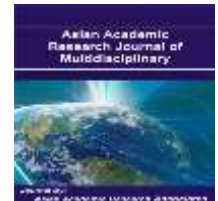




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**EXPERIENTIAL LEARNING AND MALARIA INTERVENTION VOLUNTEERS  
CAPACITY DEVELOPMENT: LESSONS FROM KOMBO NORTH DISTRICT IN  
GAMBIA**

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**Abstract**

Global distribution of per-capita gross domestic product indicates a striking correlation between malaria and poverty, and malaria-endemic countries have lower rates of economic growth. This study investigated the role of experiential learning in capacity development of malaria intervention volunteers in Kombo North District in the Western Region of Gambia. It was guided by Experiential Learning theory. Adopting a concurrent mixed methods approach particularly a case study design, a sample of 73 malaria intervention volunteers were selected from 705 volunteers using multi-stage sampling. A total of 20 key informants including senior staff of Non-Governmental Organisations and public health officials were selected purposively. Quantitative and qualitative data collected using questionnaires and interview guides was analysed using descriptive statistics, inferential statistics and contentment analysis respectively. Spearman's rank-order correlation and ordinal regression coefficients were then calculated. Results revealed that volunteers had acquired significant knowledge and skills on malaria prevention as they progressively volunteered at the Health Promotion and Development Organisation. Some capacities were developed due to training, as a result of practice and participation. Participation in bed net distribution and sensitization influenced volunteers' knowledge on malaria prevention less, although it improved their skills. The study concluded that the role of experiential learning in capacity development of malaria project volunteers at the Health Promotion and Development Organisation was the development of practical intervention skills through active experimentation and concrete experience. The study recommended that Non-Governmental Organisations should document the knowledge and skills of volunteers. A recommended area for further study studies is on the best ways to keep volunteers informed on current health trends.

**Key Words:** Experiential Learning, Capacity development, Malaria Intervention Volunteer

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### **Background to the Study**

Malaria and poverty are inseparable because high prevalence and the burden of malaria have an economic implication (Gallup & Sachs, 2001). Research showed that the global distribution of per-capita gross domestic product indicated a striking correlation between malaria and poverty, and malaria-endemic countries also having lower rates of economic growth (Sachs & Malaney, 2002). Every year, data from the World Malaria reports continue to show a predominance and high risk of malaria infection among the human population. Malaria is a deadly disease caused by plasmodium parasites and spread by the anopheles mosquitos. WHO (2015) estimated over 212 million cases of malaria and 429,000 deaths worldwide. Until the mid-18<sup>th</sup> Century, malaria used to be widespread in most continents but in 1955, the Global Malaria Eradication Program eliminated the disease from the Americas, Europe, parts of Asia and the Caribbean (Carter and Mendis, 2002).

Experiential learning is defined as a perspective on learning that combines experience, perception, cognition and behaviour (Kolb, 1985). The lack of capacity for malaria control in Africa consequently led to program failure and cancelling of the campaign in 1969. Malaria and many other diseases continued to be widespread in Africa severely undermining the development of the continent. Progress is being made nonetheless and according to the United Nations (2015), over 6.2 million malaria deaths have been prevented from 2000 to 2015. There is still a long way to go, given that 50% of humans continue to be at risk.

In 2014, \$1 billion was spent globally on malaria interventions. More will still be needed given that Target 3 of the Sustainable Development Goals aims to end the epidemics of malaria by 2030 (UN, 2016). Governments implement about 70 percent of all malaria grants whilst civil society implements 20 percent. (Poore, 2004). The Malaria intervention implemented in most malaria-endemic countries include: case management (diagnosis and treatment), insecticide-treated nets (ITNs), intermittent preventive treatment of malaria in pregnant women (IPTp), and indoor residual spraying (CDC, 2017). The goal of malaria interventions are to significantly decrease transmission to levels where malaria is no longer a problem of public health (UN, 2016). Social and behavioural change communication (SSBC) strategies are often used by interventionist to enhance the effectiveness of malaria programs at community level.

Malaria stands a major obstacle to the socio-economic development of Africa, one that weakens the continents labour force whilst draining scare development resources. Over

90% of all malaria cases occur in Sub-Saharan Africa (WHO, 2017). African children under 5 are the most susceptible to malaria; representing 70% of all deaths in the region (UNICEF, 2017). In West Africa alone, malaria funding has rapidly increased from US\$ 104 million in 2005 to US\$ 586 million in 2012 (World Malaria Report, 2015). According to a Fall et al (2010), many countries in Sub-Saharan Africa have ongoing malaria interventions which cannot be scaled up for malaria elimination due to inadequate human resource capacity at every level. This increasingly makes it hard to combat malaria in the region especially if insecticides and drugs continue to lose their potency to emerging resistant malaria and mosquitos. African heads of state consequently adopted the Ouagadougou and Algiers declaration in 2008; to develop healthcare systems and improve medical research capacity in the continent.

Efforts to strengthen health systems in Africa mostly target capacity development at higher levels such as laboratory and research capacities. This is reasonable since malaria control requires an on-going evolution of drugs to fight back evolving resistance. However volunteers as part of malaria intervention staff play key roles in community level programs (Atkinson et al, 2009). Many of them have received training in malaria prevention and have gained a lot of experience during their time in the field. These volunteers, often neglected after a given project, have a huge potential to support a country's healthcare system if their capacity is further developed. The lack of documentation of volunteers knowledge and skills makes it difficult fully utilise them to combat malaria. Instead, the training and skills acquired by community volunteers during health interventions often go undocumented and underutilised in many Africa countries where resources are scarce.

The Gambian society and economy is also affected by malaria. Apart from its effects on national productivity affecting 120 per 1000 (WHO, 2016), huge funds are spent annually to control the disease. In 2014, malaria funding in the Gambia exceeded US\$ 4. Majority of this funding was spent on supplies rather than addressing the vital weaknesses in the national health system (World Malaria Report, 2015). In a 2012 cross-sectional national malaria survey, 95% of study participants reported sleeping under LLINs while over 78% of the participants reported having IRS in their households the year before (Mwesigwa et al., 2015). Although the National Malaria Control Programme paved the way forward in collaboration with NGOs, a high national coverage would not have been possible without local volunteer participation.

Malaria has significantly declined in the Western Gambia, however the disease continues to be endemic in the east (Mwesigwa et al. 2015). The disparity is mainly due to higher incidence of poverty, weaker health systems and inadequate capacity for vector control in the swampy areas of the East. According to the World Malaria Report (2015), areas with weak health systems need innovative community based approaches and engagement to rapidly expand access to malaria interventions especially diagnostics and treatment. Volunteers in Western Gambia have participated in many malaria interventions where they received training and experience. The capacities in malaria prevention developed by these volunteers if established can be used to engage and rapidly expand access to malaria interventions in Eastern Gambia. This is not the case as NGOs in the Gambia do not document the knowledge and skills of their volunteers. The goal of this study was to investigate the role of experiential learning in capacity development of malaria intervention volunteers; in order to identify volunteer potential in expanding malaria interventions.

### **Review of Empirical Studies**

The literature reviewed was guided by the main objective of the study which was to investigate the role of experiential learning to the capacity development of malaria intervention volunteers. As such, the discussion and arguments within the chapter is centered on the following themes: malaria and prevention knowledge, malaria prevention skills, experiential learning and participation in malaria interventions and capacity development in malaria interventions. Within these themes, empirical studies were discussed to inform, clarify and identify any knowledge gaps arising from the specific objectives of the study.

### **Malaria and Prevention Knowledge**

Knowledge is defined as the comprehension of factors or fundamental ideas related to a specific subject (Werner & De Simone, 2012). Malaria is the subject in this case which is a deadly disease caused by plasmodium parasites. The disease is transmitted to people by female anopheles mosquitos who are both hosts and vectors of the parasites. There are 5 parasite species that cause malaria in humans but it is the – *P. falciparum* and *P. vivax* that pose the greatest threat (WHO, 2015). The common symptoms of malaria include: fever, chills, sweats, headaches, nausea and vomiting, body aches and general malaise (CDC, 2017). So far the best available treatment, especially for *P. falciparum* malaria which is the most deadly, is Coartem or artemisinin-based combination therapy (ACT). Prompt diagnosis and treatment prevents malaria deaths, reduces the infectious reservoir and the spread of malaria.

WHO (2015) recommends that all cases of suspected malaria be confirmed using parasite-based diagnostic testing (either microscopy or rapid diagnostic test) before administering treatment to reduce the resistance arising from misdiagnosis. Malaria misdiagnoses is common with children under 5 (Nankabirwa et al, 2009). According to Murray et al (2008) rapid diagnostic testing will aid in the reduction of malaria misdiagnosis, decrease treatment costs, reduce misperceptions of therapeutic failures when fever is caused by other diseases, and reduce selection pressure that leads to the development of drug resistance.

