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PARASITIC INFECTION AND HUMAN'S HEALTH: ENVIRONMENT AND DIET AS IMPLICATED FACTORS

by

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INTRODUCTION

---------in the beginning

God made the heavens and the earth (Gen 1:1)--, behold it was beautiful, --and the Lord God created man in his own image and gave him dominion over everything He had created (Gen 1:27,28). Then the Lord God put man in the Garden of Eden to tend and to keep (Gen 2:15). Man was in constant fellowship and communion with his Maker in the beauty of holiness. The environment was highly hygienic and in perfect order completely devoid of parasites and diseases of any kind. Such was the picture of serene and beautiful environment where man dwelt until iniquity was found in him.

After this man lost that perfect estate----holiness of life and sanitized environment. Man willfully and perversely pollute the environment and made it no friendlier, hence till date, man's attitude and behavior towards the environment has not been encouraging and is often contrary to the original plan.

Parasites might have evolved as a result of biological and geological changes. Parasitic mode of life could have been adopted for the purpose of adaptation to the existing changes in the environment which could also be the consequence of disobedience to the environmental norms. Some of these organisms which were once friendly and non-harmful started perching on man for survival, consequence upon which they constitute major threats to man's life and existence.

Parasites are groups of organisms (animals and plants) which depend on other organisms (hosts) for nutrients, shelter and support. However, more precisely, a parasite could be biologically defined as a living organism which is in physiological association with the tissues of its host, which always belong to a different species and which is usually bigger and stronger than the parasite, the purpose of the association is primarily to produce food for the parasite and as a result the host always reacts to some extent against the invading parasite. Parasites can be classified based on certain features such as their positions in or on the body of the host, hence the term ectoparasites and endoparasites. Ectoparasites are organisms that live on the outside of their host, while endoparasites are those that live within their hosts, in the gut, body cavity, lungs or other tissues[1]. This essay dwells more on the latter category of parasites since they are more involved in the infection within the human system.

Purpose

This essay is prepared to provide a baseline approach to the integration of faith and learning in the teaching of parasitic diseases that can be transmitted from the environment to human. The essay also outlines

how such diseases can be prevented by keeping to the principles provided by God as our guide to healthful living with the aim to provide a background to the teachers and students of health related professions on how to relate their teaching and learning to God's principles regarding our health and well-being. The paper also put into consideration the relevance of God's word in acquisition and dispensation of knowledge related to our attitudes and behavior towards the environment and the choice of our diet. The paper reviews the different modes of transmission of parasites most commonly associated with man in relation to his behavior (sanitary and eating habits) and environmental factors that enhance the spread of such disease-causing parasites. This paper also emphasized the relevance of God's instructions and statutes concerning human's health and well being to the prevention of parasitic infection. This indicates that it is necessary for man to be well rooted in the word of God and in the knowledge regarding his interaction with the environment. The importance of an active religious/spiritual life in relation to better health and decrease in morbidity had earlier been reported [2,7]

PATHOGENIC EFFECTS OF PARASITES ON THE HOST

Despite the fact that it is not the intention of the parasite to kill its host, its effects on the host are often detrimental. Parasites injure their hosts in a number of ways, the extent of which may vary from one parasite to another. Some of the parasites produce toxic substances in the blood stream, tissues, gastro-intestinal tract and organs of the host. The toxin produced may cause irritation, injury and even damage to the part of the host.

For instance, *Entamoeba histolytica* may cause erosion or ulceration of the tissue of the intestinal wall through the production of proteolytic enzymes, while schistosomal cercariae secret substances which cause inflammation of the skin (dermatitis). Some blood sucking arthropods cause papule at the site of bite and inject salivary fluids causing inflammatory reaction. For example *Anopheles* mosquitoes inject protozoan substances from the salivary gland into the host, and after the invasion of the red blood cells, symptoms of fever which characterized malaria episode may ensue.

Some parasites with large size or occurring in many numbers may cause a number of havoc to the host. For instance, parasites which inhabit intestinal tract may exert great influence on the host's nutritional level, and such nutritional deficiency may reach disease-level on the part of the host. For example depletion of B_{12} which is useful for blood formation by *Diphyllobothrium latum* infection may lead to megaloblastic anaemia in the host. Also microcytic hypochromatic anaemia may result from large number of hookworms in the host's blood stream; this depends largely on the quantity of host's blood ingested.

Ascaris lumbricoides which often entangle with one another may cause mechanical injury such as blockage of intestine and appendix and perforation of the gut. Other forms of mechanical injury may result from the destruction of the host tissue by skin penetrating-parasites such as hookworms, cercariae of schistosomes and larvae of myasis–producing-flies. Injury can also result from penetration of the host skin by sucker of parasites like trematodes and cestodes. Damage to the lung tissues can occur during migration of Ascaris and hookworm's larvae to the gut. Amoebic abscess is the result of destruction of tissue of organs like lungs and liver cells by *Entamoeba histolytica* which may also responsible for ulceration in the epithelia cells of the gut. In order to perpetuate these adverse effects in man, parasites have evolved many tricks in terms of modification of shape, size and structure of their body parts. They also exhibit certain characteristic behaviors which aid their survival in the host's body. All these make it difficult for man to completely escape the invasion of parasites in his system.

