

**Institute for Christian Teaching
General Conference of Seventh-day Adventists**

EDUCATING FOR HEALTH

By

**Mutuku J. Mutinga, Ph. D.
Professor of Zoology and Vice-Chancellor
University of Eastern Africa, Baraton**

**337-98 Institute for Christian Teaching
12501 Old Columbia Pike
Silver Spring, MD 20904 USA**

**Prepared for the
22nd Faith and Learning Seminar
Seminar Schloss Bogenhofen, Austria
August 9-21, 1998**

EDUCATING FOR HEALTH

INTRODUCTION

It is commonly said that Health is wealth and yet it is a commodity which mankind normally takes for granted until sickness strikes, one gets injured or there is a disease—epidemic outbreak. Hence health should be girded at all cost.

It is the intention of this paper to highlight the importance of health and its impact on development of society with special reference to the major tropical disease in the African continent. The paper will highlight the role educational institutions such as primary and secondary schools, professional training institutions which offer professional training courses such as nursing, medical technology, theology and teacher training among other Colleges or Universities, can play in order to deliver a sustainable preventive programme in the war against the acquiring and the spread of tropical diseases.

Community Health or Public Health is defined as health for all in a community. It should be and must be a basic concern of all government agencies dealing with the well being of its citizens at all levels –locally and internationally. Community Health may be taken for granted in some parts of the world such as the “Developed” world where people normally drink water off the faucet and buy milk from the store freely without ever having to think about hazards normally associated with the consumed substances such as brucellosis or tuberculosis. In such countries people can sit or travel in large crowds without fear of ever contracting communicable diseases such as small pox or scabies and where the general nutritional status of the people is good enough to protect them from food related ailments.

In most of the developing world, however, this is not the case. Public Health still requires urgent attention. Further more, in the majority of these countries, basic needs which are essential for good health such as clean water and human waste disposal, clean and adequate food etc., have not been given the attention they deserve to meet the basic requirements of the populations concerned. Hence, disease transmissions continue unabated and disease control and treatments still remain a great threat to life itself.

With specific reference to the African Continent, Public Health and related socioeconomic factors play a major role in retarding development and have placed most of the countries in Africa in the position of being among the least developed in the world. The least developed countries, for example, experience a mortality rate of 160 per thousands as compared with 19 per thousand being in the developed countries.

They have an adult literacy rate of 28 per cent against 98 per cent of the developed countries; safe water supply is available to 31 per cent of the population as opposed to 100%; a gross national product per capita of US\$170 as compared to US\$230 and per capita Public Health investment of \$1.7 as compared to that of the developed world of \$244 (Menaces, 1986).

As one looks at the magnitude of tropical diseases on the African countries, in terms of numbers of people affected and morbidity and mortality, one cannot help but realize that the diseases are a major factor in the retardation of the economies and a consequent factor for under development of the countries concerned. Equally important is the fact that when an individual is unwell, he or she cannot worship and serve God fully. That is why the One who came to restore mankind to his originally created state of perfect health, Our Lord and Savior Jesus Christ devoted a lot of time in restoring health when He came to redeem mankind: When God created our foreparents, Adam and Eve, they were in perfect health. According to the Scriptures, disease and suffering was the result of sin. Jesus came to restore fallen man to His original condition through His redemption. "During His ministry, Jesus devoted more time to healing the sick than to preaching. His miracles testified to the truth of His words, that He came not to destroy but to save" (Ministry of Healing p.19).

MAJOR TROPICAL DISEASES OF PUBLIC HEALTH IMPORTANCE

Among the diseases that have contributed greatly to the under development in the developing world in general and in Africa in particular, are the six major tropical diseases, which in the last two decades the World Health Organization has identified for special attention to hasten their prevention and control. These diseases include Malaria, Schistosomiasis, Filariasis, Leprosy, African trypanosomiasis and Chagas's diseases. It is worrying to note that one out of every ten people on earth suffers from at least one of these six diseases (Nakajima, 1993). Of these, only Chagas' s disease is absent in the African continent.