Within each malaria intervention are a host of knowledge areas that must be learned by volunteers in theory or practice to effectively implement the project. ITN interventions involve the distribution and use of treated bed nets that form a barrier around people sleeping under them. In many community-wide trials, ITNs have been shown to reduce the death of children under 5 years from all causes by about 20% and have been associated with rapid decline of malaria (CDC, 2017). Volunteers initially were required to know how to successfully re-apply the insecticide on the nets every few months, how to hang them properly, change their shapes and how to repair them. However, the availability of long lasting insecticide nets (LLINs) that can go for 3 years without further insecticide treatment has made bed nets easier and more effective to use. IRS includes spraying walls with residual insecticides such as DDT that kills adult mosquitos as they try to rest on house wall and other surfaces. IRS operations must be managed by skilled professional staff, based on an analysis of local epidemiological data and a sound understanding of transmission patterns, vector behaviour and insecticide resistance status (WHO, 2017). But in some cases volunteers also participate in IRS interventions.

IPTp involves the administration of a therapeutic dosage of antimalarial medication (sulfadoxine-pyrimethamine) to pregnant women particularly in Africa, before they are infected with the malaria parasite. WHO (2015) recommends the administration of IPTp for pregnant women in areas with moderate to high malaria transmission. Seasonal chemoprevention (SMC) is also recommended by WHO during malaria seasons in Africa. SMC mainly involves the recurrent administration of antimalarial drugs to children during seasons of high transmission to prevent infection. Behavioural change communication (BCC) also plays an important role in addressing the barriers encountered malaria interventions in Africa. Such barriers include delays in seeking treatment or inconsistent use of bed nets. According to Gies et al (2009) BCC promotes IPTp uptake whilst training in interpersonal communication improves the quality of care given to intervention beneficiaries (Shelton,

2013). Volunteer will need to know how to effectively convey malaria prevention ideas to project beneficiaries if an intervention is to be successful. Malaria prevention and control is taught in most school curriculums and educated volunteers are more likely to know about the causes and prevention of malaria. According to Mesch et al (2006) the likelihood of volunteering improves with education.

According to the Gambia DoSHSW (2009), the preference of net shape and size as well as the misconception about treated bed nets is a threat to the promotion of LLIN usage within the country. The tendency for beneficiaries to be misinformed about malaria prevention strategies highlights the need importance of behavioural change communication in local ITN interventions. HEPDO's Vision is a Gambia where the population is well informed on the importance of: women empowerment, human rights, water sanitation and hygiene, healthy environment, healthy life styles, elderly care and support, prevention and control of control of communicable and non-communicable diseases, occupational health and workplace safety (HEPDO, 2016). Guided by this vision, HEPDO's work strategy mainly involves: Information, Education and Communication (IEC); Behavioural Change Communication and the deployment of practical intervention such as bed net distribution to combat malaria. The organisation's volunteers mainly engage in public sensitization and have distributed over 426,162 treated bed nets to the Gambian community (HEPDO, 2016). The knowledge and skills of HEPDO's volunteers, however is not documented by the Organisation. Generally no literature has been found about volunteer knowledge and skills in malaria prevention. Thus a knowledge gap was revealed in the role of experiential learning in capacity development of malaria project volunteers.

### **Malaria Prevention Skills**

Skill is defined as the combination of natural abilities and capabilities developed from experience and training (Dunnette, 1976). According to Goldstein (1991), skills are generally regarded as psychomotor activities that are often measured in terms of ease and precision demonstrated during performance of a given task. The task of volunteers in malaria interventions range from distribution of treated nets, larval control, rapid diagnostic testing, sensitizing the public on malaria prevention and malaria control. The skills needed by volunteers to perform malaria intervention tasks are generally uniform across the public health field. The Public health Foundation (2014) outlines eight fundamental skill areas needed by frontline staff in public health interventions. These skills include: **Analytical**



**Skills:** to describe issues affecting community health such as equity, education income, **Program Planning Skills:** to contribute in the development of intervention goals and objectives. **Communication Skills:** to be able to communicate with writing or orally with cultural and linguistic proficiency, **Cultural Competency Skills:** to support and integrate diverse viewpoints in community program development and implementation, **Community Dimension of Practice Skills:** to identify and influence relations that influence community health and having the skill of engaging community members, **Public Health Science Skills:** to know and apply public health sciences in the implementation and managing of health interventions, **Financial Planning and Management Skills:** to motivate co-workers for the purpose of achieving intervention goals and the skill to contribute in the development of intervention budgets and **Leadership and Systems Thinking Skills:** to incorporate ethical standards of practice into all interactions with individuals and communities and contribute to the planning of healthy communities.

Malaria intervention volunteers as part of the frontline staff of NGOs are often given training in how to fix bed nets, record information and rapid diagnostic of malaria. Training is not the only area where malaria intervention volunteers develop their public health skills. Studies have shown that volunteers can also learn by observation and mimicking the actions of other workers. According to Piaget and Inhelder (1969), work activities act to reinforce, refine or generate new forms of knowledge and skills. Billet and Choy (2013) notes that the readiness of the workplace to afford opportunities for individuals to engage in work activities (Participation) and access to direct and indirect support (Guidance) is a key determinant of the quality of learning in workplaces. In addition workplace readiness can promote individual's engagement but learning also depends upon the degree by which individuals wish to engage purposefully in the workplace. Volunteers then are more likely to develop their public health skills during interventions when they are given adequate chance of participation and guidance. Participation is not always equal among volunteers as staff are often afforded chances of participation based on basis of gender, status of work and employment status (Hull, 1997).

In Africa generally, workplace learning plays a major role in staff capacity development of many institutions especially in NGOs. Many of these Organisation do not engage in staff professional training due to inadequate operational funds. As such a pragmatic approach to learning is quite common in many NGOs who favour program deployment.

Developing skills outside the workplace can be difficult, time-consuming, and expensive in the short run, and most NGO managers would prefer to spend their money on programs (McKinsey, 2001). According to Harris et al (1996), individuals may procedures that have shortcomings without guidance. For learning at work to be effective, learners need to be guided by higher skilled co-workers who can explain conceptual knowledge of work operations needed for better performance. In East Africa for example many horticultural farmers depend on workplace learning to teach their employees how grow and tend to the flowers in a manner that meets the quality required to compete in the international market. According to Mulder and Gulikers (2011), farm managers and supervisors in East Africa have a keen interest on workplace learning because the commercial farming process is very sensitive and mistakes by unskilled workers will greatly reduce profits. And since many of them cannot afford to send their workers out for professional training, they actively engage in workplace learning.

In Gambia, workplace learning also plays major roles in skills development of workers in all sectors of the economy. This is more evident in the areas of agriculture and community healthcare where community participants are given basic training just before the commencement of a community project which is often reinforced as practical problems are encountered and solved during the project lifetime. Roland Yeo (2008) proposed that problem-based learning in the workplace follows the four modes of learning proposed by Kolb, but in the following order: reflective observation, abstract conceptualization, active experimentation, and then concrete experience. Other research suggests that the majority of adults have a preference for visual material. Females are more likely than males to assimilate information from all available sources, whereas males tend to focus on fewer information sources (Darley and Smith, 1995). Hence, skill development is linked to how well learning strategies are used in workplace learning to support differences in learners' characteristics, styles and preferences. The second objective of the study was to establish the skills on malaria prevention acquired by the volunteers. There is enough literature on the skills needed by volunteers to implement malaria interventions, however, no literature can be found explaining the skills acquired volunteers after malaria interventions. Thus a knowledge gap was revealed in the role of experiential learning in capacity development of malaria project volunteers.



### **Experiential Learning and Participation in Malaria Interventions**

Experiential learning is one of the primary elements of capacity development both within an organisation and at community level. Lave (1993) points out that there is no separation between participation in work and learning (knowledge and skills acquisition). Hence, one can argue that by participating in malaria interventions, many volunteers acquire new knowledge or skills in malaria prevention and control. This is the essence of experiential learning. In many cases, the success of malaria programs in developing countries depend to a large extent on the participation and contribution of professional public health staff and community volunteers. A single malaria program can involve thousands or more public health workers or volunteers as part of a program's workforce engaged in distributing bed nets, holding community meetings, rapid diagnostics, teaching communities how to protect themselves among many other tasks. For instance the participation of over 7800 community health workers in WHO's Rapid Access Expansion Program (RAcE) since 2012 resulted in extensive capacity developments that has contributed to the successful diagnosis of pneumonia, diarrhoea and malaria and treatment of 3.8 million children under five in RAcE-supported sites (WHO, 2017).

Experiential learning during malaria interventions can also reinforce the training received by volunteers. Like Piaget and Inhelder (1969) highlighted, work activities act to reinforce, refine or generate new forms of knowledge and skills. In 2015, WHO's Global Technical Strategy on Malaria recommended that national malaria programmes expand integrated community case management (ICCM) of malaria, diarrhoea, and pneumonia programmes to accelerate progress towards universal access to diagnosis and treatment (WHO, 2015). In Tanzania, village health workers (VHW) would undergo three to six months' training (Chagula & Tarimo, 1975), while in Nigeria, VHWs were trained for three months in groups of 20, and sent for refresher courses twice a year subsequently (Hilton, 1983). A number of studies have found that if regular refresher training is not available, acquired skills and knowledge are quickly lost (Ashwell & Freeman, 1995) and that, on the other hand, good continuing training may be more important to learning than who is selected (Ande et al, 2004). Married people are more likely to be selected though given that they tend to volunteer more than people who were single or divorced (Caputo, 1997).

