	76.3	65.2 – 85.3
60 or more (n=52)	32	61.5	47.0 – 74.7
Unknown (n=45)	32	71.1	55.7 – 83.6

Table 4 above shows no consistent age specific pattern in respondents' knowledge of malaria, except that the younger age group (< 30 years) was more knowledgeable than the rest of the age groups. An age group of 60 years and above was the only group where less than 70% of the respondents knew that malaria is caused by a mosquito bite. Of interest, the respondents who did not know their age (n=45) were not far less knowledgeable about malaria causes than those who knew their ages. Taking it a step further, respondents' knowledge of the cause of malaria was stratified by the level of education.

Table 5: Respondents' knowledge of malaria stratified by the highest level of education attained (n=602)

Level of education (n)	Frequency	Percentage	95% CI
No formal education (n=124)	89	71.8	63.0 – 79.5
Primary education (n=95)	63	66.3	55.9 – 75.7
Secondary education (n=354)	305	86.2	82.1 – 89.6
Post Matric (n=15)	15	100	78.2 - 100
Other (n=14)	12	85.7	57.2 – 98.2

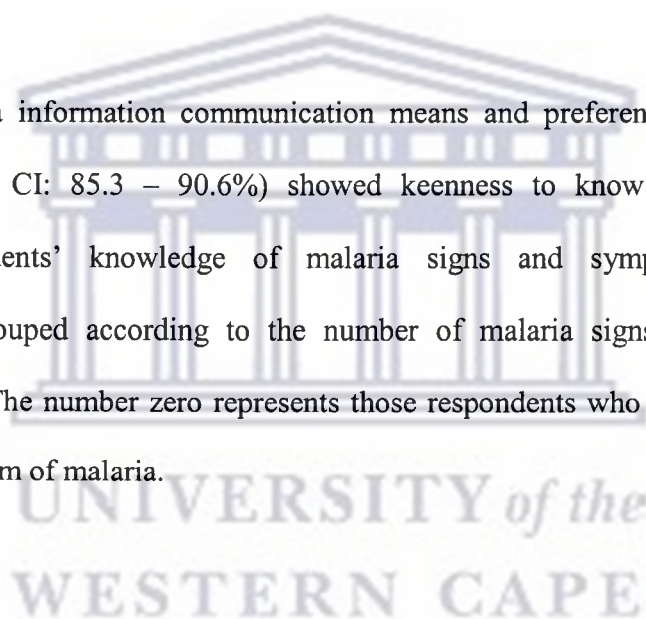
With regards to the level of education, all (n=15, 95% CI: 78.2 – 100%) respondents with post-matric qualifications and 71.8% (n=89, 95% CI: 63.0 – 79.5%) with no formal education knew that malaria is caused by a mosquito bite. A large number of respondents (86.2%, n=305, 95% CI: 82.1 – 89.6%) with secondary education knew the causes of malaria, compared to those with primary education (66.3%, n=63, 95% CI: 55.9 – 75.7%). After stratifying the respondents' knowledge of malaria according to gender, age and highest level of education attained, it was equally important to investigate and present the sources where they heard about malaria information as well as their preferred malaria information communication routes (Figure 3).



It is important to note that the questions on the sources of malaria information and the preferred malaria information communication routes were not limited to one response. Due to the multiplicity of the responses given by the respondents the percentages add up to more than 100%.

Health facilities (29.1%, n=175) and radio (19.8%, n=119) were the key sources of malaria information, while radio (22.8%, n=137) and Malaria Control Personnel (14.8%, n=89) were the most preferred malaria information communication routes. Other prominently identified sources were MCP (13.6%, n=83) and friends (12.1%, n=73), and the preferences were the CHWs (12.5%, n=75). Notably, most respondents (27.4%, n=165) did not have any particular preference of malaria information communication means, hence they said they don't know what communication routes should disseminate malaria information.

In addition to malaria information communication means and preferences, most respondents (88.2%, n=531, 95% CI: 85.3 – 90.6%) showed keenness to know more about malaria. Furthermore, respondents' knowledge of malaria signs and symptoms was assessed. Respondents were grouped according to the number of malaria signs and symptoms they managed to identify. The number zero represents those respondents who could not identify any single sign and symptom of malaria.