However, knowledge of the modes of transmission of some of these parasites will help greatly in devising means of avoiding and reducing their infection.

MODES OF TRANSMISSION

There are various ways by which parasites are transmitted in the environment; from man to man, animal to man, water to man, soil to man, air to man and vice versa.

Transmission aided by untidy environment and certain human behaviors

Certain parasites such as *Entamoeba histolytica* (Fig. 1) and *Giardia intestinalis* are responsible for diarrhea, frequent bowel motion, offensive stool with mucus or blood, dehydration and weight loss in man. These parasites are being transmitted by indiscriminate disposal of sewage resulting in contamination of drinking water[3]. The use of such water for agricultural purposes can also expose fruits, vegetables and other farm products to contamination by the cysts of these parasites. These unwholesome practices can also cause contamination of food by flies, rodents, fowls and other pests which help in distribution of cysts of the parasites. Food handlers and caregivers may also soil their hands with faecal matters through unhygienic behaviors and can inadvertently transmit the cysts of the parasites to their customers or clients.

Others such as *Naegleria* sp. which is responsible for amoebic meningoencephalitis in man; hookworm (*Ancylostoma duodenale*) (Fig.2) causing hookworm dermatitis, oedema and erythema; *Trichuris trichiura* heavy infection can lead to local inflammation, abdominal discomfort, eosinophilia and diarrhea while *Strongyloides stercoralis* (the thread worm) (Fig.3) responsible for strongyloidiasis can be contacted through contaminated soil.