In Gambia, HEPDO trained 3,244 Kabilo (village) Representatives (KRs) from January 2011 to December 2012. These KRs are volunteers selected by their communities to

conduct home visiting activities in order to counsel people on the importance of LLIN usage. HEPDO trained KRs conducted a total of 94,057 home visits helping people to hang their LLINs, change the shapes and urging them to sleep under the nets all year round (HEPDO, 2016). These participatory activities tend to reinforce volunteer knowledge and skills acquired from training and may result in experiential learning. Approaches to training have changed over the years. According to Gilson et al (1989), complaints about inappropriate training that were too theoretical or too classroom-based were quite common, today competence-based approaches are usually used, as Gilroy & Winch (2006) reported in the case of CHW training in the management of sick children. Whatever be the case, the actual practice after training often help volunteers to better understand the difficult concepts they failed to grasp during training. At the end, the outstanding point relevant to this study was that for learning and hence capacity development to occur, what is learned need to be retained over time. The third objective of the study was to examine the extent to which participation in malaria intervention leads to learning. The available literature established that participation leads to learning but the skills developed by volunteers due to participation in malaria interventions is unknown.

### **Capacity Development in Malaria Interventions**

Capacity Development is the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time (UNDP, 2008). In this definition of capacity development, setting and achieving development objectives as well obtaining and improving capabilities of individual or organisations are emphasised. Setting development objectives in an organisational context corresponds to the setting of Vision and Mission of an organisation or its **aspirations** whilst obtain and improving capabilities talks about the developing the knowledge and skills of **human resources** so that they can achieve the goals of the organisation. In other words organisational capacity development involves obtaining, strengthening and improving the knowledge and skills of human resources so that the organisation is not only able to set aspirations but also has the means to achieve those aspirations. This is also in line with the assumption of the McKinsey Capacity Framework that explains that in order to improve organisational capacity, skill, strategies and aspirations must be aligned.

Visions lie beyond the scope of any one organization. They represent the hopes and dreams of organizational members. The vision describes the changes in the prevailing economic, political, social or environmental situation that the organisation hopes to bring about (Varbanova, 2013). According to Bart (1997), the mission lays a foundation for future action and guides the organization's choice of strategies, activities and development. Human resources refers to the labour force of an Organisation, their knowledge and skills. Clearly, the human resources of any organization are its most valuable assets. In the view of many top-level executives, employees are the key source of an organization's competitive advantage (Brown and Kraft, 1998). Crafting a successful intervention, one that increases social impact and donor support, draws on the full range of an organization's skills, from strategic planning to marketing and fund-raising to program development and execution as well as financial management and program evaluation (McKinsey, 2001).

Capacity development of civil servants in Africa has been supported by donors for many decades through the provision of significant funding for training in poor African countries. However many of these training opportunities often go underutilised. According to study published by Norad in 2008, training is often poorly planned, and donors have generally developed the training programs they fund in isolation from each other, resulting in considerable duplication and inefficiency in overall resource use. Further studies by Norad (2008) also show that there are few tracking studies that identify what happens over the years to those who are given new skills. With regards to best practices in training for capacity development in Africa, "peer-learning" is publicised by many as the single most useful approach OECD (2010). This is mainly because peers are often work colleagues, members of the same community or people from different countries in the same region. This makes it easier for trainers and trainees to trust each other which is very important for effective learning. Moreover, trainers in a peer learning setting are often more aware of learning requirements of trainees and what strategies to employ for better capacity development.

In Gambia, a malaria in-service training program for Community Health Nurses (CHNs) primarily serving community villages was conducted in 2004 to develop their capacity in malaria control. The program included a computer-based training package to help CHNs to effectively record and manage data on malaria diagnostics and treatment. According to the review of the training program by Dawson and Joof (2005), learners reported wanting more computer instruction, but felt they had gained confidence. Conversely, some health

professionals expressed resistance regarding the development of information technology skills in CHNs deeming it poorly prioritized. In another study concerning the coverage and effectiveness of ITN distribution in Gambia, project supervisory staff reported that extensive coverage was not possible in some district in the country because many volunteers lacked the skill to properly record served households; and as a results, some households where missed. The fourth objective of the study was to examine the usefulness of the knowledge and skills acquired by volunteers to Capacity Development malaria in prevention. Literature on the volunteer skills and knowledge in malaria prevention was not found, hence their usefulness on capacity development cannot be established. Thus a knowledge gap exists in the role of experiential learning in capacity development of malaria project volunteers.

Lastly, the literature on capacity development showed that in order to develop staff capacity at organisational level, human resource skills, organisational strategies and goals must be aligned. The lack of literature on volunteer skills and knowledge acquired during malaria intervention makes it impossible to establish the usefulness of knowledge and skills acquired by volunteers to capacity development. This also created a knowledge gap in the role of experiential learning in capacity development of malaria project volunteers.

### **Methodology and Materials**

The researcher employed a concurrent mixed methods approach, particularly a case study design to investigate the role of experiential learning to capacity development of project volunteers in HEPDO malaria interventions. A case study research design was preferred because it produces detailed qualitative information that does not only describe real-life phenomena, but it also helps to explain the intricacies of real life situations that would otherwise be missed in survey or experimental research. The main target of the study were the Volunteers of the Health Promotion and Development Organisation in Kombo North District, Western Region, Gambia. The organisation has about 705 volunteers in Kombo North that have participated in past malaria interventions. Volunteers include members of youth and women groups found in the district. These volunteers are represented here as Kabilo (community) Representatives (CRs), Positive Deviants (PDs) and Traditional Communicators (TCs). This study specifically targeted volunteers from these subgroups that have participated in the execution of malaria interventions in the past. A 10% of the population which was 73 respondents were sampled from 705 and 20 Key informants (Senior staff from other health NGOs and District Public Health Officials) were interviewed.

Questionnaires that contained both open ended and closed questions were administered to the selected sample with the help of research assistants and interview schedules used for Key informant interviews. Ethical issues were observed during the study including: informed consent, confidentiality of information, privacy and anonymity of respondents. The research assistants explained the details of the study to the respondents and the role which they are to play in the research before administering the instruments.

The qualitative data obtained from the questionnaires and key informant interviews were transformed into themes of quantitative data based on the study objectives. This data was then keyed into SPSS to obtain the frequencies, percentages, measures of central tendencies, etc. The information was then presented in tables and charts for better comparison and analysis. Correlation and regression analysis were then undertaken with the help of SPSS to uncover existing relationships between the study variables and the nature of these relationships. An impressionist summary was subsequently developed from the findings. According to Kombo and Tromp (2006), an impressionist summary involves summarizing key findings, then explaining and interpreting the findings.

## **Results**

The research mainly targeted the volunteers of HEPDO that participated in the malaria interventions within Kombo North District, Western Gambia. Key Informant Interviews were also conducted within the area targeting district public health officials, medical personnel and executives of other NGOs. The volunteers were from the towns of Brufut, Lamin, Sinchu Alhagie and Sukuta; while the key informants were from health NGOs, healthcare facilities and government institutions within Kombo North. Of the 73 questionnaires administered, 67 were filled which is a response rate of 91.78%. All the 21 targeted Key Informants were successfully interviewed which is a response rate of 100%. The response rates of 91.78% and 100% are above 50% statistical significance recommended by Mugenda and Mugenda (2003).

## **General Information**

The study endeavoured to establish general information on the respondents concerning their marital status, educational level, years of volunteering, professional training in malaria control and malaria interventions participated.

## Marital Status of the Respondents

Respondents were asked to indicate their Marital Status. The results are presented in below.

**Table 4.1. Marital Status of the Respondents**

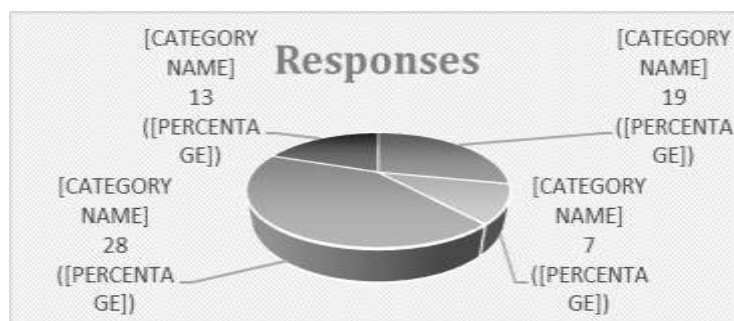
Responses	Frequency	Percentage
Married	43	64.2
Single	22	32.8
<b>Total</b>	<b>67</b>	<b>100.0</b>

The study findings indicate that majority of the respondents were married. These were 43 (64.2%) and the single respondents were 22 (32.8%). These findings suggested that married participants are more likely to volunteer in malaria interventions in Kombo North District. Similarly Caputo (1997), highlighted that married people tend to volunteer more than people who were single or divorced.

## Level of Education

The study directed the respondents to indicate their Level of Education. The results are presented in Figure 4.1.