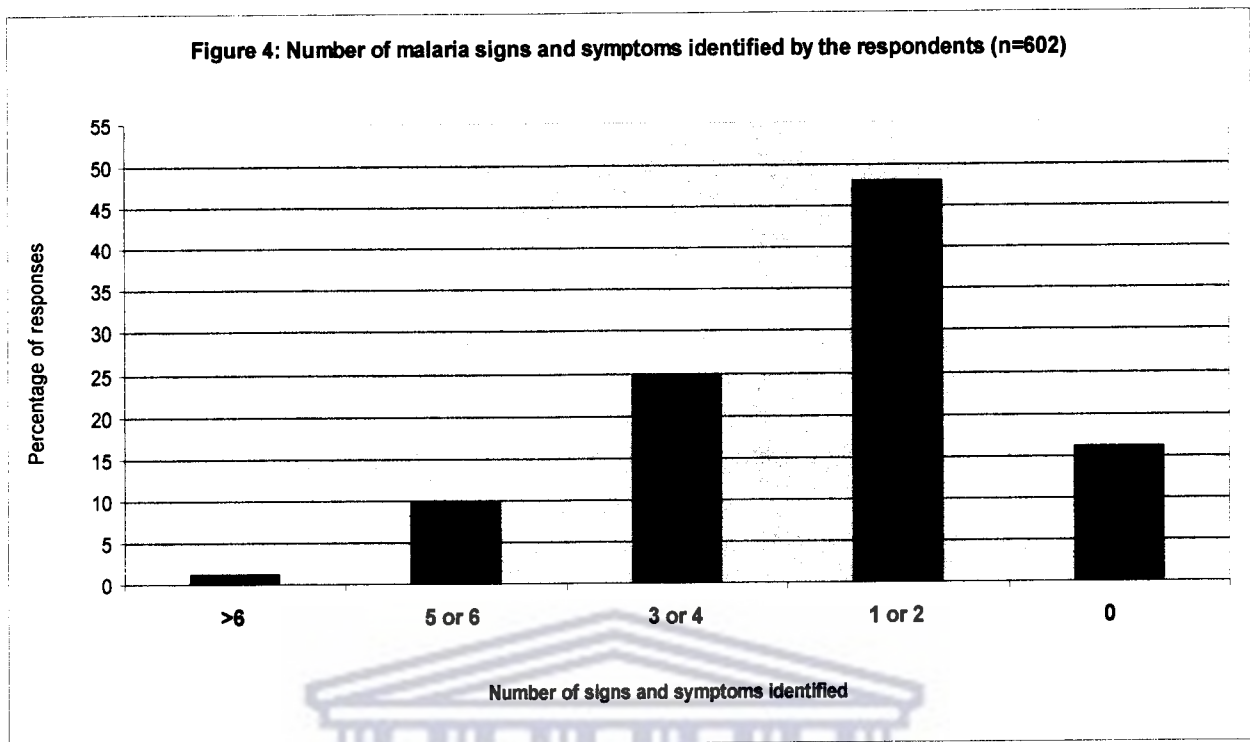
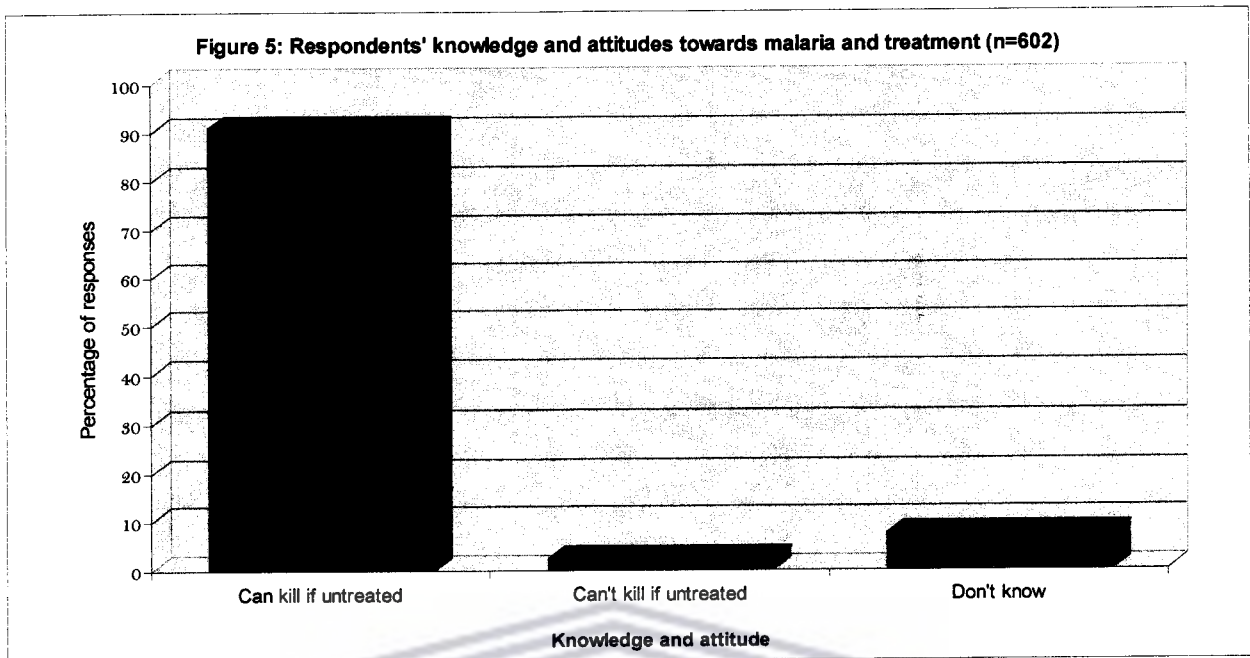
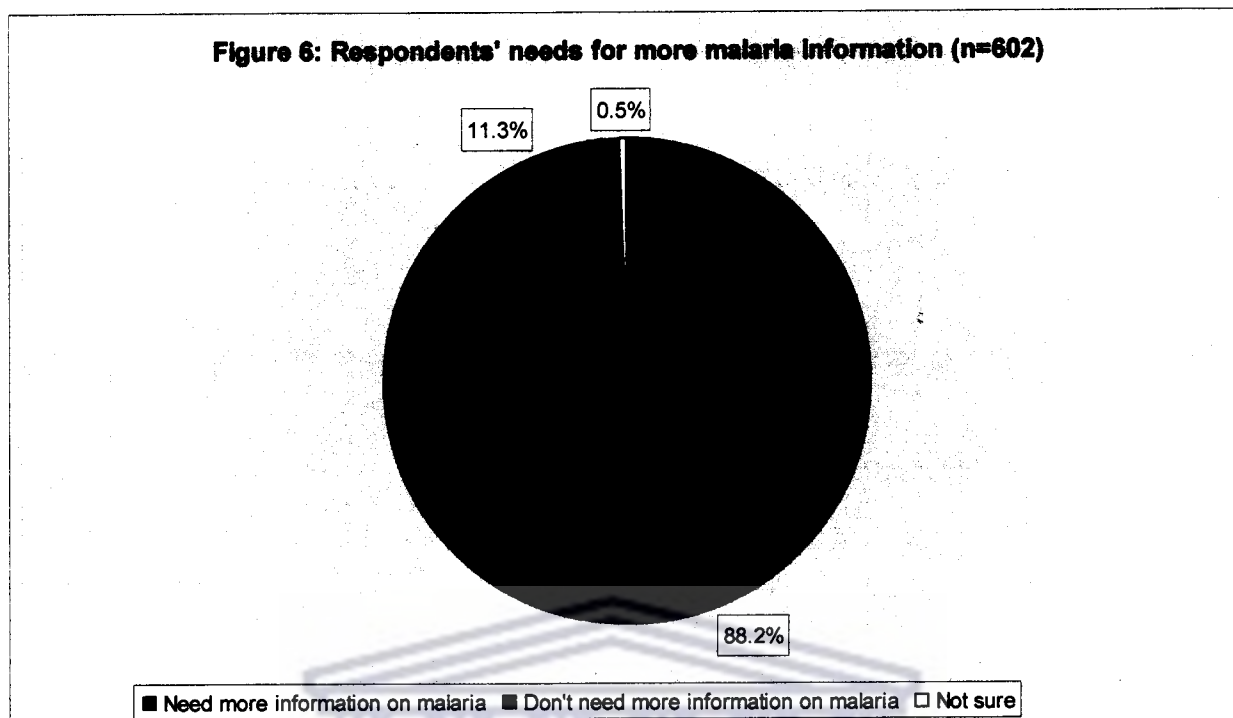


Figure 4 above shows that about 16.2% (n=98) of the respondents could not identify any single sign and symptom of malaria and these respondents are presented as zero in the above graph. Of those (83%, n=504) who knew some signs and symptoms, 48% (n=289) identified between one and two signs and symptoms, 24.8% (n=149) mentioned between 3 and 4, while 9.8% of the respondents knew between 5 and 6 signs and symptoms. Very few respondents (1.2%, n=7) had the knowledge of more than six signs and symptoms. The most commonly mentioned signs and symptoms were the headache, chills, high temperature/ fever, vomiting, loss of energy and body pains. The knowledge of malaria signs and symptoms should ultimately influence malaria treatment-seeking behaviour, therefore respondents' knowledge and attitudes towards treatment was assessed and described.