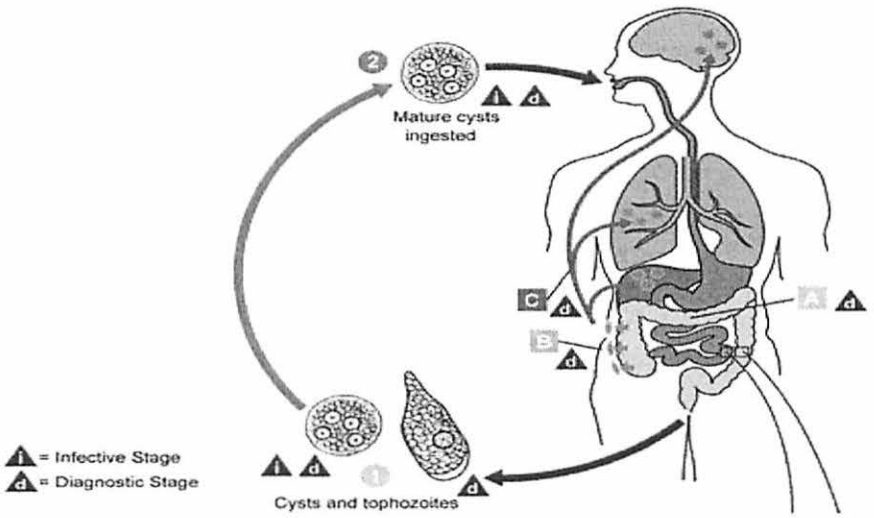


Fig. 1: Life cycle of *Entamoeba histolytica*

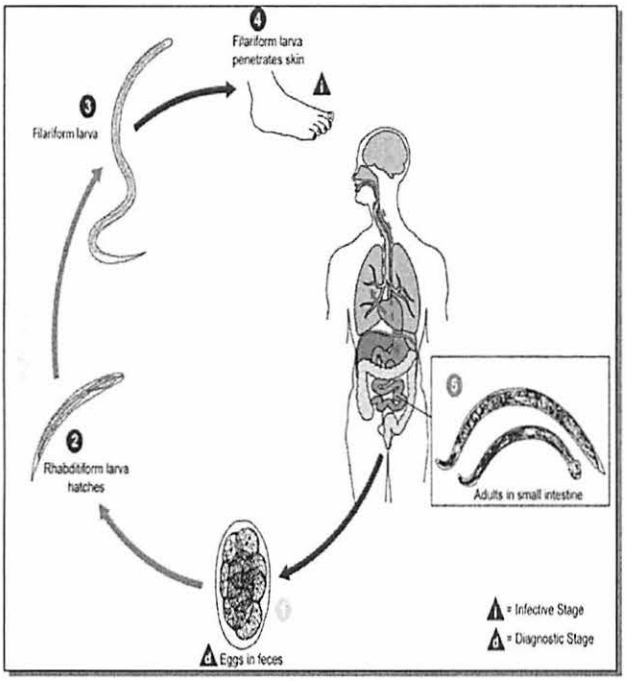


Fig. 2: Life cycle of *Ancylostoma duodenale*

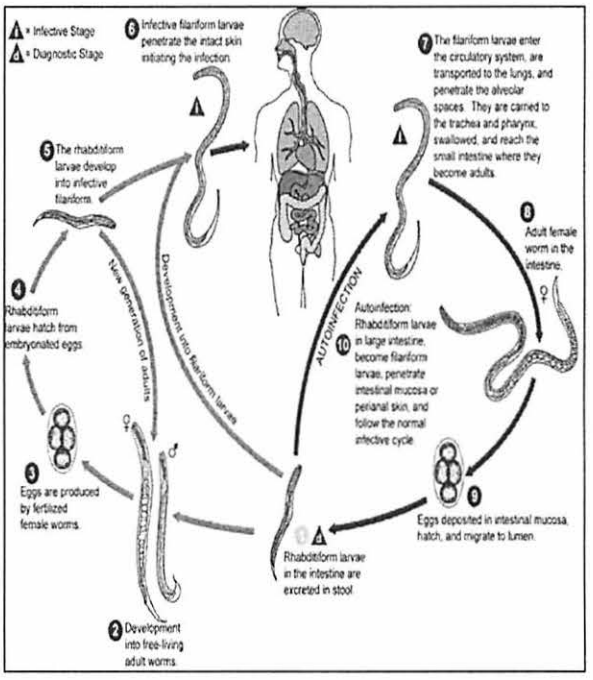
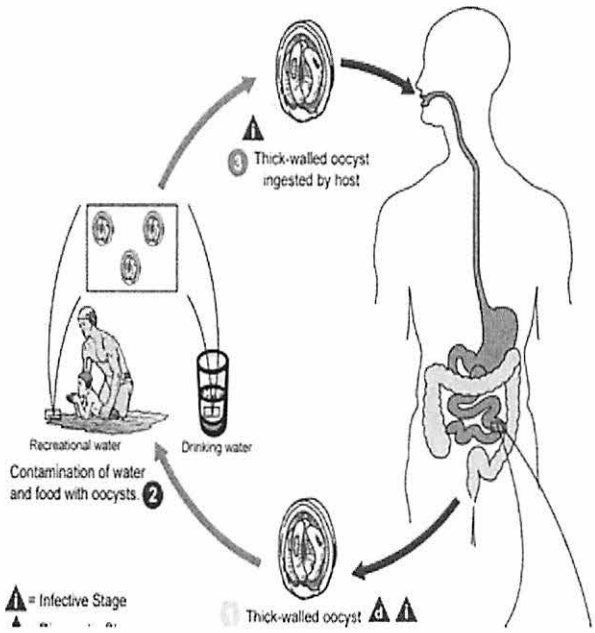


Fig. 3: The *Strongyloides'* life cycle

Parasites such as *Naegleria* sp, schistosomal worms, guinea worm *Cryptosporidium parvum* (Fig. 4) and (*Dracunculus medinensis*) (Fig. 5) can also be contracted through unavoidable contact with polluted water either by way of swimming, washing or drinking.



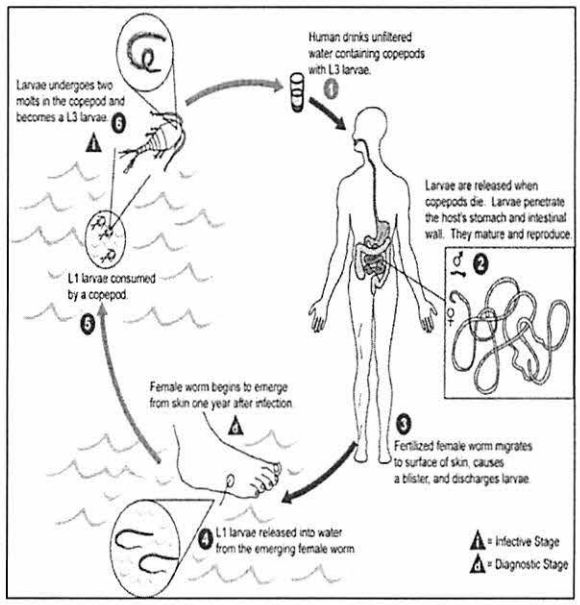


Fig. 4: Life cycle of *Cryptosporidium parvum* **5: Life cycle of *Dracunculus medinensis***

Ascarids (*Toxocara canis*, *T. cati*) are common intestinal parasites of dogs and cats (usually kept as pets) leading to toxocariasis. Transmission is usually through contaminated soil consisting infective eggs and larvae. The presence of dogs, particularly puppies, in a household, and pica (dirt eating) is the principal risk factors for human disease. Organs commonly affected are the eye, brain, liver, and lung, where infections can cause permanent visual, neurologic, or other tissue damage.