**Figure 4.1: Respondent's Level of Education**



According to the data gathered, majority of the respondents, 28 (41.8%) specified the secondary level as the highest level of formal education attained, 13 (19.4%) of the respondents were tertiary graduates, 7 (10.4%) of the respondents attained Primary Education and 19 (28.4%) had no formal education. The results show that the number of educated volunteers is higher than the uneducated volunteers. This is in line with the findings that the likelihood of volunteering improved with education (Mesch et al, 2006).

## Years Volunteered at HEPDO

The study respondents were asked to indicate the years of volunteering at HEPDO. The results are presented in table 4.2.



**Table 4.2: Years Volunteered at HEPDO**

Responses	Frequency	Percentage
0-2	56	83.6
3-5	3	4.5
6-8	1	1.5
9-11	6	9.0
12-14	1	1.5
<b>Total</b>	<b>67</b>	<b>100.0</b>

According to the data collected on the number of years volunteered, majority of the participants (83.6%) volunteered between a tof 0-2 years. This suggests that majority of HEPDO volunteers participated in one or two of the organisation's malaria interventions which approximately last 1-2 years (HEPDO, 2016).

### Participation in Malaria Interventions

The study directed the respondents to specify the Type(s) of Malaria Interventions they participated in such as Awareness creation, IRS, Larviciding and ITN distribution. The results are presented in table 4.3.

**Table 4.3: Malaria Interventions Volunteers Participated In**

Responses	Frequency	Percentage
Awareness Creation	67	100.0
ITN Distribution	49	73.1

The data collected show that all the respondents participated in awareness creation whilst 73.1% are involved in ITN distribution. These findings indicate that the only malaria interventions that HEPDO volunteers participated in were Awareness creation and ITN distribution as none of the respondents indicated their participation in other interventions.

### Professional Training on Malaria Control

The respondents were asked to specify any Professional Training they received during malaria interventions. The study findings show that all the respondents received basic training on malaria, its causes and symptoms. Most of respondents also specified being taught the prevention strategies against malaria such as sleeping under bed nets, seeking prompt treatment, taking of fansidar by pregnant women as a preventative measure, uses of IRS, etc. However, the volunteers were not trained in rapid diagnostic testing to quickly expand access of malaria intervention as recommended by WHO (2015).

### **Knowledge on the causes of Malaria**

Participants were asked to state the causes of malaria. From the results of the data collected, all of the respondents attributed the cause of malaria to mosquito bites; with 12% of the respondents going further to indicate that malaria is caused by a parasite transmitted by the female anopheles mosquito. These results are supported by the findings that all the respondents were given professional training in malaria prevention.

### **Knowledge on the Symptoms of Malaria**

Participants were then asked to state the symptoms of malaria. As it turns out, majority of the respondents have a good knowledge of the symptoms of malaria. 61.2% of the respondents were able to correctly indicate four or more (4) symptoms of malaria correctly highlighting fever, drowsiness, joint pain, headaches, vomiting as symptoms of malaria (CDC, 2017). 28.4% indicated three (3) symptoms of malaria whilst the remaining 10.4% were only able to mention two (2) symptoms of the disease.

### **Knowledge on Malaria Treatment**

Participants were also asked to describe how malaria is treated. The collected data shows that only 15 out of 67 respondents (22.4%) explained the correct procedure of treating malaria; highlighting that when the sign and symptoms of malaria are observed, the affected person should visit the hospital for testing first before taking antimalarial drugs. Conversely, majority of the respondents (87.6%) highlighted that the affected person should get Coartem, which often results in misdiagnosis. Similar results were also obtained in a Ugandan study that reported malaria misdiagnoses is common with children under 5 (Nankabirwa et al, 2009).

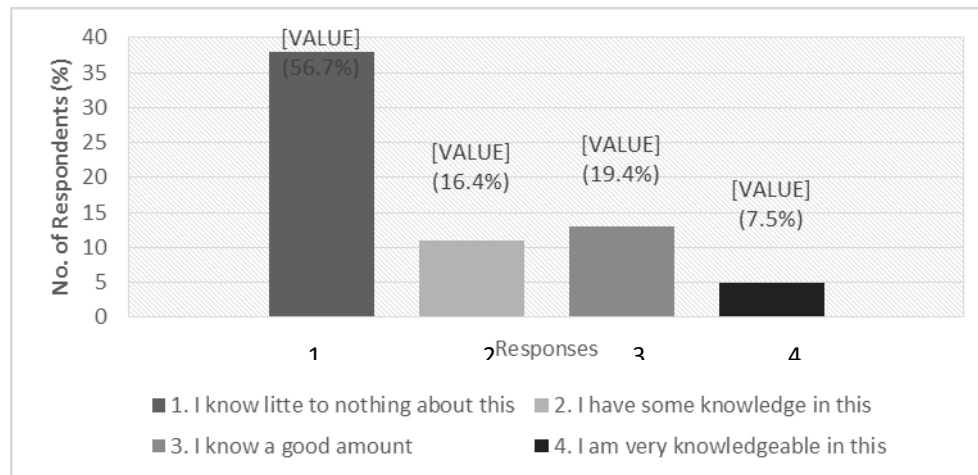
#### **4.3.4. Knowledge on Malaria Prevention**

The study also endeavoured to measure participants' knowledge on how to prevent malaria. The collected data shows that 50.8% of the respondents know three or more preventions strategies such as prevention of mosquito bites by sleeping under treated bed nets, indoor residual spraying, environmental sanitation, IPT intake for pregnant women, etc. 35.8% of the respondents were only able to mention two prevention strategies whilst 13.4% of the respondents only mentioned the use of treated bed nets to prevent malaria.

### Knowledge on Indoor Residual Spraying

The respondents were then asked to indicate their level of understanding in IRS based on a four-point Linkert scale. The results are presented in Figure 4.2 below:

**Figure 4.2: Respondent's Knowledge on IRS**

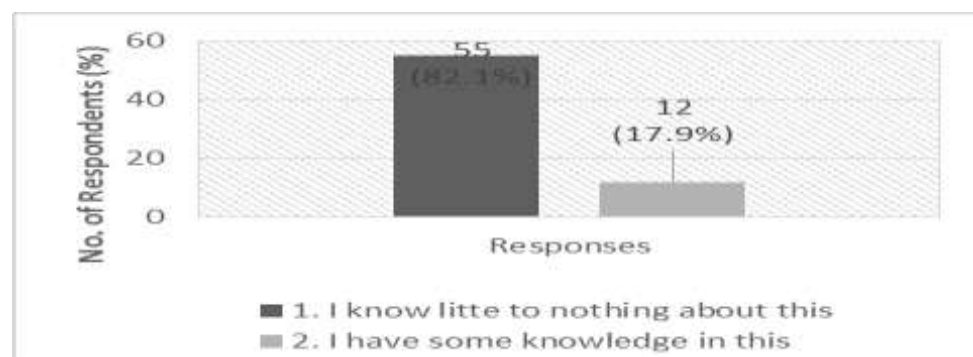


The study findings show that majority of the respondents (56.7%) know little to nothing about indoor residual spraying with only 5% of the respondents reporting to be very knowledgeable in indoor residual spraying. The findings suggest that the lack of participation in IRS interventions by volunteers at HEPDO (2016), might be a possible cause for this.

#### 4.3.6. Knowledge on Larviciding

The respondents were further asked to indicate their level of understanding in Larviciding also based on a four-point Linkert scale. The results are presented in table 4.3 below.

#### Respondent's Knowledge on Larviciding



According to the data collected, most of respondents (82.1%) know little to nothing about larviciding. The result show that only 12 out 67 respondents have some knowledge in larviciding. These findings point to the lack of participation as a possible explanation (Billet and Choy, 2013).

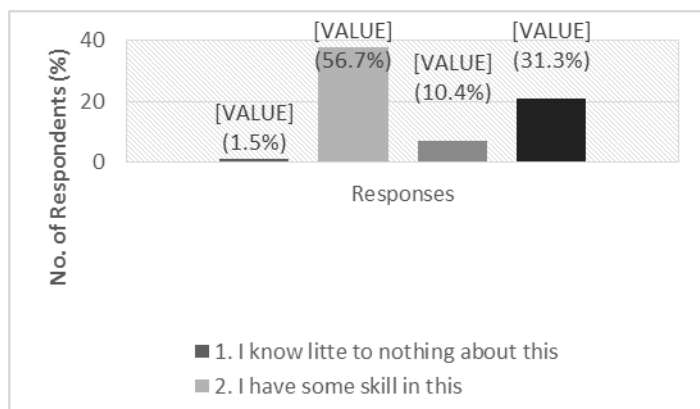
### Volunteers' Skills in Malaria Prevention Strategies

This section presents collected data on the respondents' Skill level in malaria prevention and control. The responses were based on a four point Likert-scale in which skill level rated as: 1 = I know little to nothing about this, 2 = I have some skill in this, 3 = I know a good amount about this but it would be useful to learn more, 4 = I am very skilled in this.

### Skill Levels in Communication

Respondents were asked to specify their skill level in Behavioural Change Communication. The results are presented in Figure 4.4.