Although the World has experienced tremendous technological progress in the recent past, and even if of large sums of money is spent annually by world nations on space exploration and armament projects, man has yet to achieve control and protection of his fellow human beings from death scourge totaling millions of people on yearly basis that are the result of tropical diseases.

Malaria is the most prevalent tropical disease in the tropics. In Africa, more than 300 million people suffer from the disease yearly and this results in more than one million deaths annually, mainly children and pregnant women. This disease, transmitted by Anopheles mosquitoes is by far the most important tropical disease. It is a

protozoan disease caused by four species of parasites of genus Plasmodium. Approximately 40% of the world's population is at risk for contracting malaria (Cattani, et al., 1993).

It is transmitted by mosquitoes of the genus Anopheles. There are four species of human malaria (Plasmodium falciparum, P. Malriae, P. Ovale and P. Vivax). Malaria in humans is normally transmitted when an infected female Anopheles mosquito bites on a healthy person. It is able to release parasites known as sporozoites into the bloodstream of the person and these quickly move to the liver or bone marrow and there, they develop farther and multiply. From there, they rupture the cells and invade red blood cells. This cycle takes approximately 14 days. The development in the red blood cells takes approximately 48 hours and they rupture the cells releasing sporozoite that farther invades more blood cells. If untreated, the disease is fatal.

The second most prevalent tropical disease in Africa is schistosomiasis. It is also the leading cause severe morbidity in several foci in Africa, Asia and South America. The disease affects liver, intestinal and urinary systems, as a result of complication reactions to schistosome eggs that are lodged in host tissues of affected individuals (Berquest, 1993). More than 200 million people are infected by this disease world wide but mainly in the developing world and dominantly in Africa. More over, more than 600 million people are at risk of contracting the disease. Infections are because of the body coming into contact with contaminated water infested with infected water snails.

Lymphatic filariasis or elephantiasis, globally, affects 78.6 million people while onchocerciasis filariasis that causes river blindness affects approximately 18 million people world wide (Ramachadran, 1993). The lymphatic filariasis is transmitted by mosquitoes of genus Culex while river blindness or onchocerciasis filarial worms are transmitted by black flies of genus Simulium.

Leprosy is yet another disease of great importance caused by a bacteria (Mycobacterium laprae) which in most of people remain asymptomatic but in minority of the people it causes a disease condition characterized by disfigurement or deformities particularly of hands and feet. There are approximately 5.5 million cases of the disease throughout the world and approximately 140,000 new cases occur per year. The affected people have a reduction of life expectancy about 50% (Noordeen and Hombact, 1993).

Yet another tropical disease which contribute greatly to under development in the African continent is the african trypanosomiasis which is commonly known as sleeping sickness or nagana. The insect which transmits the disease is Tsetse fly of genus Glossina, an insect found only in Africa. The disease is caused by infection by a protozoan parasites known as Trypanosoma Brucei, T. Vivax, T. Congolese, and T.

Vivax . Two parasites that are responsible for human trypanosomiasis are the Trypanosoma Gambiense or Gambian sleeping sickness and Trypanosoma Rhodesiense or Rhodesian sleeping sickness. The other parasites species cause animal trypanosomiasis.

The affected individuals show signs of intermittent fever, enlarged lymph nodes and spleen. In the advanced stages, individuals show signs of neurological symptoms and endocrine disorders. By the time the disease has reached the stage of showing signs and symptoms, it is fatal. The disease is endemic in 36 sub-Saharan African countries where some epidemic are reported to have caused over 750 deaths and where some 200,000 new cases are estimated to occur annually (Kuzoe, 1993).

Besides infecting man, the disease also affects domestic and wild animals and these animals can serve as animal reservoirs of the disease and thus establishing a zoonotic cycle which can present a problem of effective control or prevention. The double infection of man and animals also enlarges the natural foci of the disease existence and impact in that it prevents the use of some of Africa's large tracks of fertile arable and grazing land involving approximately 8 million sq km. located in areas known as "tse tse belt". The belt extends over a third of the African continent and spans 36 sub-Saharan countries. Approximately 50 million people live in or around this belt with about 200, 1998 disease foci. Both agricultural food production, animal food products such as meat and milk are hampered by the presence of the tsetsefly and the diseases it transmits (TDR, 1997).