PARASITES TRANSMITTED THROUGH FLESH CONSUMPTION

Apart from parasites that can be transmitted through the faecal-oral route either by eating or drinking contaminated food or water, there are other parasites that are transmitted through consumption of certain animal flesh and sea foods. Animal - related diseases in human race are increasing and related findings have shown that contaminated meat, dairy products, and eggs are common sources of food-related illness[9]. "Disease in cattle is making meat eating a dangerous matter, such disease is contracted by the use of meat.....In a short time it will not be safe to use anything that comes from the animal creation [10]".

There is a serious craving in the world today for animal flesh either as a component of fast food or in the form of barbecued meats or steaks which are most often insufficiently cooked. The consumers of such delicacies are often careless about the source of the animals from which the flesh

is produced. This may be a more dangerous situation in the tropical Africa where animals to be slaughtered for meat are hardly inspected by Veterinary Doctors/Officers. Even though occasionally such animals are inspected, but the animals discovered to be infected are still smuggled for slaughter for human consumption. It is not unlikely that a higher percentage of animals for human consumption is diseased compared to what is obtained in the Western world. This is simply due to the environment in which these animals are raised which is often contaminated with sewage and faecal materials. Such environments make it possible for the parasites' eggs, cysts and larvae to find their ways into the animals which often grazed intensively with little or no guidance or restriction on polluted grasses and water. Such animals receive little or no medical attention during the period of their being raised to the time of slaughter. If the meat produced from such animals is not thoroughly cooked, then it can serve as reservoir of infection to the consumers in the community.

These days, it is a fact that most people eat with their eyes. Not many people care whether the food (meat) is healthful or death-dealing, what matter most is that the food (meat) looks good and delicious to taste. Most people are ruled by their taste while sense of judgment of what is good for human consumption is being drastically reduced. Most of the people often follow the law of appetite rather than the commands of God guiding our appetite and choice of diet. One of the ways to know what is good for the complex body system is to consult the One who made it.

Before we go further into the consultation, let us discuss some of the parasites that can be transmitted through the animals reared for meat and kept as domestic pets.

Examples of parasites transmitted through invertebrate and vertebrate animals used as food

Most of the helminth parasites have more than one host to complete their life cycles. The eggs or larvae must leave the host and infect new animals to reach maturity. For example, *Heterophyes heterophyes* (Fig. 6) is a small fluke whose cercariae infect fresh water fishes e.g. Mullet (Mugil). Man becomes infected by eating infected fish raw, smoked or half cooked [1, 19].

Metagonimum yokogawai are also parasites of freshwater fishes (*Salmo, Odontobutis and Plectoglosus*) infected with cercariae. Man contracts the infection when by consuming infected raw or improperly cooked fish.

The cercariae of *Echinostoma ilocanum* infect snail while man becomes infected by eating infected snail raw or partly cooked.

Opisthorchis sinensis is a liver fluke whose cercariae infect fish (family: Cyprinidae). Man becomes infected when eats raw or half cooked infected fish. The first intermediate host of

Opisthorchis felineus is a snail which could either be *Bulimus tentaculata* or *B. leachi*, these feed on embryonated eggs discharged from faecal materials. The second intermediate host is any one of a large number of cyprinid fish mainly the trench (*Tinea tinca*) and the Chub (*Idus melanothus*). The cercariae of the parasite attach to the fins of these fish species, penetrate and form cysts within the muscle of the host. Man is infected by eating raw or partly cooked infected fish.

Paragonimum westermani (Fig. 7) is a lung fluke for which man and other animals such as pig, cat, rat, dog, tiger, beaver, wolf and fox act as reservoir. Man particularly becomes infected after eating raw or undercooked crabs and crayfish which often serve as the second intermediate host into which the cercariae of the parasite penetrate to form the infective metacercariae. Pathogenic effects of the parasite include chronic cough with chest pain, bleeding lungs, blood stained sputum containing eggs of the worm, ulceration in the abdominal cavity leading to abdominal pain, mucoid stool with eggs of the parasites and diarrhea with blood. The worm can also cause the inflammation of the infected organ such as the lymphatic glands leading to feverish conditions. Infection of the brain can lead to nervous symptoms such as paralysis and epilepsy, in children this can lead to meningitis, cerebral haemorrhage, infantile paralysis and encephalitis.

