Pre-disposing Factors Contributing to the Prevalence of Intestinal Parasitic Infections among HIV/AIDS Patients in Bungoma County, Kenya

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Abstract

Intestinal parasitic infections are parasites that populate the gastro -intestinal tract of humans adding stress to both arms of the immune system already weakened by human immunodeficiency virus (HIV), worsening morbidity in the infected person. This study was conducted with an aim of d etermining some of the pre-disposing factors to the Prevalence of Intestinal parasitic infections among the HIV/AIDS patients in Bungoma County. A cross-sectional study of 240 HIV positive and 60 HIV negative individuals was done. Stool samples were observed for intestinal parasites. Statistical analysis was done using SPSS version 17.0. Data were summarized using descriptive statistics (frequencies, Means and standard deviation). Differences in proportion of prevalence were analyzed using Pearson Chi -square test while factors causing observed differences in the prevalence were analyzed using multiple Logistic regression to identify significant factors responsible for observed prevalence. Results were considered significant at $p<0.05$ α-level. Significantly higher (χ 2 = 23.764, df = 1, P = 0.002) prevalence of intestinal parasitic infections was recorded among the HIV/AIDS patients (33.4%) compared to (19.3%) in HIV -ve patients. Protozoan and helminthic parasites were the parasites found where the prevalence of intestinal protozoans was higher than that of helminthes. Age, levels of education, income levels, smoking and drinking habits as well as dietary habits contributed significantly to increased prevalence of Intestinal parasitic infection (IPI) among the HIV/AIDS patients. The magnitude of parasitic infection was high in both HIV/AIDS and HIV -ve. It is recommended that routine examination of stool samples for parasites would significantly benefit HIV infected and uninfected individuals by contributing to reduce morbidity.

Keywords: *HIV, AIDS, Prevalence, Intestinal parasites, IPI*

Introduction

Man becomes infected with intestinal protozoa (*E. histolytica*) through the ingestion of food and water contaminated with faecal material containing the cystic stages of the organisms. Swallowed cysts pass through the stomach unchanged and hatch in the duodenum or upper jejunum, where they liberate trophozoites. The trophozoites then pass on with the contents of the bowel into the large intestine where they attach themselves onto the mucous membrane and secrete a powerful cytolytic enzyme which destroys the tissue cells. Cytolysed tissue cells together with red blood cells serve as their food (Neva *et al.*,, 1994). Apart from eroding the intestinal mucosal lining, they may invade the liver via the portal vein, the lungs, and occasionally the brain. The clinical manifestations can range from very mild or none to very gross such as rupture of an amoebic abscess into the pericardium and a multitude of others (Neva *et al.*, 1994). The public-health importance of amoebiasis, for instance, discussed in many works but its impact on urban and rural life needs more serious study and elucidation. Although most of the past work shows a small prevalence in some urban centres, the trend might have changed due to congestion in slums where toilets are inadequate and poorly constructed.

Material and Methods

This study was conducted at Bungoma District Hospital, in Bungoma County; Western region of Kenya. The Hospital is located in Bungoma town, a major transit town to Uganda. The area has maximum temperature that varies over the year between 18°C and 28°C with minimum temperature range of 8°C and 12°C. The mean temperature is 25^{O}C with the lowest temperature of 8.4^{O}C in September and the highest temperature of 28^{O}C in March (Survey of Kenya, 2004; Bungoma District Development Plan, 2002-2008).

The study area experiences bimodal rainfall pattern with an annual rainfall of 1200- 1800mm. The long rain starts in March and continues to September while the short rain season starts in September and ends in October. It has a total population of 1,630,934 of which 835, 339 were female and 795, 595 male (Kenya National Bureau of Statistics, Kenya, 2009).

The study participants were people living with HIV/AIDS aged18 to 65 years inclusive and not on ART; and were attending CCC for the first time, during the period of June 2010 to February 2011, who had been referred from: Outpatient department (OPD), Health Centres, Government of Kenya prison

and Dispensaries within the County. A convenience sampling technique was used to select HIV/AIDS patients and HIV negative individuals attending the CCC.