**Figure 4.4: Respondents' Skill in Behavioural Change Communication**

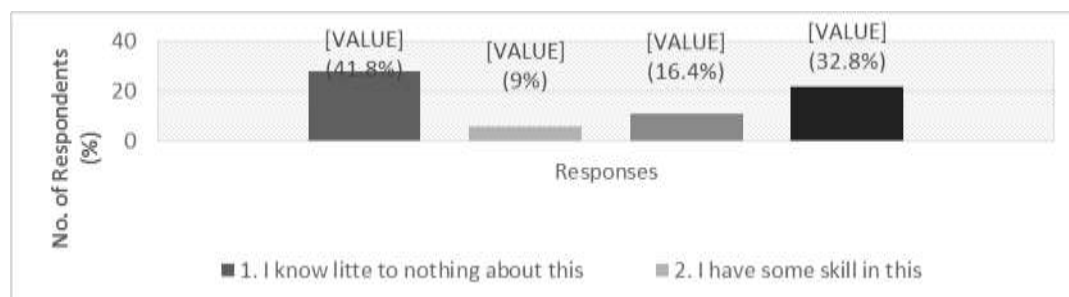


The results of the study indicate that majority of the respondents have moderate communication skills with 56.7% of the volunteers having some skill in change communication, 10.4% knowing a good amount in change communication whilst only 31.3% of the volunteers being very skilled in behavioural change communication. Given that communication is a fundamental skill used by volunteers during ITN distribution and awareness creation interventions (PHF, 2014), it may be possible that volunteers are developing their SSBC skills as they participate in malaria interventions but lack the conceptual basis to further their skill.

### Skill Levels in ITN Distribution & Use

The study directed the respondents to specify their skill level in ITN Distribution. The results are presented in table 4.5.

**Figure 4.5: Respondents' Skill in ITN Distribution**



The results of the study show that majority of the respondents have a good level of skill on how to use and properly distribute treated bed-nets with 58.2% of the respondents falling between “I have some skill in this” to “I am very skilled in this”. The remaining 41.8% responding to know little to nothing about ITN distribution. These results suggest that participation in ITN distribution interventions may have helped the volunteers of HEPDO to know more about this preventions strategy (Billet and Choy, 2013).

### Responses on the Influence of Participation in Learning

This sections present data on the extent to which participation in malaria interventions led to volunteer learning in various interventions such as: IRS, Larviciding, ITN Distribution, etc. The responses on the influence of Participation on learning is rated as: 1 = Participating in the malaria programs taught me little to nothing about this, 2 = Participating in the malaria programs taught me some knowledge or skill in this, 3 = Participating in the malaria programs taught me much but it would be useful to learn more, 4 = Participating in the malaria programs made me very knowledgeable or skilled in this. The findings on each intervention is presented in table 4.4 below:

**Table 4.4: Learning attributed to Participation in Malaria Interventions**

Statistic	IRS	Larviciding	ITN Use	Communication	Diagnostics	Treatment
Mean	1.90	1.64	2.49	2.97	1.75	1.94
Mode	1(55.2%)	1(62.7%)	3(50.8%)	3(88.1%)	1(49.3%)	1(47.8%)

Std. Deviation	1.032	.883	1.092	.347	.823	.952
Minimum	1	1	1	2	1	1
Maximum	4	3	4	4	3	3

As shown in table 4.4, ITN distribution and Persuasive Communication are the only two knowledge/skill areas where respondents reported to have learnt much due to participation in malaria programs; with both areas recording a modal score of 3 that corresponds to “Participating in the malaria programs taught me much but it would be useful to learn more” on the Linkert scale. On the other hand majority of the respondents reported to that participating in malaria programs taught them little to nothing about Indoor residual spraying, larviciding, malaria diagnostics or treatment. These findings suggest that volunteers are more likely to learn from malaria interventions if they actually practice what they have learnt than when they only received abstract training during malaria interventions (Piaget and Inhelder, 1969)

#### **The usefulness of the Knowledge and Skills Acquired by Volunteers**

This section present the findings obtained from the Key Informant Interviews about experiential learning during malaria interventions and also on how useful the acquired knowledge and skills are to combating malaria in the future.

#### **Experiential Learning Observed by Volunteer Supervisors**

The key informants where asked to specify any tasks on malaria prevention or control that their volunteers able to perform better as they participated in malaria interventions. The responses are summarised in the table 4.5.

**Table 4.5: Observed Volunteer Skills**

<b>Responses</b>	<b>Frequency</b>	<b>Percent</b>
ITN Distribution & SBCC Skills	16	76.2
Indoor Residual Spraying	5	23.8
<b>Total</b>	<b>21</b>	<b>100.0</b>

Majority of the key informants (76.2%) who were mainly executive/ supervisory level staff of Public Health Organisation clearly indicated that they have observed their volunteers to better manage bed-net distribution and have seen improvements in their volunteer SBCC skills as they participated in malaria interventions. These findings suggest that most of the



malaria interventions in Kombo North where Volunteers participated was in ITN distribution and Awareness Creation interventions.

### Essential Volunteer Skills for Combatting Malaria

The study then endeavoured to identify the essential knowledge or skills that an organisation's volunteers need to have to effectively combat malaria. According to the responses from the Key Informants, the most essential knowledge or skills volunteers need, to effectively combat malaria are: Social and Behavioural Change Communication (SSBC/IEC) skills and the knowledge of current trends on malaria prevention such as the Seasonal Chemotherapy which is recommended by the WHO (2015) as an effective preventive measure in tropical areas. These two areas accounted for 28.6% and 38.1% of the responses respectively. Other important skills highlighted by the Key Informants include planning and management skills, Adult training skills and Research skills.

### Correlation Analysis

This section presents the various Spearman's rank-order correlations run to uncover any relationship between participation in malaria interventions and volunteer learning in malaria causes, symptoms, treatment, preventions, ITN distribution, Awareness Creation, IRS, and Larviciding. As indicated in the conceptual framework, Participation in Malaria Intervention is the independent variable whilst the knowledge and skills acquired by volunteers are the dependent variables. The findings are presented in the tables below.

Table 4.6: Rank Spearman's Correlation Analysis

	Y1	Y2	X1	X2	X3	X4	X5	X6	X7	X8	X9
Y1	1.000										
Y2	.414**	1.000									
X1	-.123	-.304*	1.000								
X2	-.162	-.107	-.524**	1.000							
X3	.147	.198	.321**	.159	1.000						
X4	-.219	-.192	.171	.037	.350**	1.000					
X5	.072	-.220	-.061	.195	.084	.195	1.000				
X6	.219	.036	-.053	.191	.268*	.030	.102	1.000			
X7	.056	-.038	.046	.108	.092	.173	-.012	.067	1.000		

<b>X8</b>	.897**	.324**	-.013	.116	.037	-.112	.056	.192	.177	1.000	
<b>X9</b>	-.190	.213	-.155	.152	.083	-.044	-.159	.010	.012	-.204	1.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

### Key:

Y1 = ITN Skill Level

Y2 = Communication Skill Level

X1 = Marital Status

X2 = Level of Education

X3 = Years Volunteered at HEPDO

X4 = Knowledge of Malaria Causes

X5 = Knowledge of prevention

X6 = Knowledge of Symptoms

X7 = Knowledge of Treatment

X8 = Participation in ITN Distribution

X9 = Participation in Sensitization

The results of the correlation analysis show a moderate positive correlation ( $r_s = .414$ ,  $p = 0.001$ ) which is statistically significant between volunteers' communication skill and their ITN distribution skill, suggesting that volunteers ITN distribution skills increases as they become better at change communication. In addition, there is a strong positive correlations ( $r_s = .897$ ,  $p = 0.05$ ) which is statistically significant between volunteer participation in ITN distribution and volunteer skills in ITN distribution. This means that as volunteers' participate more in ITN distribution, their ITN skills also improve.

Furthermore, there is a weak positive correlation ( $r_s = .324$ ,  $p = 0.001$ ) which is statistically significant between participation in ITN distribution and communication skill. This implies that volunteer participation in ITN distribution improves their social and behaviour change communication skills which is an important skill in the fight against malaria according to various key informants. There is also a weak positive correlation between ( $r_s = .321$ ,  $p = 0.01$ ) which is statistically significant between the marital status of volunteers and the number of year volunteered at HEPDO. However there is a weak negative correlation ( $r_s = -.304$ ,  $p = 0.05$ ) between marital status (ranking: married = 2, single = 1) and the communication skill of the respondents. This implies that married respondent are less likely to be skilled at communication than the single respondents. The strong negative

correlation ( $r_s = -.524$ ,  $p = 0.01$ ) observed between marital status and level of education further imply that the married respondents are less educated.

Meanwhile a weak positive correlation ( $r_s = .350$ ,  $p = 0.004$ ) that is statistically significant exist between volunteers' knowledge of malaria causes and the number of years volunteered at HEPDO. A weak positive correlation ( $r_s = .268$ ,  $p = 0.05$ ) also exist between volunteers' knowledge of malaria symptoms and the numbers of years volunteered at HEPDO. These associations are supported by the fact that all volunteers are trained about the causes of malaria before the start of any interventions, and longer volunteering periods means more training.

