THE PREVALENCE OF PARASITIC ILLNESSES IN HUMAN POPULATIONS TOGETHER WITH TREATMENT AND PREVENTATIVE STRATEGIES FOR SUCH DISEASES

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ABSTRACT

The living world has been formed by and will continue to be influenced by inter specific relationships between species. The range of these connections, from mutualism to parasitism, is enormous. There are a range of microorganisms that are essential for human existence. There are times when interactions aren't productive. Plasmodium species, which cause malaria, are only one example of a possible pathogen. In the same way that many other microorganisms have an adaptive advantage, they are Machiavellian in their capacity to design a range of reproduction techniques. A vital function that parasites plays in the ecology and evolution of all living things, including humans. Although humans represent just one ecosystem out of many, neglecting to understand this has an impact on our overall image of the system, research on infectious diseases is really focused on humans. Our knowledge of the bacteria with whom share our surroundings is poor. Contrary to this belief, parasite-induced changes in the human DNA are still taking place today. There is evidence that humans have been susceptible to parasitic selective forces during most of their evolution. However, what are the pathogen-inhabiting solutions? Why don't we learn how to better control and manage them?

Keywords: Disease; parasites; human host-parasite interactions; associations; pathogens

INTRODUCTION

As a result of parasitism, a parasite and its host may coexist. The parasite benefits from the host in some manner, but the host is always injured, and this injury may often lead to illness or death. Pelagic life began to emerge on Earth a hundred-million-year-old time period (Vournourin *et al*., 2015). Several Mesozoic helminthes and arthropods, as well as Paleozoic

ectoparasites, have been found. Writings from ancient civilizations show that they were already familiar with parasites, parasitic illnesses, and parasitic treatments. When it comes to parasitism or parasite-host interactions, parasitology is an entirely new field of study. For millennia, parasites have been studied in isolation in zoological studies. As early as the 19th century, some parasite biological cycles were discovered; however, it wasn't until the twentieth century that Parasitology really took off, thanks to advances in in vitro culture, immunological techniques and the use of electron microscopy, which allowed for a more detailed understanding of parasitic protozoa to be gained(Das *et al*., 2015). Our knowledge of parasitism and parasites has been greatly enhanced since the 1980s because to new molecular biology methods. Genomes of parasitic species and drug-resistant mutations have been uncovered in large numbers. The complexities of parasite adaptation and evasion have been deciphered. It's called human parasitology when eukaryotic parasites, such as protozoas, helminths, and arthropods, are studied. More over a quarter of the world's population is infected by some kind of parasite. Due to the fact that their survival depends on them, the best parasites tend not to kill their host. With its long-term course, parasitosis may have high frequency and morbidity, but low mortality rates (Chagas disease, schistosomiasis). Poor sanitation and hygiene in tropical countries has been a long-standing relationship to the spread of parasitic illnesses. This, however, is not the case. During the last several decades, a parasitosis emergency has arisen due to a combination of reasons such as increased migration and tourism, dietary traditions being brought in from other countries, and commerce being conducted on a worldwide scale(Li *et al.,* 2013). We must also consider the increasing number of immunocompromised individuals who are parasitized by opportunistic parasites such as Pneumocystis, Blastocystis, Cryptosporidium, Toxoplasma, Isospora, Giardia spp., and all human Microsporidians, as a consequence of iatrogenic or viral causes (HIV): Even though it is hard to estimate the worldwide prevalence of parasitic diseases due to a lack of reporting requirements in many countries, many people in these countries are nonetheless affected by parasitic diseases. As a result, parasitosis may go undiagnosed in many cases because it is asymptomatic or has a generic clinical symptomatology. Parasitic protozoans like Cryptosporidium and Giardia, which are disseminated via water in rich countries, are the most common cause of human gastroenteritis and nutritional disorders. Some other protozoan species that may be transmitted by drinking water include Entamoebahistolytica, Toxoplasmosgondii, Balantidium coli, Cyclosporacayetanensis and Isosporamicrosporidia, Naegleria spp. and Blastocystishominidae. More than half of all cases of E. histolytica are found in the world's population. Amebiasis is more likely to occur in countries with subpar sanitation and hygiene standards. Death and disease are common occurrences in underdeveloped countries. Every year, more than half a billion people are infected with parasites, although only 10% get unwell. An issue with the intestines or liver may occur only in severe cases. Food may also serve as a vector for the spread of parasites. According to a study conducted by the FAO in 2014, fresh food, meat, and seafood consumption is a major vector for parasite transmission across the world. These include Cryptosporidium spp, Echinococcusgranulosus and Echinococcusmultilocularis, as well as Trichinella, Ophiostomatidae, and Ascaris spp. among the protozoans. According to WHO estimates issued in 2015, foodborne diseases caused by protozoa and parasitic helminths cause substantial morbidity and mortality in various regions of the world. These parasites include trematodes like Clonorchis, protozoans like Toxoplamagondii, tapeworms like T. solium, and nematodes like Trichinella spp. certain foodborne parasites, such as T. gondii and T. solium (pig tapeworm), may be found on every continent, although their distribution varies substantially by location. Both infections may be transmitted by the consumption of undercooked or raw meat. When it comes to the spread of T. solium in undeveloped countries, there are no health monitoring standards. T. gondii identification is difficult since the food-processing method is expensive. Even in prosperous countries, they aren't practiced. Anopheles mosquitoes transmit malaria, which is a parasitic disease caused by a variety of Plasmodium species(Ndjonka *et al*., 2013). Many experts are striving to better understand the parasite and develop a vaccine for malaria, especially in poor countries. The use of insecticide-treated mosquito nets has been the most effective strategy in the fight against malaria. Preventive treatment is also functioning effectively for children.