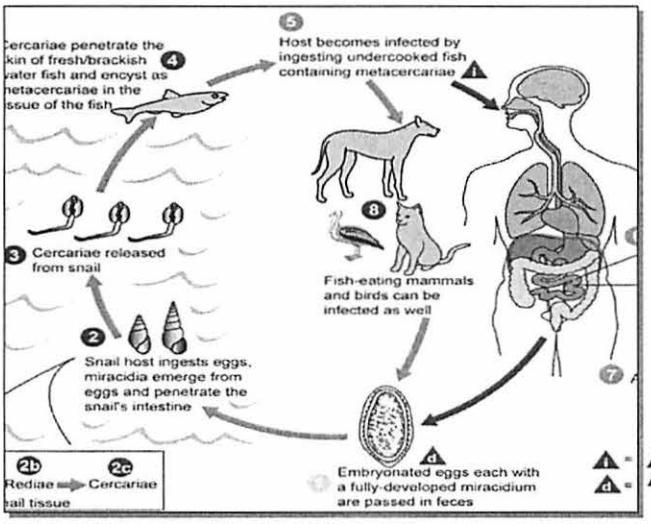


Fig. 6: Life cycle of *Heterophyes heterophyes*

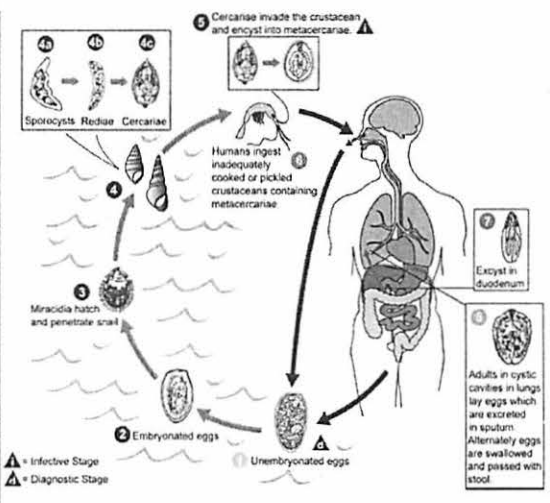


Fig. 7: Life cycle of *Paragonimum westermani*

Taenia saginata (Fig. 8) is the beef tapeworm for which cattle serves as an intermediate host through ingestion of the eggs of the worm on the pasture. The eggs reached the pasture on which the cattle graze through unhygienic habit of sewage and faeces disposal. Man becomes infected when

he eats raw or partly cooked beef inform of streaks or barbecue which is more delicious in these forms than when properly cooked, more so observation has shown that eating dead worms is not highly appealing to the palate[11]. Infection can lead to appendicitis, abdominal obstruction in case of heavy infestation; however, common symptoms include eosinophilia, nausea, vomiting, hypogastric pain and gallbladder infection.

Taenia solium (Fig. 8) is the pork tapeworm which infects the pigs through ingestion of the eggs of the worm from the sewage or faecal materials. Man becomes infected when he eats infected pork or measly meat that is not properly cooked. However, faecal - oral transmission is possible by ingestion of the eggs through contaminated hands, food or drink. The infections are also similar to that of *T. saginata*, although, specific symptoms may include constipation, diarrhea, loss of appetite, nervous and intestinal disorder, abdominal pains among others. Heavy infestation can lead to loss of weight, body weakness and pain, nervous disorder, and cramps[1, 11].

Hymenolepis nana is a 'dwarf' tapeworm of rodents and also, of man, in whom it causes hymenolepiasis especially in children. The eggs of the parasites may be swallowed by man through faecal-oral transmission via contaminated hands, food or drink or by eating infected rats or mice which are not properly cooked. The common clinical symptoms are restlessness, diarrhea and irritability.

Diphyllobothrium latum (Fig. 9) is a broad fish - tape worm of man. The eggs are deposited through the faeces of the infected person into the water body while the coracidium formed from this is swallowed by a copepod in which the worm develops to procercoid stage. This is then swallowed by plankton feeding fish from where plerocercoid develops. Man becomes infected when he eats the infected plankton feeding fish or the larger fishes which are smoked or partly cooked. Heavy infection may lead to pernicious anemia due to depletion of vitamin B_{12}, a component of blood formation and low erythrocyte count. Other pathogenic effects include systemic toxaemia, abdominal pains, intestinal obstruction and lassitude among others.

Trichinella spiralis (Fig. 10) is essentially a 'domestic' or 'synanthropic' parasite known to cause zoonosis transmitted to man by the ingestion of infected pork raw or partly cooked. Pigs become infected by eating infected pork scraps or infected rats which had earlier scavenged garbage with pork wastes. Sausages are also known to be a common source of the infection as a small particle of infected pork, after mincing, may become widely distributed among a number of

sausages. Common clinical symptoms of human trichinosis (disease) include periorbital oedema, myalgias, eosinophilia and fever among others.

Toxoplasma gondii occurs in all warm-blooded animals-mammals and birds. Although, its nature and pattern of transmission remains mystery, however, transmission of the worm could be through the faeces of cat, being a domestic animal, man's food or water could be contaminated through contact with cat's faecal materials which may also contaminate pastures on which cattle graze. In other words, man could become infected by ingesting oocysts of the worm via contaminated food or water, or by consuming the cysts in undercooked beef or through placental transmission. Pathogenetically, toxoplasmosis in adult man is almost symptomless; however, the infection may result in fever and swelling.