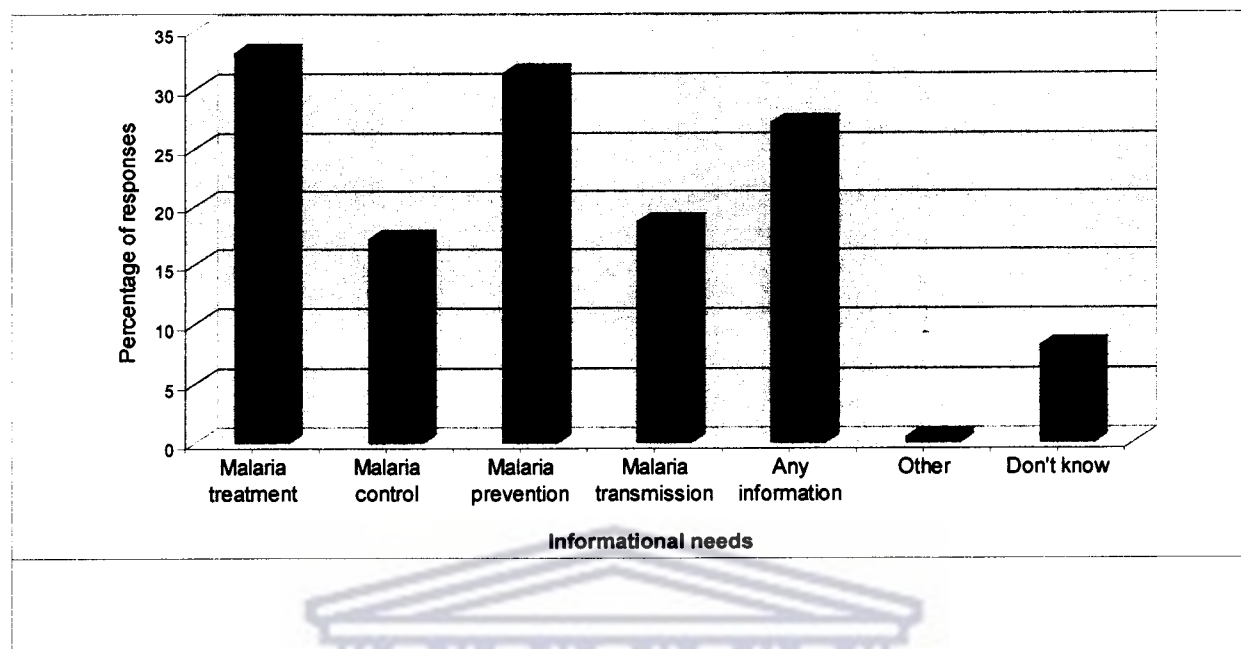
Interestingly, most respondents (90.7%, n=546, 95% CI: 88.0 – 92.8%) perceived malaria to be a serious disease and stated that it can kill if it is untreated. After investigating the respondents' attitudes towards malaria and its treatment, the respondents' malaria informational needs were evaluated as illustrated by the Figures 6 and 7.

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The majority (88.2%, n=531, 95% CI: 85.3 – 90.6%) of respondents showed keen interest to know more information about malaria. Of the people who had not heard about malaria (7.1%, n=43), about 81.4% (n=35, 95% CI: 66.6 – 91.6%) stated that they needed more information on malaria. Of the people heard about malaria (92.9%, n=559), the majority 88.7% (n=496, 95% CI: 85.7 – 91.2%) stated that they needed more information on malaria. The study further investigated the nature of information the respondents wanted to know more about malaria and Figure 7 below provides the breakdown of such information.

Figure 7: Respondents' malaria informational needs (n=602)



Of 531 respondents who wanted to know more information on malaria, most of them pointed at treatment (33%, n=175, 95% CI: 29.0 – 37.2%) and prevention (31.3%, n=166, 95% CI: 27.4 – 35.4%) as their interest areas. A substantial number of respondents (27.1%, n=144, 95% CI: 23.4 – 31.2%) did not specify the type of information they wanted to know, instead they said they would appreciate any malaria information. Approximately 17.1% (n=91, 95% CI: 14.1 – 20.7%) of the respondents wanted to know more information on malaria control, compared to and 18.6% (n=99, 95% CI: 15.5 – 22.3%) whose keen interest was malaria transmission. Strangely, 8.1% (n=43) of the respondents said they don't know what they want to know on malaria. Only 2 respondents (0.4%, 95% CI: 0.1 – 1.5%) stated that they wanted to know other things and those things were: information on diagnosis as well as information on signs and symptoms. Respondents were also allowed to provide more than one response as a result the percentages add up to more than 100 percent.