We, the most advanced species on Earth, are unable to thrive on our own, without the help of our symbionts. This varied set of microbes known as the Microbiome is essential to the survival and reproduction of eukaryotic species in general. Because it has developed unique capabilities that complement human metabolism, they say, it plays an important role in human health. Immune system development, vitamin absorption, hormone production, and hormone regulation are all affected by intestinal bacteria. Symbiotic interactions are, nevertheless, quite complicated. Scavengers and possible pathogens, like Taur and others, aren't always friendly and cooperative with each other. Gut microbiota modification, notably a loss of microbial stability amongst humans, may lead to an overgrowth or dominance of dangerous bacteria, according to (Pamer, 2013) as with other drugs, antibiotics may decrease the body's natural defense mechanisms. Pathogens may cause intestinal problems when the microbiota is disrupted due to weakened host immunity. To understand how living creatures interact with one other is to understand their connections. Antibiotic resistance is on the increase as a consequence, which is a major issue. A public health problem has existed from the beginning of time. Before humans started employing medicinal herbs as medications, this resistance developed. Ancient bacterial sequences that correlate to resistance genes were found in the research, proving that these microorganisms were able to protect themselves against outsiders.

In the vastness of host-pathogen interactions, it is easy to get daunted by the variety. Malaria, the earliest human parasite illness, serves as a good illustration of this idea. Malaria is caused by unicellular eukaryotes. Blood transfusions are still responsible for the deaths of over one million children each year. These parasites are protozoa of the Plasmodium genus. Because it has just one cell, scientists think it to be an extremely basic creature. In the Apicomplexa group of parasites, Plasmodium and Toxoplasma species are included. We can see that these parasites are closely related to ciliates when we examine their phylogenetic location in the evolutionary tree. Ciliates and dinoflagellates share morphological, molecular, biochemical, and pharmacological features with these species. Distinct gender differences exist only in humans; there are none in Plasmodium (female and male)(Perry, 2014). In any event, they are sexuated creatures due to the fact that the same genotype generates both male and female gametes. Hermaphrodites are creatures that can reproduce both male and female. Asexual mitotic reproduction is also a part of the parasites' life cycle. As a consequence, the parasites' biology of reproduction provides two advantages: asexuality and sexuality. In addition to out-crossing, they are capable of self-fertilization (that is, combining gametes from the same individual with the same genotype) (union of gametes originating from two different genotypes). One-fourth of this parasite's reproduction is attributed to self-fertilization, while the other three-quarters is due to outcrossing. By self-fertilization and out-crossing, these organisms are able to preserve their genotype and propose novel combinations. This parasite may also alter its sex ratio (i.e., the uneven production of female and male gametes) in order to boost its chances of fertilization and subsequently its reproductive success fitness, according to another research(Goncalves *et al*., 2003). In order to distinguish them from other protozoa, they are often referred to as "Machiavellian" protozoa. Self-fertilization, out-crossing, and modifying the sex ratio are all feasible methods of reproduction, as are sexuality and asexuality. People have a tough time combating parasite populations because of the parasites' large reproductive populations and the fact that they have a significant advantage over humans in terms of choice.