Another disease of great public health importance is Leishmaniasis. It is a disease caused by infection by a protozoa parasite, of genus Leishmania and transmitted by different species of phlebotomine sand flies. Although there are over 20 different species of sand flies known to science, only about a dozen are known vectors of Leishmaniasis (Modabber, 1993). The disease is classified in three groups, namely: Cutaneous leishmaniasis, the most common form of the disease which mainly cause skin lesion; Muco-cutaneous leishmaniasis which initially cause similar symptoms as cutaneous leishmaniasis is able to metastasize into nose and mouth causing hideous destruction of tissues resulting in disfigurement of the affected areas; Visceral leishmaniasis also known as kala-azar infects and destroys the cells of the spleen and the liver of the affected individuals causing the enlargement of the organs. It causes symptoms of abdominal enlargement, fever, anaemia, loss of appetite among others. If untreated, it is fatal. There are approximately 12 million cases world wide, especially in the tropics. In addition over 350 million people live in areas where there is potential of contracting the disease. Approximately 1.5 million new cases occur every year and the disease outbreak is associated with several factors. These include periodic famine which may be caused by some severe drought, civil strifes resulting in lack of food

production. The disease may be a result of movement of large population into areas which are endemic for the disease normally circulating among wild animals or may be a result of extension of agricultural activities into forested areas where both the sandfly vectors are in abundance and the animals reservoirs naturally thrive (Mutinga 1992).

The most recent communicable disease of great significance to arrive on the scene and to pose a great threat to the inhabitants of the African continent is AIDS (Acquired Immune Deficiency Syndrome). This disease is so threatening that it has in some incidences left children as orphans some of them already infected by the parents at birth and in other instances a whole villages may be left without adults to take care of the surviving children or youth. The disease is increasingly assuming great public health concern in that it poses a great challenge to Public Health services. Since illness can last for long time, when large numbers of patients are admitted to the hospital, there is little if any, room left for patients suffering from other ailments. The advanced condition of a person in advance stage of the disease which is caused by the virus called "HIV" (Human Immune Deficiency virus), is very pathetic. Although the first case of documented AIDS was in 1959, its spread continues to be alarmingly fast. In 1993, WHO estimated that there were 14 million cases world wide and is estimated that by the year 2000, there would be between 30 to 40 million persons infected with AIDS virus (Clarke, 1994). The disease is mainly transmitted through sexual contact with an infected partner. However the virus HIV (AIDS) is also carried in body fluids such as: blood, semen, milk of infected mother and vaginal secretions (Wangai, 1998).

The above highlighted diseases are but a few of the most prevalent and serious ailments which pose serious concern for those charged with responsibilities of ensuring that the health of the people of the nations they represent, is assured and protected. However, there are other important disease such as yellow fever, cholera, typhoid, plague, intestinal worms infection, malnutrition, etc., to name a few, which, although they are very important and will cause death if they are not attended, they do not pose danger to, the same magnitude as the major ones listed above.

Whether or not nations affected by these diseases take appropriate measures to control or eradicate them, the price for not taking any action is very high. Besides taking many lives of the citizens of the countries affected, large sums of money are drained from the economies of the countries concerned though purchasing of drugs for the treatment of affected individuals not to mention the amount of money wasted on hospitalization and nursing care of the affected individuals. These expenditures on curative measures could better be utilized to improve the living standards, on education, on improvement of infrastructures such as roads, communication, water supply and for production of food. There is also no question that these diseases are either directly or indirectly linked to poverty or wealth of the citizens of the countries affected. It is therefore imperative that nations, scientific communities, institutions of

higher learning as well as those of lower levels and even at individual level must assume moral responsibility to act decisively and responsibly to control, prevent, and eradicate these diseases. They must not be seen to pass by the sideway and to hope that the situation could at some time in the future on its own settle down.