4.4 Treatment-seeking behaviour

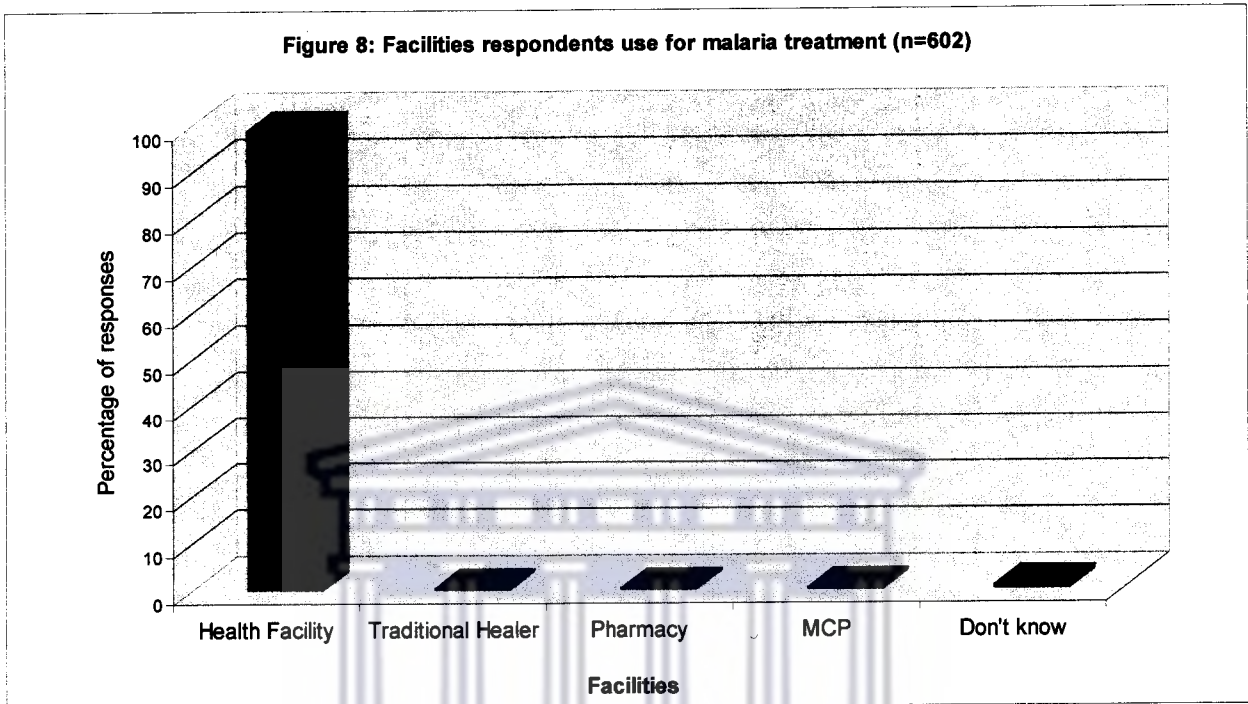


Figure 8 above shows that 98.8% (n=595, 95% CI: 97.5 – 99.5) of the respondents would reportedly seek treatment at health facilities, 82% of whom would do so within 24 hours of onset of malaria symptoms. Of the remaining 1.2% (n=7) respondents who would not seek treatment at health facilities, four stated that they do not know where they would seek treatment, whereas each of the three respondents mentioned traditional healer, pharmacy and Malaria Control Programme.

On overall, 81.6% (n=491, 95% CI: 78.2 – 84.5%) of the respondents stated that they would seek treatment within 24 hours of onset of malaria symptoms. Figures 9, 10 and 11 below elaborate on the promptness in seeking treatment, further disaggregating data according to gender, age groupings and highest level of education attained.

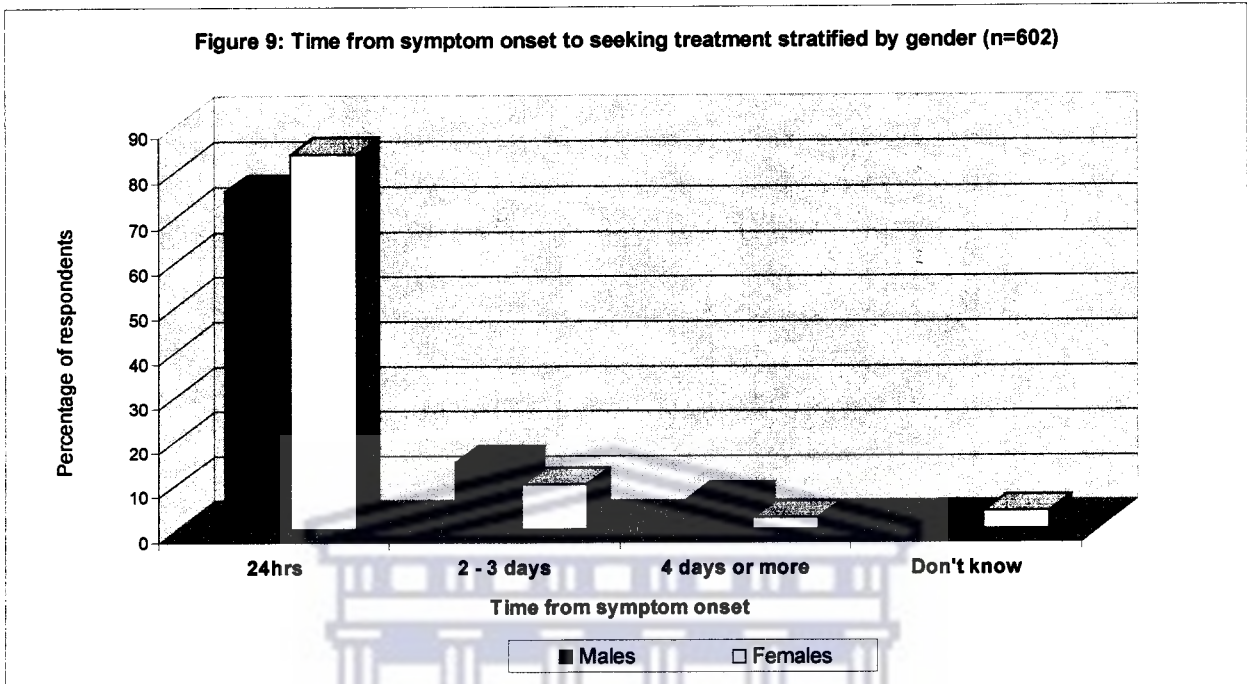


Figure 9 above demonstrates that promptness in seeking treatment was relatively high in both males and females. However, females (83.6%, n=377) were more likely to seek treatment within 24 hours of onset of malaria symptoms compared to male (75.5%, n=114) counterparts. On the other hand, more males waited for more than 24 hours before seeking treatment. Interestingly, for males and females, the number of respondents who did not know how soon they would seek treatment for malaria was relatively low, i.e. 2.6% (n=4) for males and 4% (n=18) for females.

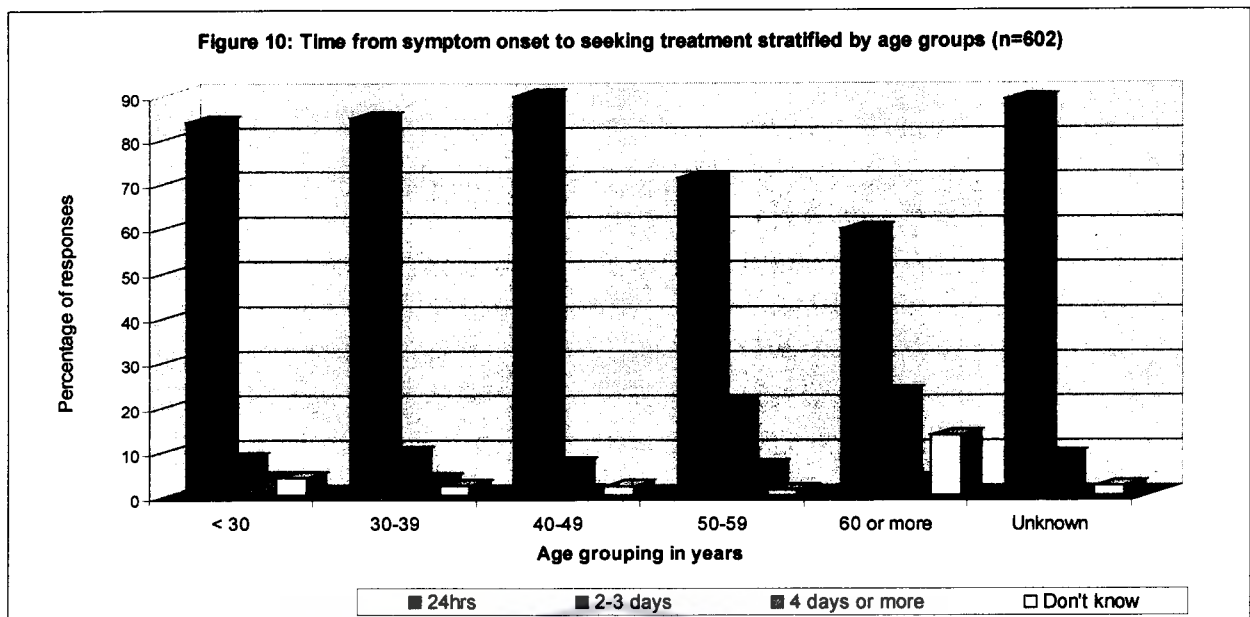


Figure 10 above shows that the respondents in age groups < 30 years, 30 to 39 and 40 to 49 years did not have major age-specific differences regarding promptness in seeking treatment. For example, in all these age groups more than 80% of the respondents would seek treatment within 24 hours of onset of symptoms. There was a decline in an early treatment seeking among the respondents above the age of 50 years. For example, 71.1% of the respondents between 50 and 59 years compared to 59.6% of those who are 60 years and older, would seek treatment within 24 hours of onset of symptoms. Notably, 13.5% of the respondents in the age group of 60 years and more did not know how long they would wait before seeking treatment for malaria.