### Ordinal Regression Analysis

An ordinal regression analysis was conducted to examine the extent to which volunteer participation in malaria interventions and other factors such as years volunteered and level of education, can predict the communication and ITN distribution skills of HEPDO volunteers.

Three regression models are used to in the analysis so as to better compare the effect the different explanatory variables to find the combination that best predicts the outcome of the dependent variables (i.e. ITN and communication skills). The base model controls for volunteers' knowledge of malaria causes, symptoms and prevention. The background model controls for years volunteered at HEPDO, marital status, and knowledge of malaria causes, symptoms and prevention; whilst the full contextual model controls for years volunteers at HEPDO, marital status, knowledge of malaria causes, symptoms and prevention as well participation in ITN distribution and sensitization. The table below presents the summary of the results.

**Table 4.7: Summary of Regression models for Volunteer Skills in ITN Distributions**

	Base Model	Background model	Full contextual model
<b>Model-Fitting Info</b>			
-2LL Intercept only	106.742	133.583	160.573
-2LL Final	93.002	114.876	47.842
- Chi-Square	13.741	18.707	112.732
- Sig.	.089	.132	.000
Link function: Logit			

<b>Goodness-of-fit</b>			
-Pearson Chi-Square	72.002	109.078	159.100
-Deviance Chi-square	60.170	92.383	44.330
-Sig.	.631	.641	1.000
Link function: Logit			
<b>Nagelkerke R<sup>2</sup></b>	20.2%	26.6%	88.8%

As shown in table 4.7 above the explanatory variables of the base model: volunteers' knowledge of malaria causes, symptoms and prevention can only account for 20.2% of the variation between volunteers skills in ITN distribution. The model also fails to give a significant improvement in prediction over the intercept-only model as indicated by a statistically insignificant chi-square statistic ( $p > 0.05$ ). Hence, one can conclude that the knowledge acquired by volunteers in malaria causes, symptoms and prevention from training does little to improve their skills in ITN distribution.

The background model controlling for years volunteered at HEPDO, marital status, and knowledge of malaria causes, symptoms and prevention, only explains 26.6% of the variation between volunteer skills in ITN distribution. However this model also fails to give a better prediction than if the volunteer skills were predicted based on marginal probability as indicated by the chi-square statistic of 18.707 which is statistically insignificant. This shows that marital status and years volunteered only have a little effect on volunteer skills in ITN distributions.

Meanwhile, the full contextual model controlling for years volunteers at HEPDO, marital status, knowledge of malaria causes, symptoms and prevention as well participation in ITN distribution and sensitization accounts for 88.8% in the variation of volunteer skills in ITN distribution. With a statistically significant chi-square statistic of 112.732 ( $p = .000$ ), the model gives a better predictions of volunteer ITN distribution skills than the intercept-only model, the base model and the background model. In addition the deviance chi-square significance (1.000) is greater than 0.05, indicating that deviance of the model is statistically insignificant and that the model is a good fit for the data. This means that participation in ITN distribution and sensitization strongly improves volunteer skills in ITN distribution.

**Table 4.8: Summary of Regression models for Volunteer Communication Skills**

	Base Model	Background model	Full contextual model
<b>Model-Fitting Info</b>			
-2LL Intercept only	83.153	103.248	124.482
-2LL Final	73.455	84.520	79.981
- Chi-Square	9.697	18.728	44.501
- Sig.	.287	.013	.000
Link function: Logit			
<b>Goodness-of-fit</b>			
-Pearson Chi-Square	52.356	81.292	126.246
-Deviance Chi-square	49.686	66.114	75.083
-Sig.	.901	.994	1.000
Link function: Logit			
<b>Nagelkerke R<sup>2</sup></b>	15.7%	28.3%	56.4%

Similar to the base model for ITN distribution skills, the base model for volunteer communication controls for malaria causes, symptoms and prevention. From the analysis in table 4.8 above, the model can only account for 15.7% of the variation between volunteer's communication skills. In comparison with the intercept only model, the base model fails to give a significant improvement in prediction as indicated by a statistically insignificant chi-square statistic ( $p = .287$ ). This implies that volunteer communication skills is not significantly affected by their knowledge in malaria causes, symptoms and prevention.

Controlling for years volunteered at HEPDO, marital status, and knowledge of malaria causes, symptoms and prevention, the background model for volunteer communication skills explains 28.3% of the variation between volunteer communication skills. Furthermore, this model is significantly (chi-square = 9.697,  $p = 0.013$ ) better at predicting the communication skills of the volunteers than if the skills were predicted based on marginal probability. Also the deviance chi-square is statistically insignificant ( $p > .05$ ) indicating that the model is a good fit for the data. This shows that a volunteers' background significantly affects their communication skills.

The full contextual model for volunteer communication skills which controls for years volunteered at HEPDO, marital status, knowledge of malaria causes, symptoms and prevention as well participation in ITN distribution and sensitization explains 56.4% of the variation in volunteer communication skills. The model fitting is also statistically significant as indicated by a chi-square statistic of 44.501 with a p value of .000. The deviance chi-square of 75.083 ( $p = 1.000$ ) is insignificant meaning that the model is a good fit for the data. This implies that participation in ITN distribution and sensitization moderately improves volunteer communication skills.

## **Discussion**

### **Volunteers' knowledge on malaria causes symptoms and treatment**

The study findings showed that majority of the respondents attribute the cause of malaria to mosquito bites. According to the WHO (2015), malaria is caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. In this way, only few of the respondents (12%) correctly specified that malaria is caused by a parasite and that mosquitos are only the agents of transmission. The study found out that the longer the participants volunteered at HEPDO the more likely they were to know the real cause of malaria. This is because the longer a participant volunteered the more training they received in malaria prevention. The study findings also indicated that majority of the respondents have a good knowledge of the symptoms of malaria. According to the CDC (2017), the symptoms of malaria include: fever, chills, sweats, headaches, nausea and vomiting, body aches and general malaise. More than half of respondents were able to mention four or more of these symptoms, about a quarter of the respondents were only able to mention three of these symptoms whilst few of the respondents only were only able to indicate two of these symptoms. Analysis of these findings show that the number of years volunteered at HEPDO also increased volunteers' knowledge of symptoms. This is because like earlier mentioned, longer volunteering means more training on malaria prevention.

The result of the study further indicate that only few respondents have adequate understanding in malaria treatment as most of the respondent skipped diagnostics, mentioning only the intake of anti-malarial drugs. WHO (2015) recommends that all cases of suspected malaria be confirmed using parasite-based diagnostic testing before administering treatment (ACT) to reduce the resistance arising from misdiagnosis. They went on to highlight that medical prescription should only be given in the case that testing is not possible. The study



findings show that only 22.4% of the respondents explained the correct procedure of treating malaria; highlighting that when the sign and symptoms of malaria are observed, the affected person should visit the hospital for testing and in the case that the test comes out positive for malaria, antimalarial drugs such as Coartem (ACT) is prescribed accordingly. This is because the respondents mainly received training in malaria prevention and not in malaria treatment.

### **Volunteers' knowledge on malaria prevention**

The results of the study show that majority of the respondents know of the malaria prevention strategies used today. According to the CDC (2017), four interventions make up the essential package of malaria prevention and control in endemic countries; they include: case management, insecticide-treated nets, intermittent preventive treatment of malaria in pregnant women, and indoor residual spraying interventions; although larval control/larviciding is sometimes used. About half of the respondents specified three or more of these prevention strategies, 35.8% mentioned two prevention strategies whilst 13.4% only indicated the use of bed nets as a preventive measure. This extensive knowledge in malaria prevention is because all the respondent received training in malaria prevention whilst volunteering at HEPDO. In terms of depth, the findings indicate that majority of the respondents know little to nothing about indoor residual spraying and larviciding. This is because none of the participants have ever participated in IRS. According to WHO (2017), IRS operations must be managed by skilled professional staff, based on an analysis of local epidemiological data and a sound understanding of transmission patterns, vector behaviour and insecticide resistance status. Hence most volunteers do not participate in IRS.

### **Volunteer's skill in ITN distribution**

The findings of the study indicate that majority of the respondents have a good level of skill in how to use and properly distribute treated bed-nets with 58.2% of the respondents falling between "I have some skill in this" to "I am very skilled in this". According to the Gambia DoSHSW (2009), the preference of net shape and size as well as the misconception about treated bed is a threat to the promotion of LLIN usage within the country. In another study concerning the coverage and effectiveness of ITN distribution in Gambia, project supervisory staff reported that extensive coverage was not possible in some district in the country because many volunteers lacked the skill to properly record served households; and as a results, some households were missed. Thus, having good communication and record

keeping skills, an ability to hang the nets properly and change their shapes, as well as the ability to repair and re-treat nets are important skills in ITN interventions. About three-quarters of the respondents have participated in ITN interventions and are believe to be a good judge of their skill in ITN distribution. As mentioned earlier, majority of respondents are skilled in ITN distribution. This is mainly due to participation in ITN distribution with majority of the respondent reporting that participation in the malaria programs taught them much about ITN distribution. See table 4.11 for more details.