The current disease situation which is detailed in this paper cannot be ignored in spite of the prevailing economic situation the world at large finds itself. These financial constraints are indeed real and have been advanced as an issue in the past in order to postpone action to control or manage such diseases. A solution must be found and soon in the interest of mankind. Control and/or eradication of these major diseases is the only lasting solution. Unhealthy society will and can only produce either death or unhealthy society. It becomes therefore a matter of great national, and international importance which warrants a declaration of war on the disease organisms as well as on the agents which transmit them.

There is good will at all levels including the international community, national governments and at the individual levels. There is enough knowledge available to make the first step in the direction of preventive health while the curative aspects continue. People themselves are the agents of development. The children, must survive and they must be taught how to survive these prevalent severe infection and they must be given chance to grow and lead a normal life.

THE ROLE OF SCHOOLS, COLLEGES AND UNIVERSITIES IN PREVENTIVE HEALTH

Modern science has developed very advanced therapies for most of the diseases mentioned above. Some of the therapies can cure fast while others take a long time. However, treatment alone cannot and will not solve the immense problem of tropical diseases. As soon as treatment is completed, the individual goes back to the same environment where the infection was contracted in the first place and the cycle of infection and treatment is repeated. History has shown that where there has been international concerted effort and community involvement great achievements have been made. This was the case in the great campaign which was launched for the eradication of malaria with the advent of DDT from the countries of the Mediterranean Region and southern United States in 1940's and was met with tremendous success leading to the eradication of the diseases.

Disease control strategies must be carefully planned and executed based on scientific information of the epidemiological studies which show methods which could be best applied to achieve maximum success. Control methods chosen must include both the transmitting agents (vectors) as well as the disease organisms. Investigations

about the role in epidemiology of the diseases and vectors in question must involve their mode of infection or transmission, their ecology, behavior, biology and bionomics before instituting appropriate control or eradication measures. These studies or investigations are critical in order to make sure that control measures applied do not introduce natural imbalance on other biological organisms. This can be done and must be done as part of the planning in order to ensure sustainable disease control. The investigation which requires some basic scientific information gathering are best done by the scientific community based in education or research institutions of higher learning such as colleges or universities which are best suited to play that role.

TRAINING FOR A PURPOSE AND FOCUS IN TROPICAL PUBLIC HEALTH

Man is always at war with both the disease causing organisms and vectors that transmit them. The body itself is capable of fighting for itself against many of the common ailments in the environment. In order for the body to do its work, however, it must be kept at its best health. Keeping the body fit and strong to enable it to do its God's appointed role of defense against disease, however is an individual responsibility. The individual also requires reinforcement through learning and training both for normal awareness and to know best how to take care for the body.

The body was created by God to function at its best when its operational manual specified by its Maker from the very beginning (the Bible) is strictly followed. The guidelines on how to take care of it were to be taught diligently from generation to generation (Deut. 6). Experience has shown that as the years went by, after sin came into the world the information became deliberately ignored or was unheeded, and this negligence has resulted in consequences of weakening the body to the state it is.

Despite the weakened situation of the body, when it is taken care of according to the guidelines given by the inspired word and the spirit of prophecy, the body functions at its best. It may be mankind decided it was no longer necessary because he could take care of himself without God. This also results to serious consequences of succumbing to illnesses and/or early death.

The injunction that our bodies do not belong to us but are temples of the Holy Spirit (1 Cor. 3:17) has, however, never been withdrawn by the giver and therefore it remains the responsibility, at individual as well as collective levels, to take care of our bodies the best way we know how. Those who have gained knowledge of anatomy and physiology of the body and how it functions best and how to keep it as such, not only enjoy good health but are duty bound also to pass on that information at all levels for the best health of the present and future generations. Further more, knowledge is dynamic and God will continue to reveal His will to those who are seeking for it either

through reading or scientific research and they too will continue to be channels through which knowledge will be passed on to those who need it but lack the knowledge.