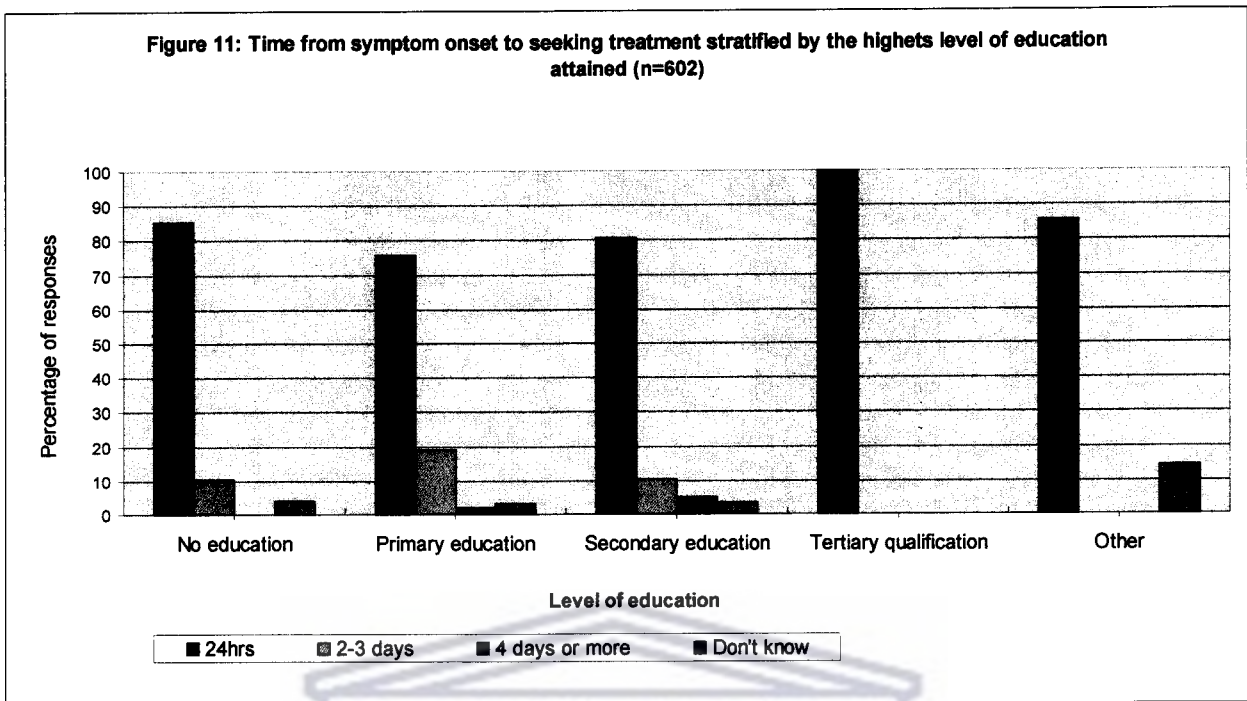


Figure 11 above illustrates that all (n=15) the respondents with tertiary qualifications stated that they would seek treatment within 24 hours of onset of malaria symptoms. Notably, a high number of people with no education (85.5%, n=106) stated that they would seek treatment promptly (within 24 hours of onset of malaria symptoms). On overall, irrespective of gender, age and educational level attained, 14.8% (n=89, 95% CI: 12.1 – 17.9%) of the respondents would seek treatment in more than one day. Almost all (97%, n=87, 95% CI: 92.1 – 99.7%) of those who would not seek treatment immediately (within 24 hours of onset of malaria symptoms) reported that they will do nothing in the meantime, while the remaining two respondents (2.2%, 95% CI: 0.3 – 7.9%) stated that they would buy an over-the-counter medicine.

CHAPTER 5

RESULTS DISCUSSION AND CONCLUSIONS

5.1 Introduction

This chapter compares the study findings with those of the published literature. Residents' knowledge of the causes of malaria and the signs and symptoms is assessed in view of what has been found in other studies. Sources of malaria information and preferences in information dissemination routes are discussed and the residents' informational needs are evaluated. The treatment-seeking behaviour, in terms of the promptness and the choice of treatment facilities, is discussed in view of other study findings and evaluated against WHO recommendations and targets set by the Abuja Summit. Variables such as gender, age and the highest level of education attained play meaningful role in the discussion of the respondents' knowledge and behaviour in response to malaria.

5.2 Community understanding of malaria and its causes

This study found that some people who reported to have heard about malaria in Bushbuckridge did not necessarily know that malaria is caused by a mosquito bite. This assertion is confirmed by the fact that 15.4% of the people heard about malaria did not know its causation. Of the respondents heard about malaria, 84.6% were able to associate malaria infection with mosquito bite, the results which were better than what was found in Indonesia, whereby 69% of the people heard about malaria correctly identified mosquito as the cause of infection (Sanjana *et al.*, 2006). There is evidence for the relevance of the messages and the effectiveness of the communication routes which needs to be addressed. Ideally, all people reporting to have heard about malaria should know that malaria is caused by a mosquito bite, since this is the primary information upon which malaria infection can be understood.

On overall, this study found that 80.4% of the respondents were able to identify mosquito as a cause for the malaria infection. Except for the study conducted in Mbarara, Uganda (Nuwaha, 2002), whereby 95.3% of the respondents correctly associated malaria with mosquito bites, the results of study in as far as malaria causation is concerned were still better than the studies undertaken other African countries, such as Butajira, Ethiopia (66%) (Deressa *et al.*, 2003) and Baringo, Kenya (58.8%) (Munguti, 1998). Studies have found that community knowledge of the causes of malaria increase the application of preventive measures and personal protective practices among the affected populations (Tyagi *et al.*, 2005; Ahorlu *et al.*, 2006).