Questionnaires, interviews, observations and stool examination were used as main tools for data collection. Quantitative type of data was collected from 300 respondents at Bungoma District Hospital from June 2010 to February 2011. This study was conducted with the approval of the Institutional Research and Ethics Committee (IREC) of Moi University (Reference: IREC/2011/52). Participants, who consented to the study filled the questionnaire on the outlined pre -disposing factors contributing to intestinal parasites among HIV positive patients.

Intestinal parasites were examined in the stool samples using direct microsco py for preliminary screening and formal-ether concentration was employed to increase sensitivity. Modified Zeihl-Neelsen method was used to detect *Cryptosporidium* spp. All data was entered and analyzed using SPSS V.17. Data was summarized using frequency and differences in pre-disposing factors contributing to prevalence in intestinal parasites were analyzed using Pearson Chi-square. In all analysis, results were considered significant at $P \leq 0.05$.

Results and Discussion

Majority of the HIV/AIDS were female 138 (57.5%) while the HIV negative 33 (55%). More than half of the HIV/AIDS 125 (56.2%) were aged between 36-50 years while 26 (43.3%) HIV negative were of similar age-group. In both HIV/AIDS and HIV negative respondents, majority had secondary level of education 142 (59.2%) and 23 (38.3%) respectively. Similarly, majority were married in both groups 187 (77.9%) and 44 (73.3%) for HIV/AIDS and HIV negative respondents respectively. With regard to occupation, 109 (45.4%) HIV/AIDS and 26 (43.3%) HIV negative were self employed. Pre-disposing factors contributing to the prevalence of intestinal parasitic infections were as tabulated below.

Table 1. Shows Factors Affecting the Prevalence of Intestinal Parasitic Infections among HIV/AIDS Patients at Bungoma District Hospital

Attributes Characteristics Characteristics Character		Frequency	Prevalence of IPI	χ^2	P-value
Age	<18	26	17.8		
	18-35	23	36.9	19.443	<0.001
	36-55	19	39.7		
	> 55	12	51.6		
Gender	Male	63	22.8	21.311	<0.001
	Female	17	44.4		
Marital status	Married	19	34.5		
	Single	21	35.1	0.811	0.623
	Divorced	21	32.3		
	Widowed	19	32.7		
Levels of education	None	31	49.3		
	Primary	18	45.4	25.442	<0.001
	Secondary	13	33.9		
	College	14	24.2		
	University	4	13.2		
Income levels	< 1500	27	51.1		
	1501-5000	18	35.4		
	5001-10000	15	32.5	31.222	<0.001
	10001-20000	13	24.9		
	> 20001	7	22.4		
Smoking habits	Smoker	34	45.2	22.133	0.001
	Non-smoker	46	21.3		
Dietary habits	Eat fatty food	25	44.2	9.442	0.022
	Vegetarian	8	23.2		
	Eat at home	49	34.3		
	Eat in hotels	11	35.4		
Drinking habits	Drinker	33	27.5	19.233	0.001
	Non-drinker	47	39.3		

A total of 8 factors were likely to affect the prevalence of intestinal parasites in HIV/AIDS patients and these were: Age, Gender, Marital status, Levels of education, Income levels, Smoking habits , Dietary habits and Drinking habits. Out of the 8 factors, it was established that marital status was an insignificant factor, while the other 7 factors were independently responsible for the prevalence of intestinal parasitic infections among the HIV/AIDS patients.