Our institutions at all levels of learning, especially because they should be “schools of prophets” are constantly engage in imparting applied and relevant knowledge that will fit the youth of today for service of God on earth through training. These institutions particularly those located in the Tropics where most of the diseases thrive, have a morale duty to include in their curriculum the training on general awareness of the major tropical diseases. The training should include how the diseases are acquired and transmitted and how they can be prevented and/or how they can be controlled or eradicated. Such training could be acquired in the classroom under required general courses for all students in schools at all levels. In addition, since the presence of these diseases in the environment pose economic constraints nationally, there should be deliberate efforts made by colleges or universities to ensure the mounting of programmes geared to training professionals in the relevant Allied Health areas tropical disease and vector in order to equip the youth with tools to enable them to take responsibilities in training and research targeted to integrated management.

The above mentioned disease problems are too big to be left to the concern of governments and or their agents alone to tackle. It is a problem which has been around for centuries but need not to remain there during these days of scientific enlightenment. It is a complex problem which requires multi-disciplinary and multi-sectoral approach. It must involve national and international governmental agencies, educational institutions, non-governmental organizations, research centers, the business world as well as community involvement at all levels. Indeed it involves deliberate input and the cooperation of all levels of school systems such as the primary, secondary schools as well as tertiary level institutions in order to realize success. The integrated and interdisciplinary control and prevention approach can result in sustained solution to the problem. At the primary, the secondary and the university, training in public health and tropical diseases could be made part and parcel of normal learning.

It should be also the responsibility of the institutions of higher learning to carefully study areas which would challenge the youth to take some of the Allied Health areas as a career or profession, with view to being eventually specialists teachers or researchers on better ways of controlling the disease.

Research in institutions of higher learning should be both encouraged and enhanced through procurement of essential research equipment and actual financial support of both applied and basic research in tropical diseases. This will enable researchers to institute appropriate and optimal measures of control of tropical diseases which are sustainable and efficient socio-economic and anthropological investigations should simultaneously be carried out along with other research on tropical diseases in

order to find out how the community, which is affected by the diseases, perceive the disease and how they have coped with the disease problems over the years. This will assist in the incorporation of indigenous knowledge from the community so that they would feel as part of the team solving their own problem. The community should also be consulted regarding the intervention measures which are applied on the diseases.

This, in turn, would lead to the community ownership of the control measures against the diseases and will ensure sustainability. In this way the community own the disease preventive or control programme fully after the researcher has gone. At the university level multi-disciplinary participation of various departments could become a real asset. Departments of sociology, geography, environmental studies, theology, history, government, biology, nursing, public health, agriculture, chemistry, and home economics could all have a part to play in planning and implementation of integrated multi-disciplinary disease and vector control measures against tropical diseases for meaningful disease control and eradication. Institutions based in Africa cannot afford to let this golden opportunity pass by. It encompasses part of the truth and the message of hope we are to bear to the inhabitants of the continent.

It is very important to start investing in real life training of youth in our institutions of higher learning and it must concern every administrator in these institutions to want to invest in both instruction and research in Public Health.

When God conducted the first public school in the desert school as he trained the children of Israel on the way to their new homeland in Canaan, public health education was among the lectures they received from God Himself as is (Leviticus 13, 14, 15, & 17, and Deuteronomy 23). Hence God showed that he was particular as regards the public health of the people, particularly in regard to diet, cleanliness and disease prevention.

Great majority of ailments human kind suffer from, are preventable. If every one disposed of human waste for example, as the Bible speaks about in Deut. 23:13,14 "having a place without the camp for waste disposal" and after easing oneself, cover it, majority ailments such as of worms, bacterial and protozoa diseases which are transmitted through fecal contamination would disappear and the people would experience vibrant health in areas where many children and adults die from these ailments.

SOME SPECIFIC INTERVENTIONS FOR MAJOR TROPICAL DISEASES

For lack of space I will highlight some control measures against malaria which can be used as a model for the control of other similarly transmitted diseases as well. It

should be understood that these are very general control measures because to go into details would require a lot of technical details.