The genus S*arcocystis* consists of two species-*S. hominis* and *S. suihominis* for which man serves as a definitive host. S*arcocystis* zoitocysts are commonly found in farm animals- cattle, sheep, pigs, horse, buffalo, camels, - and in game animals. Man becomes infected with *S. hominis* by eating undercooked beef containing zoitocysts. Pathogenic effects include nausea, stomach pains and diarrhea. *S. suihominis* is contracted by consuming insufficiently cooked infected pork; the pathogenic effects could be more severe leading to stomach pain, vomiting, diarrhea, nausea and dyspnoea within twenty four hours[1, 12, 20].

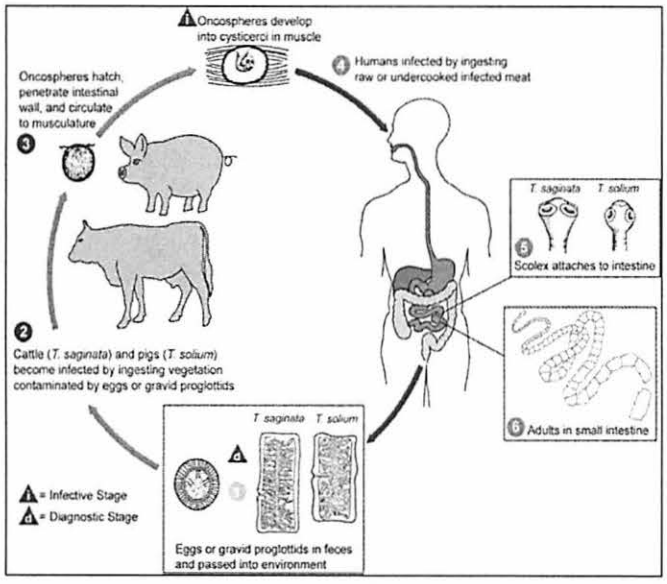


Fig. 8: Life cycle of *Taenia solium*

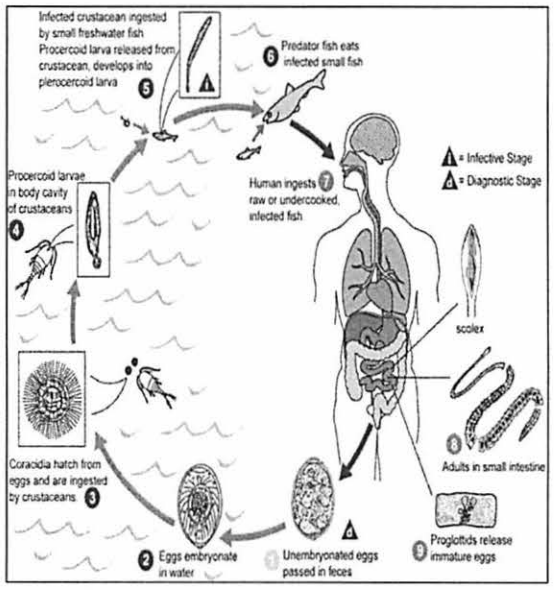


Fig. 9: Life Cycle of *Diphyllobothrium latum*

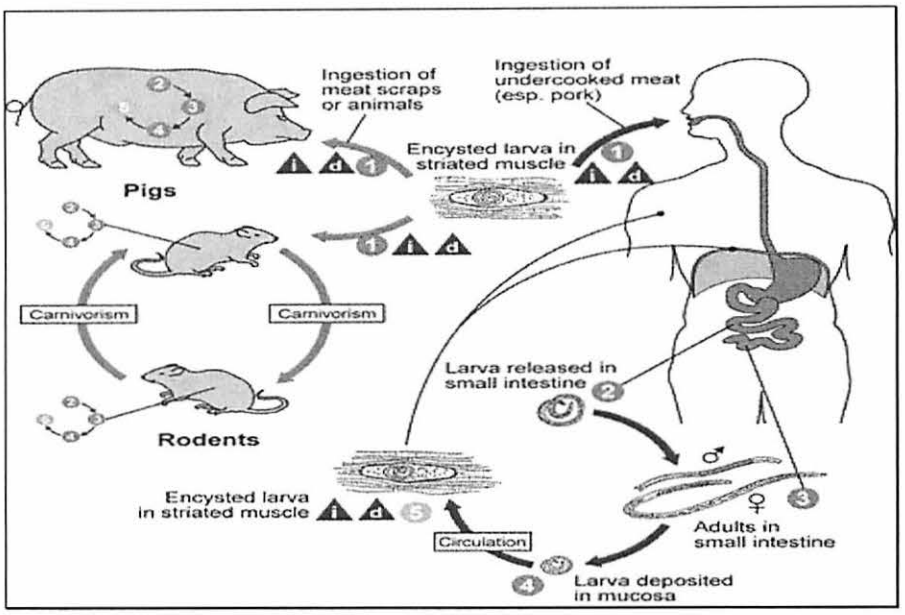


Fig. 10: Life Cycle of *Trichinella spiralis*

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FACTORS ASSOCIATED WITH REDUCTION OF CONTACT WITH PARASITES

It is possible for man to avoid or reduce contacts with parasites and diseases caused by them if certain hygienic principles and behaviors are maintained. Failure to keep within the healthy and safety limits could be the result of lack of knowledge and information concerning modes of transmission of these parasites; hence, education plays a pivotal role in avoiding or reducing parasitic infection.