Contrary to the study conducted by Govere and colleagues (Govere *et al.*, 2000) in Tonga, Mpumalanga, whereby they established a close association between knowledge of the role of mosquito in malaria transmission and knowledge of disease symptoms ($P < 0.001$), this study revealed that more people knew the causes of malaria compared to those who could correctly identify key signs and symptoms. At least less than 60% of the respondents were able to identify two or more signs and symptoms, whereas the knowledge of the cause of malaria was as high as 80.4%. This is one of the major gaps identified by this study.

Nkwo-Akenji and colleagues (2005) found the knowledge of malaria signs and symptoms to be among the important factors determining early diagnosis and treatment. However, in this study there is no suggestion that knowledge of malaria signs and symptoms could be related the treatment-seeking behaviour. Supporting this assertion is the fact that, despite the respondents' relatively poor knowledge of malaria signs and symptoms in Bushbuckridge, the intended prompt treatment-seeking practice was high.

5.3 *Malaria information, education and communication (IEC)*

The current study found that health facility (29.1%), radio (19.8%) and MCP (13.6%) were the key sources where most respondents heard about malaria. Radio was noted to be a commonly and widely used source for disseminating malaria information across studies and countries (Ndyomugenyi *et al.*, 2007; Joshi & Banjara, 2008). Taking a step further, this study investigated communication routes, which respondents preferred to communicate malaria information. Notably, health facility was not amongst the most preferred malaria information communication channels, despite being mentioned by most respondents as the source where they heard about malaria. However, radio was not only widely used (19.8%), but was also the most preferred malaria information communication route (22.8%).

Other malaria information communication routes preferred by a substantial number of the respondents were MCP (14.8%) and CHW (12.5%). CHWs have been noted as effective means in delivering messages on specific control, treatment and prevention behaviours (Cropley, 2004). It was note with serious concern that most respondents (27.4%) did not specify any preferred malaria communication route. This finding was very difficult to interpret, while passiveness of community members and or non-involvement of community members by the malaria control officer remained possible factors. Reasons associated with their inability to present their preferred malaria communication routes were not established.

Despite mixed responses on the respondents' preferred malaria information communication channels, their keenness to receive more information about malaria was apparent, whereby 88.2% of the respondents stated that they needed more information on the disease. Information desired

most was on treatment (33%) and prevention (31.3%). Continuous pattern of undecided people is also visible in this case, whereby 27.1% of the respondents did not specify their informational needs, despite expressing the desire for more malaria information.

5.4 Treatment-seeking practices in terms of promptness and treatment options

The results on the choice of treatment and promptness in seeking treatment were encouraging, especially when viewed against the recommendation by the WHO, which states that, 'at least 60% of those suffering from malaria should seek treatment within 24 hours of the onset of symptoms' (WHO, 2000). Most respondents in this study stated that they would seek treatment at health facilities, a trend contrary to some African countries, such as, Ethiopia (Deressa *et al.*, 2003), Ghana (Dunyo *et al.*, 2000), Uganda (Nuwaha, 2002; Kilian, *et al.*, 2003) and Burkina Faso (Müller *et al.*, 2003), whereby most people were found to prefer medicine from non-public health facilities as a first treatment option.

The study conducted in Kenya revealed that health facilities were frequently used by adult population (66%) for malaria treatment (Sumba *et al.*, 2008). In the Lubombo Spatial Development Initiative (LSDI) region - a collaborative approach to malaria control between Mozambique, Swaziland and South Africa, treatment-seeking at health facility is notably high and encouraging (Castillo-Riquelme *et al.*, 2008; Hlongwana *et al.*, 2009). The treatment-seeking trend found in Mozambique, Swaziland and South Africa was attributed to the effectiveness of country Malaria Control Programmes (Mabaso *et al.*, 2004), as well as the successes of the LSDI (Sharp *et al.*, 2007). In line with the treatment-seeking trend in South Africa, high treatment-seeking behaviour among the Bushbuckridge residents was further justified by their attitude

towards malaria, given the fact that over 90% of the respondents stated that they thought malaria can kill if it is untreated.

On overall, this study showed a relatively high number of respondents (81.6%) who would seek treatment within 24 hours of onset of malaria symptoms. These were positive findings, especially when compared to some studies conducted in African countries, such as rural Ethiopia (13%) (Deressa, 2007), southern Ghana (11%) (Ahorlu *et al.*, 2006) and Uganda (30%) (Ndyomugenyi *et al.*, 2007). Most people in these countries would normally seek treatment in more than two days of onset of malaria symptoms. However, the study conducted in Swaziland on the promptness in seeking treatment produced one of the outstanding treatment-seeking behaviour, whereby 88.1% of the respondents stated that they would seek treatment within 24 hours of onset of malaria symptoms (Hlongwana *et al.*, 2009). Most importantly, both Swaziland and South Africa have solid Malaria Control Programmes which have been effectively controlling malaria for over 50 years in Swaziland (Mabaso *et al.*, 2004).

5.5 Knowledge, attitudes and treatment-seeking disaggregated in gender, age and level of education

There is dearth of published KAPB studies that disaggregate data according to gender, age and level of education, yet these factors are anticipated to play an important role in knowledge, attitudes and intended treating-seeking practice. While this study focused on knowledge, attitudes and the intended treatment-seeking behaviour towards malaria among adult residents of Bushbuckridge, issues of gender, age and educational were considered important and formed the basis of data analysis.

Interestingly, the results of this study did not show major differences between males and females in their knowledge of the causes of malaria, except that the decrease in knowledge started to show for people older than 50 years. The very same pattern was observed on the intended treatment-seeking behaviour, whereby the number of people who intended to seek treatment after 24 hours increased for the over 50s.

In the study conducted in Assam, more males were found to use public health facility than females (Borah *et al.*, 2004). This study produced opposing results, whereby gender and educational level influenced promptness in treatment-seeking. In this study, females and more educated people appeared to intend seeking treatment promptly compared to the males and less educated counterparts. No evidence was found to explain these dynamics, but the differential socialisation between males and females remains a possible factor. Males are taught at a very young age to be strong, emphasising that strength symbolises masculinity. The study conducted by Copley (2004) in rural refugee villages in Belize, Central America found no difference among various age groups in as far as positive treatment-seeking behaviour for malaria, is concerned. This study also found no visible signs suggesting that age had any bearing on people's early treatment-seeking practice.

5.6 Summary

The first notable dimension in this study was disproportionate representation of respondents in terms of gender; hence only 25.1% of the research participants were males. KAPB reports disaggregating data according to gender, age and the highest level of education attained are not widespread. Therefore disaggregating data in this study provided a broader perspective which enriched the results and the discussion. Most importantly, this study was amongst the few KAPB,

to investigate sources where people receive malaria information and further evaluate those sources against the preferred malaria information communication routes.

About 7% of the respondents had not heard about malaria. It was noted throughout the results that these respondents consistently lacked the most basic information on malaria. Of 602 respondents, 92.9% had heard about malaria, mainly from health facilities and radio. On overall, 80.4% of the respondents correctly associated malaria with mosquito bites. Knowledge of malaria had very little to do with gender, and more to do with age and to some extent with the highest level of education attained.