### **Volunteers' skill in Awareness Creation (BCC)**

Behavioural change communication is an important intervention that often goes hand in hand with the other interventions mentioned earlier, it is used to improve the effectiveness of other interventions through sensitization. According to Gies et al (2009), BCC promotes antenatal care attendance and IPTp uptake; and as earlier mentioned BCC can also promote the usage of LLINs by clarifying any misconception that may hinder net use. The results of the study indicate that all the respondents have participated in awareness creation interventions to sensitize their households and communities on malaria prevention. The finding further indicate that about of the respondents have poor skills in behavioural change communication and could benefit from more training. Conversely, the remaining half of the respondents are fairly skilled in behavioural change communication with many of these respondents also engaged in counselling, leadership and teaching activities. From the analysis, it has been found that married volunteers who form about 64% of the respondents attained low level of education and have lower BCC skills compared to single respondents. In addition the married respondents significantly reported more obstacles ranging from financial constraints, language barriers and absence due to family responsibility.

### **Influence of participation on volunteers' knowledge**

In general, the analysis of the research data have showed that participation in malaria interventions does not have a strong influence on the volunteers' knowledge about malaria, its causes, symptoms or control. The only factor significantly associated with the knowledge of volunteers is the number of years volunteer at HEPDO, indicated by a positive correlation of 0.350 between volunteers' knowledge of malaria causes and the number of years volunteered, and a positive correlation of 0.268 between volunteers' knowledge of malaria symptoms and the numbers of years volunteered at HEPDO. This means that the longer the volunteering duration, the more volunteer improve their knowledge on malaria causes and

symptoms. This is because all volunteers are trained about the causes of malaria and how to prevent it before the start of any interventions, and longer volunteering periods mean more training.

In addition malaria infection is quite common in the Gambia and there are only few people if any who can say that they have never been infected or closely witnessed a family member who has been infected. As a result many Gambians are familiar with the common symptoms of malaria. And although Piaget and Inhelder (1969) highlighted, work activities act to reinforce, refine or generate new forms of knowledge and skills, it appears that participation in ITN distribution and awareness creation on malaria may reinforce volunteers' knowledge but it does not necessarily improve on what volunteers' already know about malaria prevention and control.

### **Influence of participation on volunteers' skills**

Anderson (1993) explained that skill acquisition occurs in three phases: declarative knowledge (forming a mental representation of the task), knowledge compilation (integration of cognitive and motor processes needed to perform a task), and procedural knowledge. Thus knowledge acquisition is an important aspect of skills acquisition. Findings from the analysis of the research data have showed that participation in malaria interventions has a strong influence on volunteer communication and skills in ITN distribution. To begin with, a strong positive correlation (spearman's rank) of 0.897 exist between volunteer participation in ITN interventions and volunteer skills in ITN distribution. This indicates that volunteers' ITN skills increases as they participate more in ITN distribution. Volunteers' skills in ITN distribution also improved as volunteer communication skills improved indicated by a moderate positive correlation (spearman's rank) of 0.414 between communication skill and their ITN distribution skill.

A regression analysis run to examine what factor(s) best predict the variation of volunteer skills in ITN distribution showed predictions to increase significantly to 88.8% (Nagelkerke  $R^2$ ) when participation in ITN distribution and sensitization were added as explanatory variable in the full contextual model. When participation in ITN distribution and sensitization was removed from the regression model as in the background model which only controlled for years volunteered at HEPDO, marital status, and knowledge of malaria causes, symptoms and prevention; the Nagelkerke  $R^2$  value decreased to 26.6%. This implied that volunteers' participation in ITN distribution and sensitization explain to a large extent the

variation in volunteer skills in ITN distribution which means that participation is responsible for volunteer skill in ITN distribution. This in line with insights of Lave (1993) who highlighted that there is no separation between participation in work and learning.

Meanwhile, there is also a positive correlation (spearman's rank) of 0.324 between participation in ITN distribution and volunteers' communication skill. This means that as volunteer participation in ITN distribution increases their behaviour change communication skills also improves. However there is a weak negative correlation (spearman's rank) of -0.304 between marital status and volunteers' communication skills, indicating that married respondent are less likely to be skilled at communication than the single respondents. This is because the married volunteers are relatively less educated than the single volunteers as indicated by the strong negative correlation ( $r_s = -.524, p = 0.01$ ) observed between marital status and level of education. According to Hull (1997) employees (volunteers) are afforded the chance to participate on the basis of gender, perceptions of individuals' competence, race, status of work, employment status, workplace demarcations and relationship. Thus volunteers who have achieved higher education are likely to receive more guidance, be more confident during awareness creation as community members tend to listen more to what they have to say.

The findings from the regression analysis has showed that participation in ITN distribution and awareness creation interventions accounts for a significant variation in volunteers' communication skills. The Nagelkerke  $R^2$  value increased by 28% when participation in these two interventions were added to the background model which initially only controlled for years volunteered at HEPDO, marital status, and knowledge of malaria causes, symptoms and prevention as explanatory variables. And although the influence of participation in volunteer communication skills is not as strong as the influence of participation on ITN distribution skills, participation in these two interventions do indeed help to improve volunteer BCC skills.

### **Usefulness of the knowledge and skills acquired**

The findings of the study indicate that the knowledge of current trends on malaria prevention such as the seasonal chemotherapy and behavioural change communication skills and are the two most important areas where volunteers need to develop their knowledge and skills. Respectively, these two areas accounted for 38.1% and 28.6% of the responses from

the Senior Managerial staff (key informants) of various health organisations interviewed during the study. Other skills mentioned by these key informants include: planning and management skills, adult training skills and research skills. There are numerous studies that on malaria prevention and control that also emphasize on the importance of behavioural change communication skills and staying informed on the current trends of malaria prevention. For example the WHO (2015), recommends the administration of seasonal chemotherapy in tropical areas such as the Gambia as an effective preventive measure during seasons of high transmission. Hence, if volunteers are regularly informed about current trends, they can in turn sensitize their communities and prevent infection. Similarly, behaviour change communication plays an important role in addressing the barriers encountered during other interventions such as delays in seeking treatment or inconsistent use of bed nets. According to the Gambia DoSHSW (2009), the preference of net shape and size as well as the misconception about treated bed is a threat to the promotion of LLIN usage within the country, indicating the importance of BCC in ITN interventions.

### **Role of Experiential Learning in Volunteer Capacity Development**

Experiential learning is the process whereby knowledge (skills) is created through the transformation of experience and that this knowledge or skills results from the combination of grasping and transforming experience (Kolb, 1984). In other words, experiential learning is acquiring knowledge and skills through direct experience or participation; and this study seeks to investigate the contribution of this type of learning to the capacity the development of malaria intervention volunteers. According to UNDP (2008), capacity development is the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time. In an organizational context, the McKinsey capacity framework (2001) emphasizes that organisational skills is an important part of organisational capacity which arises from human resources, organisational structure and infrastructure. The framework asserts that to improve organisational capacity, human resource skills, organisational goals and strategy must be aligned. Since the volunteers of HEPDO are the main subjects of the study, the skills of these volunteers correspond to human resources skills which was measured against HEPDO's goals and organisational strategy to reveal any evidence of capacity development caused by participation in malaria interventions.

HEPDO's Vision is a Gambia where the population is well informed on the importance of: women empowerment, human rights, water sanitation and hygiene, healthy environment, healthy life styles, elderly care and support, prevention and control of communicable and non-communicable diseases, occupational health and workplace safety (HEPDO, 2016). Guided by this vision, HEPDO's work strategy mainly involves: Information, Education and Communication (IEC); Behavioural Change Communication and the deployment of practical intervention strategies including activities with specific objectives, resource distribution and capacity building. One of the key elements in HEPDO's vision is the prevention and control of communicable and non-communicable diseases. This indicates that the organisation plans to continue fighting malaria which is one of the most deadly communicable disease affecting Gambians today. Fighting against malaria is also evident in their Organisation's strategy as shown by their involvement in extensive ITN distribution, behavioural change communication and malaria education programs. Now if capacity development only occurs when volunteers acquire knowledge and skills that are aligned to what the organisation is trying to achieve, (to prevent malaria in this case) then significant capacity development has occurred as revealed by the new knowledge and skills acquired by the volunteers in the study findings. But is this capacity development due to experiential learning?

From the analysis of the findings, it has been revealed that the longer participants volunteered, the more they knew about the causes and symptoms of malaria as these volunteers received more training. Yet, participation in ITN distribution and awareness creation did not have much influence on volunteers' knowledge on malaria prevention, meaning that volunteers gained more knowledge about malaria prevention during training than during participation in BCC and ITN interventions. This opposite was found to true when it came to volunteers' skills in ITN distribution. Here, the analysis revealed that volunteer participation in BCC and ITN interventions significantly improved volunteer skills in ITN distribution. Similarly greater participation in these interventions was responsible for better behavioural change and communication skills among volunteers. Thus participation in ITN distribution and malaria sensitization did not build conceptual knowledge on malaria prevention and control but it did build volunteer skills in ITN distribution and communication. This confirms that experiential learning leads to volunteer capacity development in ITN distribution and behavioural change communication, both of which are valuable skills needed by HEPDO to prevent malaria.