Knowledge is power

Both secular and spiritual knowledge and social exposure are important in acquisition of strategies required to keep the environment clean and to make right choice of diet. Knowledge is power, without which man cannot live a victorious life. The word of God declares—people perish for lack of knowledge (Hosea 8:4), ---but through knowledge the righteous will be delivered (Proverb11:9 [b]). Perilous times are here and diseases of every kind are rearing their ugly heads in human life. The arch enemy of the human race is doing his utmost to take advantage of men's ignorance and to lay the foundation of disease by improper treatment of the body. Those who claim to be sons and daughters of God will do well to avail themselves while they can of the opportunity now presented to gain knowledge of the human system and how it may be preserved in health[4]. Man

deliberately chose not to trust and acknowledge God's words due to arrogance and self trust—the origin of sin. Man perpetually follows evil, busy pursuing his own way, engaging in many perverted acts which often result in wanton destruction of innocent lives and properties. God called in a loud voice but they never answered, and He spoke but they did not listen (Isaiah 65:12). Policy makers in most of the nations of the world have neglected God's knowledge; neither do they acknowledge His words. Bible declares, "the fear of God is the beginning of wisdom"(Prov.9:10); If thou criest after knowledge, and liftest up thy voice for understanding; if thou seekest for her as silver, and searchest for her as for hid treasures; then shalt thou understand the fear of the Lord, and find the knowledge of God. Proverb 2:3-5. Most often, decisions taken by these leaders rest solely on man's wisdom and most of the time these give birth to wrong policies that produce adverse effects on the followers. These leaders oftentimes become neck-deep in corrupt practices with subsequent care-free attitudes, lack of respect for life and rules of law resulting in environmental degradation, poor health delivery, poverty-ridden and lawless community.

Most of the developing countries especially those in tropical Africa lack basic infrastructures such as constant power supply, clean water supply, modern sewage disposal and recycling systems, good housing schemes, modern and affordable health facilities. No wonder the Bible declares, "Righteousness exalts a nation but sin is a reproach" (Prov. 14:34). These poor states of affairs in most of the developing countries especially in Africa are at least partly due to leadership problem and bad policies. This gives the true picture of one of the basic and fundamental problems associated with the widespread distribution of parasites-causing diseases in this part of the world. Due to poor leadership, the followership has also lost the orientation and commitment required to live a normal and orderly life, people behave irrationally with no fear of God, their attitudes and behavior towards their fellow human beings and the environment reflect absolute lawlessness and frustrations. The laws guiding environmental management are no longer binding; environmental pollution has become the order of the day. People deliberately or frustrated(ly) desecrate the environment through acts of indiscriminately disposal of sewage and faecal material leading to the pollution of land and water which are the important constituents of the environment.

Man comes in contact with land and water in the cause of his day to day activities. In Africa, children (toddlers) who are often left to crawl freely on the ground often have access to the soil through body contact or at times even putting the soil particles into their mouth. Others such as farmers, bricklayers, sand loaders and other related professionals often have contact with soil and

even used the unwashed hands for feeding at sites. These are some of the behaviors that aid faecal-oral transmission of soil-dwelling parasites into the man's system.

Some of the parasites transmitted through contact with contaminated soil include *Naegleria* sp., hookworm (*Ancylostoma duodenale*), *Acanthamoeba* sp., *Toxacara canis, Trichuris trichiura* and *Strongyloides stercoralis* (threadworm).Water is an essential component of life, almost every function of life is carried in water medium. The proper use of water promotes health. It is therefore very important that water supply system should embrace quality and quantity in its modus operandi. Such a water supply system must be accessible and reliable because this will go a long way in reducing contact with infected water. But where such water supply is inadequate or unavailable, people may be forced to look for alternative means of water supply and this may be from unprotected sources. Where this is the case, people look for solace in fetching, drinking, washing and swimming in polluted water and such practices may predispose the whole community to water-borne infections. Such parasite-related infections being transmitted via water medium include diarrhea, dysenteries, amoebic dysentery, balantidiasis, cyclosporiasis, cryptosporidiosis, giardiasis, schistosomiasis, guinea worm infection, clonorchiasis, diphyllobothriasis, fasciolopsiasis, paragonimiasis and toxoplasmosis. Unfortunately, most of the communities in Africa suffer from some of these diseases due to inadequate or lack of clean water supply. Previous findings show that 80% of all diseases in the world are associated with poor water supply and inadequate environmental management system[5]. Ironically, in the developing world, only 68% of the people have access to clean safe water supply[6], while in Nigeria only 48% of the inhabitants of the urban and semi-urban areas, and 39% of rural areas have access to potable water supply[7]. This situation is inimical to good health and general well being of the people. Invariably, this has untold effect on the prosperity, happiness and the perfection of Christian character which is important for the development of the powers of mind and body. This contradicts God's ideal for us, according to 3 John 2, which states that "Beloved, I pray that you may prosper in all things and be in health, just as your soul prospers." A physically and spiritually active person is bound to be healthy and prosper in all aspects of life and this definitely will lead to decrease in morbidity and unnecessary deaths[8].