There was a significant difference in treatment-seeking behaviour in as far as males and females were concerned. Females were more likely to seek treatment within 24 hours of onset of symptoms, compared to males. Similarly, there were significant differences between people of different educational levels regarding their treatment-seeking practice. Knowledge of malaria signs and symptoms was relatively poor. However, this challenge did not negatively affect their attitude towards the fatality of the disease; hence 90.7% thought that malaria can kill if it is untreated. Generally, the treatment-seeking behaviour was high; both in terms of promptness in seeking treatment and use of appropriate health care facilities.

5.7 Apparent gaps/ challenges revealed by results

Few gaps or challenges were apparent from these results. These gaps/ challenges are as follow:

- About 7% of the people had not heard about malaria and therefore lacked the very basic information on malaria.

- A considerable number of respondents did not provide useful information in guiding malaria health education activities, since they did not state their preferred malaria information communication routes.
- Some of the sources of malaria information messaging were not the same as the people's preferred malaria information communication routes.
- Despite many people showing keen interest in knowing more information about malaria, this keenness was complicated by their lack of decisiveness on the actual information they wanted to know. This was evidenced by the respondents' (27.1%) failure to state the exact type of malaria information they wanted to know.
- It was noted that 16.2% of the respondents could not identify a single sign and symptom of malaria, while many (48%) only knew one or two signs and symptoms.

5.8 Recommendations

5.8.1 Improve use of the most preferred malaria information communication routes

While acknowledging that financial resources could be constraining factors, effort to intensify the use of radio, CHWs and MCP personnel to disseminate malaria information is recommended. This recommendation takes note that most respondents expressed confidence and preference to these information routes. While radio is known to spread information speedily and widely, CHWs are also of significant help to convey information on one-to-one basis and attend to necessary questions that community members may have, individually. In other areas, malaria control personnel have repackaged CHWs' educational tools to include malaria materials and this strategy proved to be rewarding, since an increase in malaria knowledge was noted.

Community meetings are also important methods to disseminate information in traditional settings; since 8.3% of the respondents preferred its use, which was a major shift from 1.2% who stated that they heard about malaria from this route. Therefore, it is recommended that MCP personnel collaborate with local leadership to make effective use of community meetings as strategic resources to spread malaria information. This is likely to be among the most cost-effective strategies in malaria IEC activities, since meetings are normally called by community leaders, yet malaria information can get across to the members of the community. It is anticipated that by implementing this recommendation, about 7% of the people lacking the most basic malaria knowledge will be reached. Because partnership with the community would have been increased through collaboration with local leaders, it is anticipated that some degree of passivity in malaria issues will be resolved.

5.8.2 Targeted interventions to address knowledge gaps

It came out very clear from this study that most people do not have enough information on malaria signs and symptoms. Planned and ongoing IEC interventions should prioritise educating the community on the malaria signs and symptoms. It should be noted that, even if the intended treatment-seeking attitude is good, inability to recognise malaria signs and symptoms will, inadvertently, jeopardise promptness in seeking treatment and making appropriate choice of treatment facility.

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APPENDIX A: QUESTIONNAIRE

KNOWLEDGE, ATTITUDES AND TREATMENT-SEEKING BEHAVIOUR TOWARDS MALARIA IN BUSHBUCKRIDGE, EHLANZENI DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA

NUMBER OF ENQUIRY

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Name of interviewer		Interviewer's Signature
Date of interview	/ / 2008	
Starting (time)		
Ending (time)	
Locality		Supervisor's Signature
Sector		
Interview time		
Verified by supervisor	/ / 2008

SECTION 1: DEMOGRAPHIC INFORMATION

(Please write down the code in a shaded space with the exception of name and age)

1 Name	2 Age	3 Sex	4 Relationship to the household (HH) head	5 Highest level of formal education attained	6 Occupation	7 Have you tested for malaria in the past 12 months?	8 Have you suffered from malaria in the past 12 months?
	Write age in years	1=Male 2=Female	1=HH Head 2=Spouse 3=Daughter/ son 4=Grandchild 5=Parent 6=Grandparent 7=Other (specify)	1=No education 2=Primary School 3=Secondary School 4=Post-matric qualification 5=Other (specify)	1=Unemployed/ housewife 2=Farm worker 3=Civil servant 4=Private sector 5=Entrepreneur 6=Pensioner 7=Studying 8=Other (specify)	1=Yes 2=No 3=Forgot	1=Yes 2=No 3=Forgot

NB: Past 12 months in this survey refers to the period between September 2007 and August 2008

SECTION 2: MALARIA KNOWLEDGE AND INFORMATION, EDUCATION AND COMMUNICATION (IEC)

9. Have you heard about malaria? 1 Yes 2 No

10. Where did you hear about malaria?

<input type="checkbox"/> 1	Friend	<input type="checkbox"/> 10	Church
<input type="checkbox"/> 2	Family member	<input type="checkbox"/> 11	Community meetings
<input type="checkbox"/> 3	Posters	<input type="checkbox"/> 12	Community Health Workers
<input type="checkbox"/> 4	Pamphlets	<input type="checkbox"/> 13	Malaria Control Personnel
<input type="checkbox"/> 5	Health facility	<input type="checkbox"/> 14	Community awareness campaigns
<input type="checkbox"/> 6	Newspapers	<input type="checkbox"/> 15	Forgot
<input type="checkbox"/> 7	Radio	<input type="checkbox"/> 16	Other (specify)
<input type="checkbox"/> 8	TV	<input type="checkbox"/> 99	Not applicable
<input type="checkbox"/> 9	Scholar/ teacher		

11. Can you tell me, what transmits malaria?

12. Do you think malaria can kill you, if it is untreated?

1 Yes 2 No 98 Don't know

13. What do you think are the most common signs and symptoms in malaria infection?

<input type="checkbox"/> 1	Headache	<input type="checkbox"/> 8	Loss of appetite
<input type="checkbox"/> 2	High temperature/ fever	<input type="checkbox"/> 9	Dizziness
<input type="checkbox"/> 3	Body pains	<input type="checkbox"/> 10	Other (specify):
<input type="checkbox"/> 4	Chills	<input type="checkbox"/> 98	Don't know
<input type="checkbox"/> 5	Vomiting	<input type="checkbox"/> 99	Not applicable
<input type="checkbox"/> 6	Loss of energy		
<input type="checkbox"/> 7	Delirium		

14. Do you need more information on malaria?

- 1 Yes
 2 No
 3 Not sure

15. If yes to 14, what information would you like to get about malaria?

1	Information on treatment	6	Other (specify):
2	Information on control	98	Don't know
3	Information on prevention	99	Not applicable
4	Information on transmission		
5	Any information		