Most of control measures directed against the majority of protozoa, helminths and other tropical diseases have mainly been on the curative. Eradication campaign against malaria was started during and after the Second World War. The advent of the DDT gave the false hope that malaria eradication was eminent. The effort was however partly rewarded because it resulted in the disappearance of malaria in the southern part of the United States and a large area of the Mediterranean countries. Campaign to eradicate malaria was consequently started for India where large epidemics of the disease were recorded. In 1955, India recorded resistance of mosquitoes to DDT. Subsequently, large areas where such campaigns were in progress were halted. A few years later it was also found that DDT was unsuitable to the environment and harmful both to man and animals. The chemical was hence consequently banned from use as insecticide by many countries. The ban of DDT and the development of resistance by many species of insects including mosquitoes resulted in resurgence malaria and other related insect-borne diseases such as kala-azar, sleeping sickness, and onchocerciasis. Unfortunately during the time of DDT campaigns against malaria there was no programme of either malaria control or eradication initiated in the African continent although the continent registered the highest incidence of malaria. At that time however, almost the entire continent was dominated by colonial powers whose priority, understandably would not have included local interest agenda such as public health or tropical diseases control.

Among the current technologies now available for integrated management of malaria include control of malaria mosquitoes.

Transmission of malaria involves being bitten by an infected *Anopheles* mosquito which transfer malaria parasites to a healthy person. Of the many species of mosquitoes known to science, however, only a few species are responsible for transmitting malaria. It is important therefore to train people to be able to recognize the species which transmit the disease so as to deal with those specific ones carefully so as to ensure that nature balance is not disturbed by indiscriminate destruction of the good and the bad mosquitoes when dealing with mosquito control. In general, mosquito control should be carried out on a wide scale under the guidance and supervision of some one who is experienced in the area. Control of mosquitoes would normally include the destruction of both the adult mosquitoes as well as the larvae forms or the immature stages. Efficient control of mosquitoes depends on thorough knowledge of exact species involved, their breeding and resting sites and periods of breeding, and most economic means of controlling them. Since the immature stages depend on aquatic habitats for larvae development, the best means of control depends on the elimination of breeding sites or by use of selected chemicals to destroy the immature

forms. Adult mosquitoes can be managed by the use of selected and safe insecticides.

Various methods of destroying adult mosquitoes have been developed and tested in the recent past with a very good success. What remains to be done is for these methodologies to be applied in a manner that can be sustained in malaria endemic areas and by the population affected in order to ensure their sustainability.

Another way of controlling the disease is by protecting the population from mosquito bites. Several ways of protecting people from mosquito bites have been developed such as insecticide impregnated bed nets and wall curtains (Lines, et al., 1997 and Mutinga et al., 1992).

Mosquitoes can also be controlled by applying biotechnology such as targeting certain species and applying sterile male technology to reduce the numbers. This technology although it has been applied on some species of mosquitoes which are not malaria transmitting, it is still under investigation for malaria mosquitoes.

Other Disease Control Measures

The above measures of control of insect-borne diseases can similarly be applied for other insects which transmit the diseases vector-borne mentioned above. In the case of Schistosomiasis, however, which is transmitted by several species of water snails, the application of the sustainable measures of control are different, even though the principals of control are similar. Control measures would involve ensuring that there is safe water for bathing and drinking which is free from contamination by fecal matter. This is a very difficult job particularly when dealing with large rural population working in open fields and large bodies of water. It requires organization and public health education of the masses and the guidance of experts in the control programmes. The community should also be educated about the disease, its importance and simple and practical preventive measures which can be implemented with great success and at minimal cost.

For leprosy and HIV transmitted by bacteria and virus respectively, the approach of their management may be slightly difficult and less appreciated. The main reason why people might not appreciate the seriousness of acquiring both of these diseases is because it takes time for the symptoms of the disease to manifest itself and by the time this happens it is usually too late for the victim affected.

The approach of preventive measures is therefore different and less appreciated by the target groups.

Leprosy is associated with very low standard of health while HIV is linked with

sexual contact as well as exposure to body fluids of individuals infected the virus. Using the above mentioned control knowledge to control tropical diseases, secondary schools and University students can be equipped and empowered to participate in prevention and control of tropical diseases.