Throughout the history of parasites, humans have come into touch with a wide range of diseases. Human migrations and colonizations of more temperate locations were followed by the introduction of new parasites, even if the original hominids' environment was restricted to tropical savannahs. The dynamics and variety of parasite populations were also strongly influenced by the structure and size of these human settlements. Pathogen interaction has decreased considerably in numerous locations in recent years as a result of considerable socioeconomic changes. When cleanliness grew more prominent in the 19th and 20th centuries, marsh drainage became more frequent, and agricultural techniques altered, for example. West European nations made significant progress toward malaria eradication in the twentieth century(Cox, 2010). Antibiotics have seen an uptick in popularity since the 1950s, mostly due to changes in personal hygiene and the surrounding environment during the course of the twentieth century. The parasite population is down to levels never before seen. As most parasites may cause severe harm, this is a positive result for the afflicted. Even if medical advancements have contributed to an increase in life expectancy, the decrease in parasite contact has been the primary factor in this gain. The degree to which parasite reduction has also led to other changes in the twentieth century, such as an increase in birth weight, a drop in fertility, and an increase in Q1, is uncertain, although this is being addressed.

Throughout the course of their development, parasites have posed a danger to all living things. However, although humans have been able to wipe predators and rivals from the environment, illnesses have remained. A history of human connections with diseases, as well as those relationships themselves, is defined by events that may be traced back in time. Instead of going through all of the human genes that are affected by parasite contact, we'll look at the specifics of malaria transmission in this case study. An inherited disorder known as sickle cell anemia, or drepanocytosis, has a substantial public health effect in West Africa. Nearly a century has passed since this abnormality of the red blood cells was found. A single amino acid change at position 6 causes a point mutation in hemoglobin's beta chain, resulting in the disease. Researchers quickly realized that this illness, which is highly severe in homozygotes carrying the mutant gene, had an especially high incidence in Central Africa. In fact, this disease is a genetic burden that should never have been permitted to exist in a Darwinian setting in the first place. Is there a better way to convey something than with words? We think heterozygotes with one normal and one mutant allele will be more resistant to P. falciparum malaria infection than homozygotes with two non-mutated alleles, and this is the hypothesis we're working toward (Haldane, 1949). The "malaria theory" refers to this idea. An article by (Piel *et al*., 2010) showed that this genetic trait was selected for because it gives resistance to parasite infection by P. falciparum in 2010.

METHODOLOGY

In the current study data obtained by different laboratories about prevalence of parasites were used for research purposes.   Most studies on multiparasitism make use of data either from natural systems or from carefully monitored experiments in the lab. These data may be analyzed using either exploratory or mechanistic models. Furthermore, simulation may be used to investigate the features of these models. Based mostly on data gathered from natural and laboratory environments, multiparasitism research is conducted. These data may be examined using exploratory or mechanistic models. The attributes of these models may also be examined using simulations.