16. How would you like this information communicated to you? (Through what channels of communication?)

1	Family member	10	Malaria Control Personnel
2	Friend	11	Scholar/ teacher
3	Church	12	Traditional healer
4	Radio	13	Community meetings
5	TV	14	Community Health Workers
6	Posters	15	Community awareness campaigns
7	Pamphlets	16	Other (specify)
8	Newspapers	98	Don't know
9	Health facility		

SECTION 3: TREATMENT AND TREATMENT-SEEKING BEHAVIOUR

17. If you were to present with the signs and symptoms of malaria, where would you seek treatment?

1	Health facility	7	Malaria Control Personnel
2	Private Doctor	8	Nowhere
3	Traditional Healer	9	Other (specify):
4	Faith Healer	98	Don't know
5	Pharmacy		
6	Shop		

18. How soon after suspecting that you are infected with malaria, would you seek treatment?

1	Immediately (within 24hrs/ 1 day)
2	2-3 days
3	4-6 days
4	7 days or more
98	Don't know
99	Not applicable

19. If you do not seek treatment immediately (within 24 hours), what would you do in the meantime?

.....

99	Not applicable
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We have now concluded our interview. Thank you very much for your hospitality and your valuable contribution. Do you have questions for me?

.....

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Appendix B: CONSENT LETTER



UNIVERSITY OF THE WESTERN CAPE *School of Public Health*



Private Bag X17 • BELLVILLE • 7535 • South Africa
Tel: 021- 959 2809, Fax: 021- 959 2872

RECORD OF INFORMED CONSENT TO CONDUCT AN INTERVIEW

Date:

Principal Investigator's (student) details:

UWC Student no: 2616809

Tel: +27 (0) 31 2034809 Fax: +27 (0) 31 2034704

E-mail: khumbulani.hlongwana@mrc.ac.za

Institution(s): South African Medical Research Council/ University of the Western Cape

Place at which the interview was conducted: Bushbuckridge

Thank you for agreeing to participate in this research interview. What follows is an explanation of the purpose and process of this interview. You are asked to sign this consent form before an interview begins.

1. Information about the Student/ Principal Investigator (PI)

Khumbulani Hlongwana is a student at the SOPH, University of the Western Cape. He is conducting this study as part of his Masters in Public Health, for which he is accountable to his Supervisor: Mr Wondwosson Lerebo, who is contactable at 021 959 2809/ 2166 or c/o SOPH, Fax: 021 959 2872 or by e-mail at wlerebo@uwc.ac.za. The study investigates community knowledge, attitudes and treatment-seeking behaviour towards malaria in Bushbuckridge.

2. Purpose and contents of interview

The purpose of this study is to produce baseline information that Malaria Control Programme can use to inform its health promotion activities. The scope of the interview covers community understanding of malaria transmission, recognition of signs and symptoms, perceptions of cause and treatment-seeking trends in Bushbuckridge.

3. The interview process

We are interviewing many people from the randomly selected households in Bushbuckridge. You are free not to answer questions you feel uncomfortable with, interrupt the interview process and even abandon it without consequences. The interview process is anticipated to last for approximately 10 minutes.

4. Anonymity of contributors

Information collected will be treated with the highest level of confidentiality and research participants' names will not appear in any oral or written report of this study.

5. Things that may affect your willingness to participate

The issues covered in this questionnaire are fairly general, but if in your opinion you view certain questions as offensive or intrusive, please advise me to stop. I will not be offended and there will be no negative consequences. Your honest guidance in this interview will be highly appreciated.

6. Agreement

6.1 Interviewee's agreement

I have read the information about this study on the *participant information sheet*, or it has been read to me. All my rights as a participant and voluntariness of my participation have been explained to my satisfaction.

6.2 Interviewer's agreement

The contents of the research interview shall be kept confidential and shall be stored in a locked place. Your name will not appear in any oral or written report of this study. The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

Interviewer's Name:

Consent Date

Interviewer's Signature

Participant's Name:

Consent Date

Participant's Signature

Place:



Appendix C: PARTICIPANT INFORMATION SHEET

Dear Potential Participant

You are hereby requested to read this document, which provides detailed explanation of this research project. This research is primarily conducted as a requirement for the Masters in Public Health at the University of the Western Cape. It seeks to provide information on knowledge, attitudes and treatment-seeking behaviour (KAB) towards malaria among adult residents of Bushbuckridge. Such information is considered vital for use by the Malaria Control Programme (MCP) in Mpumalanga Province to inform health promotion activities. Should you have anything that you do not understand or are unclear about in this document, please do not hesitate to contact the Student or his Supervisor, whose contact details are recorded at the end of this memo.

TITLE OF RESEARCH

Knowledge, attitudes and treatment-seeking behaviour towards malaria among adult residents of Bushbuckridge, Mpumalanga Province.

PURPOSE OF THE STUDY

The purpose of this study is to produce results that can be used to design and implement relevant and effective malaria health education strategies.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT

This study is conducted through the individual interviews with an intention of establishing various things about your knowledge of malaria issues. Your answers will be part of many other interviews conducted among adult residents of Bushbuckridge to ensure your anonymity. In addition, no one outside the research team will be informed about your participation or non-participation.

CONFIDENTIALITY

Should you agree to participate in this study, all your responses shall be kept confidential.

Completed questionnaires and signed consent forms will be kept in a locked place.

VOLUNTARINESS OF YOUR PARTICIPATION

Participation into this study is completely voluntary. However, it will be highly appreciated if you do share your thoughts with us. You are free not to answer questions you feel uncomfortable with, interrupt the interview process and even abandon the questionnaire without consequences.

BENEFITS AND COSTS

There are no direct benefits for participating in this study. However, your contributions will help the Malaria Control Programme to develop appropriate information resources to help local residents effectively recognize malaria signs and symptoms, and act appropriately when suspecting infection.

INFORMED CONSENT

If you decide to participate in this study, you are required to sign the consent form before an interview begins. Consent form has been included with this information sheet. Please review it and make an informed decision on whether you would like to participate in this study or not.

QUESTIONS

There are no wrong or right answers. However, your honest opinions are extremely important. In case you do not understand a question or issue, please ask the interviewer to repeat or clarify. Questions can be addressed to the Student or his Supervisor whose contact details are listed below:

Student's Name/ PI: Khumbulani Hlongwana
Student Number: 2616809
Cell Phone: 0748904574
E-mail Address: khumbulani.hlongwana@mrc.ac.za
Telephone at work: +27(0)31 2034809
Fax at work: +27(0)31 2034704

The student is accountable to Mr Wondwossen T. Lerebo, his supervisor at the University of the Western Cape, who can be contacted at:

Telephone at work: +27(0)21 959 9307/ 2166

Fax at work: +27(0)21 959 2872

E-mail address: wlerebo@uwc.ac.za

Website: www.uwc.ac.za/comhealth/soph



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