It was established that prevalence of IPI increased with age. According to the results, HIV/AIDS patients aged 18 to 35 years had significantly lower prevalence of intestinal parasitic infections than those aged over 55 years. This observation is similar with that o f Sarfati *et al*. (2006). The overall high infection rate with intestinal parasites recorded in the elderly could be due to reduced immunity as senescent sets in (George-Morris, 2004). Meanwhile, significantly higher proportion of females had intestinal parasitic infections than their male counterparts. The higher prevalence of IPI among the females compared to males in these studies can be attributed to the fact that females in the study area engage in water and food preparation for the family, thus leaving them more exposed to infective agents of IPI than men. It is also possible that females received repeated high doses of the HIV in unprotected sex, leaving them with a more degraded immunity than males thus more vulnerable to various infections. Alternatively it is also possible that more females visited the hospital not only for medical treatment but also for other services such as antenatal services and family planning in the study area. This is contrary to (Awogun 2011) observation that reported opposing trend and attributed it to the fact that males have fewer restrictions than females.

The findings that parasite infections declined with increased level education of the study participants indicated the overall improvement of hygienic conditions and san itation with knowledge of self deworming. Another study by Bern *et al*. (2000) had shown such a relation between increase in educational level and lower prevalence of intestinal parasite infection. Higher income levels was also found to result in reduced prevalence of IPI mainly because, people with high income have ability to afford drugs that will reduce the prevalence of IPI than those without any disposable income.

Smoking and poor dietary habits were all found to increase the prevalence of IPI among the HIV/AIDS patients. These are similar to findings by Zander (2004). Smoking, poor dietary habits and excess drinking have been associated with reduced immune response and increased pathogens in the body (Foudraine *et al.,* 1998) and can presumably explain the high prevalence of these pathogens among the patients who smoked, non-vegetarians or consumed less alcohol.

Table 2. Multiple Logistic Regression of Factors Influencing Prevalence of Intestinal Parasitic infections among the HIV/AIDS Patients

Factor	β	S.E	Wald	Sig	OR (95%CI)
Age (ref>18)					
<18	0.219	0.565	0.150	0.699	1.244(0.411-3.765)
18-35	0.879	0.595	2.184	0.139	2.409(0.751-7.730)
36-55	2.079	0.691	9.060	0.003	8.000(2.066-30.983)
Gender (Male)	0.203	0.534	0.159	0.169	0.808(0.625-1.078)
Education level (ref=none)					
Primary	0.327	0.378	0.751	0.386	8.904(0.191-12.262)
Secondary	1.235	0.632	3.823	0.051	3.438(0.997-11.859)
Tertiary	2.195	0.790	7.722	0.005	1.387(1.061-2.909)
Income level (ref<1500)					
Kshs1500-5000	-0.177	0.466	0.144	0.704	0.838(0.336-2.089)
Kshs 5001-10000	-0.623	0.472	1.748	0.186	0.536(0.213-1.351)
Kshs 10001-20000	-1.329	0.501	7.036	0.008	0.265(0.099-0.707)
Kshs >20001	-0.910	0.764	1.419	0.234	0.403(0.090-1.798)
Smoking habits (smoker)	0.304	0.926	3.108	0.034	0.738(0.365-0.958)
Drinking habits (drinking)	-0.404	0.300	8.908	0.007	1.513(1.369-8.106)
Dietary habits (Vegetarian)	-0.112	0.263	0.601	0.002	0.894(0.300-0.998)
Constant	4.709	3.41	4.251	0.006	4.181(2.093-7.083)

Numerous studies have shown that multiple factors can each influence the proportion of parasites infections. Also habitat characteristics are known to greatly influence parasite and host distributions (Krist *et al*. 2000). This study supports the value of standard faecal examinations in HIV/AIDS individuals, since these examinations can be easily performed with low costs allowing

initiation of provision of the therapeutic approaches. It can be inferred that some attributes of man play an important role as host factors in the prevalence of IPI.

Conclusion and Recommendations

Factors that were responsible for the prevalence of intestinal parasitic infections were age, gender, levels of education, income levels, eating of meat and smoking. Concerted effort in Health education targeting females and males weather married or not, low income earners and smokers on the mode of transmission, personal hygiene and dangers of IPI in HIV/AIDS need to be emphasized.

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