Multiparasitism in natural systems may be studied using a variety of methods, one of which is longitudinal research. This approach has a number of limitations, the most significant of which is the need of tracking research volunteers throughout time. Simple, one-of-a-kind tags may be used to identify individuals. As part of CMR research, or as more sophisticated technology, they're being examined. Such gadgets include, for example, Argos transmitters and GPS chips(Banuls *et al*., 2013). However, these systems are not well suited to the task at hand. For example, arthropods, which are small creatures that may be monitored and function as disease vectors, are important epidemiologically. In long-term studies, sampling approaches are used. There must be no compromises in the host's fitness, hence only non-invasive or minimally invasive techniques should be used (ie. blood and/or faeces, or skin samples). It is difficult to do research on parasites. With the use of parasitic worm research, it is possible to investigate how the presence of one parasite affects infection, persistence, and transmission. Such study takes a long time to complete. Resources include money, manpower, and time. This kind of research examines a small sample of individuals across short time spans and provides information on the population at-large. Cross-sectional studies might use invasive or non-intrusive sampling techniques, depending on the nature of the study. It is still possible to acquire long-term data by altering cross-sectional research. Samples may be taken from a specific group of persons in a study population to monitor their development, for example. The population has grown steadily throughout the years. Samples will be taken if this design is executed. The host's well-being must not be jeopardized. These studies look at a group of individuals and compare them to each other. It takes less time and money to do longitudinal research. Research into host-parasite systems involving novel illnesses is greatly aided by their capacity to analyze a large number of hosts.

Laboratory experiments are necessary in order to gain a better understanding of the effects of multiparasitism and to highlight the synergistic and antagonistic interactions between the different parasite groups (for example, helminthes, protozoa, fungi, and viruses) that infect various host taxa, such as mammals, insects, and plants. In experiments, it is feasible to modify not only the characteristics of interest (for instance, common risk factors), but also a wide range of important parameters. [For example] (e.g. host growth, parasite establishment). Because of this, it may be challenging to draw parallels between the results of laboratory research and the consequences of illnesses that occur in the real world. Another restriction is that the studies were conducted using biological models (such as the mouse and the rat) that could or might not be vulnerable to parasites that were brought in by non-model species (e.g., humans, domestic animals, and wildlife)(Banuls *et al*., 2013).

There are two main techniques to analyzing multiparasitism data: exploratory models and mechanistic models. An exploratory model is used to examine parasite co-occurrence, although it is unable to make firm conclusions on parasite interactions. When studying organisms, the biology of the creature is not considered. Exploratory models include the following characteristics: For one thing, they're fast and straightforward to use, and they may be used to cross-sectional data. There are a variety of models used to study parasite connections in more detail, such as deterministic and probabilistic models. providing an environment in which scientists may focus on potential interactions For example, researchers may examine the effects of micro parasite co-infection and macro parasite co-infection and look at the development of many parasite species. How virulence impacts transmission dynamics, how host life-history aspects affect the role of host life-history traits, and how cross immunity affects parasites that exist in close proximity to each other. Compared to exploratory models, they are far more sophisticated simulations whose structure is heavily impacted by the particular circumstance under consideration. Because they're stronger, they're also better for your health overall. As a consequence, researchers will learn more about the methods they're looking at.

RESULTS

Results regarding prevalence of parasites in various samples are given in following sections

Table 1. Parasites level in food

Food source	**No. of bacteria**
Improperly frozen meat	600
Unpasteurized milk	440
Improperly cooked Fried rice	500
Half cooked eggs	420
Broth	740

Table 2. Parasite level in blood

Bacteria isolated from blood	**Frequency**	**Percentage**
Sample 1	66	29.3
Sample 2	30	13.3
Sample 3	29	12.9
Sample 4	28	12.4
Sample 5	24	10.7
Sample 6	20	8.9

Table 3. Parasite level in urine

Bacteria isolated from	**Frequency**	**Percentage**

urine		
Sample 1	13	29.54
Sample 2	9	20.45
Sample 3	3	6.81
Sample 4	4	9.09
Sample 5	3	6.81
Sample 6	2	4.54