Training of Teachers

In this way, it will be possible to reach the majority of the affected population in a very efficient manner –education. The way forward in this would be to train teachers in this area so that they can teach the students in the classroom. Teachers play a major role as communicators of information to homes of the students they teach. Public health education should be deliberately taught as part of the curriculum for primary and secondary school teachers level. Frontier knowledge about how these diseases can be prevented and managed on sustainable basis should therefore become the responsibility of the institutions.

Training Nurses and other Allied Health Personnel

The allied health personnel including nurses, technicians, medical students, clinical officers, and public health officers etc., come into contact with people who are both sick and healthy and the message to these people should include how to keep from acquiring the diseases once treated.

Involving the Entire University in Outreach for Community Health

The tertiary level institutions could organize special days for outreach on public health training which the entire institutions would be involved in, training community on health issues such as preventive measures for diseases outlined above. During such days all departments of the institutions could be involved and plans made for innovations of most efficient way to communicate the information. For poor families which cannot afford to construct simple things such as latrines, arrangements could be made for students to do the job on voluntary basis.

Public Health Education for Theology Students

Ministerial students constitute another group which after graduation would be in contact with the people mainly in the rural areas. Equipping the ministers with public health information would result in yet another tool to pass on the preventive health in the community, while ministering to the soul. "Medical Missionary work is the pioneer work of the gospel. In the Ministry of the word and in the medical missionary work the gospel is to be preached and practiced." "We should ever remember that the object of

the medical missionary work is to point sin-sick men and women to the Man of Calvary, who taketh away the sin of the world" (Ministry of Healing p.189).

Besides the Allied Health Departments and the inclusion of required general education for all students, the institutions of higher learning could contribute greatly in the area of public health by deliberately requiring inclusion of specific courses in public health as required courses in various other departments which are related to health such as biology, agriculture, home economics, geography, chemistry, etc. Curriculum could be designed to accommodate such courses.

Training at the university level should therefore include a general course on public health for all students to be taught practical ways of identification, recognition and preventive measures taken against major diseases and their vectors and ways of controlling and preventing their spread.

REFERENCES

- Berquest, R. (1993) *Schistosomiasis. Tropical Diseases Research (RDR)*.
- Cattani, J. Davidson, D. and Angers, H. (1993) *"Tropical Disease: Research Progress (1991-92) UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.*
- Cheng, T. C. (1974) *General Parasitology, Academic Press, New York.*
- Clarke, D. (1994) *Aids, the Biblical solution. Evangel. Publications, Nairobi, Kenya.*
- Kuzoe, A. (1993) *Leprosy. "Tropical Disease Research Progress (1991-92) UNDP /World Bank/WHO Special Programme for Research and Training in Tropical Diseases.*
- Lines, J. D., Myamba, J. and Curtis, CF (1987) *Experimental Hut Trials of Permethrin-impregnated Mosquito Nets and Eave Curtains against Malaria Vectors in Tanzania. J. Med. And Vet. Entomology 1, 37-51.*
- Metcalf, C. L., Flint, W. P. and Metcalf R. L. *Destructive and Useful Insects, McGraw-Hill Book Company , (1962), New York.*
- Mutinga, M. J., Mutero, L. M., Basimike, K. and Ngindu A. M. (1962) *The Use of Permethrin-impregnated Wall Cloth (Mbu cloth) for control of vectors and malaria and Leishmaniasis in Kenya. 1. Effect on Mosquito Population Insect Sci. Appli. 13 (2) 151-161.*
- Nakajima, K. (1993) *"Tropical Disease Research Progress (1991-92) UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.*
- Noordeen and Hombact, (1993) *Leprosy. "Tropical Disease Research Progress (1991-92) UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.*
- Ramachadran, P.C. (1993) *"Lymphatic Filariasis and Onchocerciasis TDR"*
Tropical Diseases Research (TDR) 1997. *Eighth Programme Report of UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, Geneva.*
- Wangai, P. Jr. *Outlook, East Africa Division Vol. 14, p. 199.*
- White E. G. *Ministry of Healing, Pacific Press, Mountain View.*