Abiding by God's health principles and laws

The children of God will come to regard obedience to the laws of health, not as a matter of sacrifice or self-denial, but as it really is an inestimable privilege and blessing"[13]. An obedient life signifies a holy life. When we obey God's laws through the indwelling spirit of God, we become

transformed both physically and spiritually. When we pay attention to God's principles and laws of health then we need not necessary labor (fasting and prayer) to prevent disease just because the rules that govern cleanliness and temperance in eating (1 John 3:10) have become part and parcel of us[14.15]. To live a disease-free life man must live in harmony with those natural laws which govern his day to day activities----"and God has pledged Himself to keep this human machinery in healthful action if the human agent will obey His laws and cooperate with God" [16]. Man must learn how to live so that all he does will be to the glory of God (1 Corinthians 10: 31).

It is so amazing that the Almighty Creator is specifically concern about human health even as Bible clearly declares "Beloved, I wish above all things that thou mayest prosper and be in health, even as thy soul prospereth 3 John 2". God who knows what is good for human consumption also gave some injunctions with regards to our health and our diet, especially those that have to do with flesh eating as stated in Leviticus 11: 3-11 and Isaiah 66:17. Some of the forbidden animals mentioned in these chapters of the Holy Book including swine, hyena, pig, mouse, rat, horse, camel, hawk, ostrich, owl, kite, falcon, vulture, bat and seafood such as oyster, shrimps, crabs, eels, catfish, lobster, crayfish, clam, et cetera which are found to specifically inhabiting estuaries along coastal region or other water bodies where discharges of sewage, sewage effluents and other water-borne pollution from municipal discharges, suburban home drainage and agricultural runoff are accumulated[10]. The polluted habits of these sea animals make them to be more vulnerable to parasitic invasion. These sea foods are usually deliciously prepared whole with their intestine and contents (faeces) intact for human consumption-making them more dangerous to human health.
Bible declares " if thou wilt diligently harken to the voice of thy Lord thy God and wilt give ear to His commandments, and keep all His statutes, I will put none of these diseases upon thee, which I have brought upon the Egyptians: for I am the Lord that healeth thee. By obeying the laws of God concerning health and diet, diseases may be mitigated or avoided altogether. It is apparent from this excerpt that it is not the will of God that great, epidemic scourges should send millions into their graves, He wants us to prosper and be in good health-body, mind and soul. For we are not our own, Christ has bought us with a unique price (1Corinthians 6:19-20). Therefore the body must be kept whole and healthy for the use of the Master.

Temperance/abstinence

It takes a disciplined and determined mind with absolute self control powered by the Holy Spirit to overcome the overwhelming desires to fulfill the flesh demands. This is the mind that imbibes the principles of temperament in making decisions and choices. Temperance has to do with moderation in using those things that are beneficial to the body or total abstinence from those things that are harmful to the body. Most of the diseases of man especially those that have to do with diets are consequences of lack of the will power to resist. Moderation in our daily life activities-diet, sleep, work should be encouraged while abstinence from unclean meat and other harmful substances and practices is a virtue. It is an irony that Satan has created an appetite for the very foods God forbade consequence upon which epidemic disease has followed the violation of God's dietary principles. Breaking this health law has very serious consequences "Intemperance lies at the foundation of all the evil in our world[17]". Man needs special gifts from God with regards to knowledge, wisdom and power required for self control in order to overcome the appetite urge. This will help him to gain control over the power of appetite and when he conquered on this point would have moral power to gain the victory over every other temptation of Satan and would finally escape the ruin predicted to come over thousands who lack self control. But those who are slaves to appetite will fail in perfecting Christian character....And as we near the close of time, Satan's temptation to indulge appetite will be more powerful and more difficult to overcome[18]."

CONCLUSION

Healthful living requires a change of lifestyle in conformity with hygienic environment and choice of diet that will be free parasites. Both spiritual and secular education is indeed germane to the acquisition of proper knowledge required for healthful living. Acquisition of adequate knowledge regarding health will provide essential information for reorientation and right attitudes towards the environment consequence upon which the widespread distribution of parasites and other harmful microbes will be brought to bay.

In addition, the teaching of health principles will reduce the level of ignorant with regards to dietary options especially those that concern with the animal flesh and this may lead to reduction in predisposition to parasitic infection in our community.

This paper brought to view the importance of sanitized environment and wise choice of diet in conformity with God's principles of health as our guide to prevent parasitic infection. This may also serve as an approach to the integration of faith and learning in the teaching of health-related programmes.

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