There will be 9–10 billion people on the planet by the end of this century if not more than that. In pathogen-host symbioses, there are many distinct factors to consider, ranging from aggressive interactions in which one party preys on the other to cooperative or mutualistic connections in which both sides profit from the association(Cummings and Turco, 2009). It is likely that diseases would remark, "We were not borne pathogens, we became," if they had the ability to do so, because they have no choice but to inflict damage to humans. The eukaryotic cell's mitochondrial endosymbiosis serves as an example of this. Why, on the other hand, do certain illnesses become lethal to humans? One of the most pressing issues in modern biology must be solved to ensure the safety of both the public and the animal. Fighting pathogen aggressiveness using pathogen diversity and environment is still a new idea. Medicinal chemicals generated from the richness of the vegetal world (mainly fungus and plants) and careful screening of this diversity by scientists to identify active principles include penicillin, artemisinin, paracetamol, morphine, and quinine, to name just a few. Humans are a host that diseases may interact with or compete with in. Humans are a host. The hosts, and it has been shown that these relationships. It is feasible to gain an advantage by creating imaginary enemies. Co-infections may actually reduce the virulence of a disease.

It is our duty to understand how diseases interact with their hosts on an ecological and evolutionary level in order to profit from the biological variety that makes up Earth's natural treasure. We also need to know how infections interact with one another and how to take advantage of disputes they sometimes have with other parasites in order to favor the less harmful parasites. Rather than being utilized on a one-on-one basis, this strategy must now be used on a global scale. We must alter our mindset, and this can only be accomplished via the collaboration of a variety of disciplines, including medicine, evolutionary biology, and chemistry, to mention just a few. In the battle against parasites, we can't wait until it's too late to begin treating infected individuals; instead, we need to execute a unified, global strategy for managing risk and infectious assault. This has a direct impact on human population increase. However, we must not forget that both the animal and plant worlds are equally affected. If a disease that is especially harmful to rice emerges, for example, the threats of starvation may cause as many lives as the flu. In the absence of a global equilibrium being built, the decline will be inescapable.

DISCUSSION

According to the number of intestinal parasite species per host, monoparasitism was more common than polyparasitism, which involves the presence of more than two parasitic species. Invasion by ectoparasites followed a similar route. Rather than the mere presence of other parasite species, parasite-parasite interactions are controlled by parasite load, according to these results. Wild animals, including parasites, fight or cooperate with one another. Two ecological and evolutionary principles should be better used to better understand and manage viral diseases: competition and cooperation(Haque, 2007). We must acknowledge that no infectious disease has fully disappeared from the earth, with the probable exception of smallpox. As pathogen virulence and resistance are two phenotypic features of pathogens, the extensive use of antibiotics and other anti-pathogen medications favors them much too frequently. Humans, on the other hand, are not innocent. Those who practice medicine, on the other hand, must treat their patients so that they may be employed. This is a spiral with an unexpectedly happy finish. In summary, the increase in parasite frequency, density, and species composition identified in this research might reflect pollution in the environment and health care discrepancies between urban and rural areas in the United Kingdom. Research areas are plagued by zoonotic parasites such as trichuriscanis, A. caninum, and D. caninum.

CONCLUSION

Species development is regulated by a complex web of relationships that affects all living organisms. Because there are so many different kinds of life in our surroundings, the ways in which we might come into contact with them are innumerable; listing them all would take a whole life. It is necessary to use analytical methods that go beyond the single host/single parasite paradigm and take into account many hosts and multiple parasites at once. As a result of this study, we can highlight four major research avenues that aim to provide light on the interactions that take place during co-infections In order to uncover community-level interactions, there is a methodological difficulty that has not yet been solved. There will be a need to identify and account for common risk characteristics in parasite interactions in order to better understand parasite interactions. Network theory and association screening are two potential paths of investigation. However, the development of statistical tests that can be used with network analysis is essential. An attempt must be made to include non-independence across analytical models since parasite transmission dynamics are affected by multiparasitism. Fourth, fresh biological discoveries must be included into multiparasitism laboratory experiments if they are to improve. Researchers want to better reproduce natural systems in order to better understand parasite interactions. Finally, in order to better multiparasitism and its consequences, multidisciplinary methodologies and collaborations will be essential in any future research.

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