Furthermore, the findings of the study indicate that the knowledge of current trends on malaria prevention and behavioural change communication skills and are the two most important areas where volunteers need to develop their knowledge and skills. And although having skills in ITN distribution such as record keeping and net re-treat nets is important, there is already a high national coverage of LLINs (Mwesigwa et al. 2015) and ITN interventions may soon phase out. BCC interventions on the other hand are likely to be around as long as the malaria fight is going on. This is because communication is a critical for the success of most malaria interventions. Hence the acquisition or development of volunteer BCC skills during participation in ITN and sensitization interventions stands to greatly benefit the aspirations of HEPDO.

### **Summary of findings**

Overall, the study revealed that the role of experiential learning in volunteer capacity development is the acquisition of necessary skills needed to improve work performance. In the case of volunteers in HEPDO malaria interventions, the role of experiential learning here is developing volunteer skills in distributing ITNs and change communication to prevent malaria. This is because, as volunteers participate in malaria interventions, they are actively interacting with community members trying to transfer and explain what they have learnt in training. Many have conducted numerous home visits applying experiential learning to develop their presentation, counselling and leadership skills. Volunteer ITN distribution skills are also improved as they embark on the task regularly, like Daniel Willingham (2004) stated, “Practice makes perfect—But only if you practice beyond the point of perfection.”

The summary of findings discussed in this section are arranged in accordance with the four study objectives. The first objective of the study was to establish the knowledge on malaria prevention and control acquired by the volunteers of HEPDO. First, the study established that 19.4% of the respondents were tertiary graduates, 41.8% attained secondary education as the highest level of formal education, 10.4% attained Primary Education whilst 28.4% had no formal education. The study also found out that all the respondents received basic training on malaria, its causes, symptoms and prevention. From here, the study established that all the respondents attributed the cause of malaria to mosquito bites; with only 12% of the respondents going further to indicate that malaria is caused by a parasite and transmitted by the female anopheles mosquito. The study further established that the respondents have a good knowledge of the symptoms of malaria with 61.2% of the respondents being able to



correctly indicate four or more (4) symptoms of malaria highlighting fever, drowsiness, joint pain, headaches, vomiting, etc. as symptoms of malaria. 28.4% were able to indicate three (3) symptoms of malaria whilst the remaining 10.4% only indicated two (2) symptoms of the disease. With regards to the participants' knowledge on malaria treatment, the study established that only 15 out of 67 respondents (22.4%) explained the correct procedure of treating malaria; highlighting that when the sign and symptoms are of malaria are observed, the affected person should visit the hospital for testing and in the case that the test comes out positive for malaria, antimalarial drugs such as Coartem is prescribed accordingly. The remaining 77.6% of the participants demonstrated an inadequate understanding of malaria treatment by ignoring the need for proper diagnosis. Findings on the participant's knowledge on malaria prevention showed that 50.8% of the respondents know of three (3) or more preventions strategies such as prevention of mosquito bites by sleeping under treated bed nets, indoor residual spraying, and environmental sanitation; 35.8% were only able to mention two (2) prevention strategies whilst the remaining 13.4% only mentioned the use of treated bed nets to prevent malaria.

The second objective of the study was to establish the skills on malaria prevention and control acquired by the volunteers of HEPDO. In this area, the study revealed that the respondents participated in two types of malaria interventions at HEPDO. These include: awareness creation and ITN distribution with all respondents participating in awareness creation whilst only 73.1% participated in ITN distribution. Subsequently, the study established that the participants have moderate communication skills with 56.7% of the volunteers having some skill in change communication, 10.4% knowing a good amount, whilst only 31.3% of the volunteers being very skilled in behavioural change communication. The study also found out that majority of the respondents have a good level of skill on how to use and properly distribute treated nets with 58.2% of the respondents falling between "I have some skill in this" to "I am very skilled in this". The remaining 41.8% know little to nothing about ITN distribution. The study also found out that majority of the respondent lacked skills in IRS and larviciding with 56.7% and 82.1% reporting to know little to nothing about IRS and larviciding respectively.

The third objective of the study was to examine the extent to which participation in malaria interventions leads to volunteer learning (knowledge and skills acquisition). As mentioned earlier, all of the respondents participated in awareness creation whilst only 73.1%

participated in ITN distribution. The study then established that 64.2% of the respondents were married whilst 32.8% remained single. In addition, majority of the respondents (83.6%) volunteered at HEPDO for a period of 0 – 2 years with the remaining 16.4% reporting to have volunteered for 3 years or more. A correlation analysis on these variable revealed that the only factor significantly associated with the knowledge of volunteers is the number of years volunteer at HEPDO. This was indicated by a positive correlation of 0.350 between volunteers' knowledge of malaria causes and the number of years volunteered, and a positive correlation of 0.268 between volunteers' knowledge of malaria symptoms and the numbers of years volunteered at HEPDO. The absence of any signification associations between participation in ITN distribution and awareness creation revealed that participation in these interventions did not have much influence on volunteers' knowledge. Instead, it was revealed that the amount of volunteer training which increased with years volunteered had a great influence on volunteers' knowledge on malaria.

Similarly, a strong positive correlation (spearman's rank) of 0.897 exist between volunteer participation in ITN interventions and volunteer skills in ITN distribution. The study also revealed a moderate positive correlation of 0.414 between communication skill and their ITN distribution skill. Following a regression analysis, the study established that volunteers' participation in ITN distribution and sensitization when added as explanatory variables increased the predictions of the model to 88.8% (Nagelkerke  $R^2$ ) down from 26.6%. This revealed that volunteers' participation in these intervention activities significantly improves their skill in ITN distribution. In terms of volunteers' communication skills, a positive correlation of 0.324 exists between participation in ITN distribution and volunteers' communication skill. However, a weak negative correlation of -0.304 exist between marital status and volunteers' communication skills, revealing that married respondent are less likely to be skilled at communication than the single respondents. The strong negative correlation of -.524 observed between marital status and level of education further imply that married volunteers are less educated. Accounting for all these factors, the regression analysis showed that participation in ITN distribution and awareness creation interventions moderately improved volunteer communication skills as indicated by a 28% (Nagelkerke  $R^2$ ) increment in the model's predictions upon adding the two interventions to the model.

The fourth objective of the study was to examine the usefulness of the knowledge and skills acquired by the volunteers to the success of future malaria interventions. Here, majority

of the key informants (76.2%) who were mainly executive/ supervisory level staff of Public Health Organisation clearly indicated that they have observed their volunteers to better manage bed-net distribution and have seen improvements in their volunteer SBCC skills as they participated in malaria interventions. However, the study later revealed that BCC skills and the knowledge of current trends on malaria prevention were the most important skills and knowledge that volunteers need to effectively help organisations combat malaria in Gambia. These two areas accounted for 28.6% and 38.1% of the key informant responses respectively. Other important skills highlighted by the Key Informants include planning and management skills, Adult training skills and Research skills.

### **Conclusion**

In light of the study findings, these conclusions were reached regarding the contribution of experiential learning in capacity development of malaria project volunteers at HEPDO. First of all, the volunteers have acquired significant knowledge and skills on malaria prevention as they progressively volunteered at HEPDO. These acquired knowledge and skills on malaria prevention were found to be in alignment with HEPDO's Vision and strategy for malaria, thus justifying that volunteer capacity development has occurred. Whilst some of these capacities were developed due to training, some were developed as a result of practice and participation. In particular, knowledge on malaria preventions was greatly developed during training programs whilst skills on malaria prevention were mostly developed during participation. As it turns out, the longer participants volunteered, the more they knew about the causes and symptoms of malaria as these volunteers received more training.

However, participation in ITN distribution and awareness creation did not have much influence on volunteers' knowledge on malaria prevention. Instead volunteers gained more knowledge about malaria prevention during training programs. Conversely, volunteer participation in BCC and ITN interventions significantly improved volunteer skills in ITN distribution, whilst greater participation in these interventions was responsible for better behavioural change and communication skills among volunteers. Therefore, the role of experiential learning in capacity development of malaria project volunteers at HEPDO, is the development of ITN distribution and BCC skills through practice and refinement. These are all important skills that volunteers can use to effectively help organisation fight malaria especially BCC skills. There are over 700 volunteers of HEPDO in Kombo North District

that have participated in these malaria interventions, where they have acquired ITN distribution and BCC skills. It will therefore be beneficial to HEPDO performance and the community's wellbeing if these volunteer capacities were well documented, improved and shared to effectively combat malaria in the Gambia.

### **Recommendations**

The study recommends that Non-Governmental Organisations should recognise the value in documenting the knowledge and skills of their volunteers after the completion of their interventions as this will improve volunteer capacities, uncover strengths and weaknesses in the volunteer workforce and serve as a useful reference point for follow-up training and future interventions.

The study also recommends that volunteers should be given more training by NGOs in the concepts of interpersonal communication in order to improve their behavioural change and communication skills. This should be an adult friendly training that takes into account the challenges of adult the learners with no formal education.

This report recommends that further studies should be conducted to find the best ways to maximise experiential learning of volunteers in health projects, as a means to develop staff capacities and improve organisational performance.

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