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Person-Related Factors and Intestinal Parasitic Infections: A cross-sectional study on Persons with Disabilities in Gem Sub-County, Siaya County, Kenya

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Abstract: Persons with disabilities (PWDs) are more vulnerable to infectious diseases including intestinal parasitic infections (IPIs) due to their mobility limitations, dependence on caregivers and barriers to water, sanitation and facilities, yet they are rarely targeted by IPI surveillance and control programmes. In Kenya, where approximately 2.2% of the population have disabilities, Siaya County has a high disability prevalence of 4.1%, with Gem sub-county having an even higher prevalence at 4.3%. Although, person-related factors negatively affect the PWDs' health outcome, their association with IPIs in Gem Sub-county has received little attention. In this cross-sectional study, multistage sampling was applied to select 191 participants. Stool samples were collected from each of the participants and examined using direct saline and iodine mounts as well as formol-ether concentration to detect intestinal parasites. Structured questionnaires captured the person-related factors associated with intestinal parasitic infections among the study participants. The associations between the variables of interest were examined by bivariate and multivariate logistic regression tests (α = 0.05). The overall prevalence of intestinal parasites was 46.03%; with *Ascaris lumbricoides* at 37.93% and *Entamoeba histolytica* at 29.89% being the predominant parasites. The prevalence was highest among those with physical disability at 62.07% followed by mental disability at 32.18%. Person-related factors including poor personal hygiene (COR:3.74, 95% CI: 1.65-8.51, p=0.002) and soil-eating behaviour (COR:2.7, 95% CI: 1.25-5.81, p=0.011) were associated with higher odds of intestinal parasitic infections. Conversely, proper latrine usage (p=0.001), treatment of drinking water (COR: 0.36, 95% CI: 0.19-0.69, p=0.002), handwashing with soap after defecation (COR:0.34, 95% CI: 0.17-0.67, p=0.002) and before eating (COR:0.48, 95% CI: 0.21-0.88, p=0.02) and regular shoes- wearing (COR:0.37, 95% CI: 0.2-0.68, p=0.001) were associated with lower intestinal parasitic infections. This study recommends inclusion of the PWDs in routine mass drug administration, targeted hygiene education, disability-accessible latrines and handwashing facilities and promotion of shoe-wearing habits and other preventive measures.

Keywords: *Prevalence, Intestinal Parasitic Infections, Persons with Disabilities.*

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I. INTRODUCTION

Intestinal parasitic infections affect at least 60% of the world population and are among the leading causes of morbidity and mortality globally [1]. Deprived communities face a higher burden due to limitations related to factors such as poor sanitation, personal hygiene and healthcare facilities [2]. About 820 million people, globally, are infected with *Ascaris lumbricoides*, while 460 million are infected by *Trichuris trichiura* and 440 million by hookworms (*Ancylostoma duodenale* and *Necator americanus*) [3]. Among intestinal protozoa *Giardia* and *Entamoeba* are the most prevalent, with over 100,000 deaths reported annually due to *Entamoeba histolytica* infections [4].

Disability is any impairment, physical or mental, that limits mobility, activities or senses of an individual [5]. Forms of disabilities include physical, visual, hearing and mental impairment as well as communication and self-care difficulties[6]. Nearly every individual is at risk of experiencing disability due to increased accidents, chronic illnesses and ageing populations[7]. About 15% of the world population has disabilities, and due to their disabling condition, are discriminated against equitable access to health, education, employment and sociocultural opportunities [8]. People with disabilities (PWDs) experience poorer levels of health; hence more susceptible to communicable diseases, including intestinal parasitic infections [9-11]. Comparatively, disabled people experience a greater health burden from IPIs than non-disabled people [12, 13]. Despite the greater health burden due to IPIs in Sub-Saharan Africa[14, 15], including Kenya [16-18]; studies addressing the health burden and person-related factors associated with enteric parasites among PWDs, especially in Siaya county, are lacking. The information on the factors associated with IPIs among PWDs is crucial for developing targeted measures to reduce the transmission of IPIs among the PWDs.

Person-related factors contribute significantly to the transmission of IPIs. Sub-Saharan Africa, due to poverty, illiteracy on hygiene, low-quality water and improper sanitation; is endemic to intestinal parasites that lead to significant morbidity and mortality [19]. Poverty, measured in terms of low income, inadequate clean water and sanitation facilities, illiteracy about personal hygiene, malnutrition and overcrowding, is significantly associated with enteric parasitic transmission in most cases [20, 21]. Most surface water sources in Africa, Kenya inclusive, have faecal contamination[22], which is associated with the transmission of enteroparasites. In addition, malnutrition and both mental and physical impairments are strongly associated with IPIs [23]. At a personal level, factors like heredity, age, sex and lifestyle choices make persons with disabilities more susceptible to secondary health conditions [24]. For instance, in Ethiopia, poor handwashing habits, eating raw and unwashed fruits and vegetables, and dirty and untrimmed fingernails increased the risk of enteroparasitosis [25].

Persons with disabilities, because of their academic, social and economic discrimination, experience many challenges that predispose them to infections, including IPIs [8]. Inadequate access to sanitation and hygiene facilities [26], exposes the PWDs to increased health risks. Also, the lack of inclusive facilities like specially designed latrines/toilets implies that PWDs often must engage in unhygienic and contagious practices [27]. Although several studies have revealed the influence of person-related factors on the transmission of IPIs [28, 29]; the information on the person-related factors associated with IPIs among PWDs in Gem Sub-county, Siaya County, Western Kenya is limited. The findings will guide stakeholders in designing appropriate health policies to eliminate IPIs among the PWDs.

II. METHODOLOGY

➢ *Study Area*

Gem sub-county lies in Siaya County, Western Kenya; located at latitude $0^{0}02'29.74"$ North and longitude $34^{0}27'16.19"$ East. The area is characterized by diverse topography, edaphic and land-use patterns, with an altitude ranging between 1140 and 1400metres above sea level. Rainfall is bimodal rainfall, ranging from 800 mm to 2000 mm annually. Gem hasa total of 179,792 people, with an average household size of 4 and a population density of 444 persons per km^2 [30]. About 4.3% of the people in Gem sub-county have disabilities [6]. The majority of the residents depend low-income activities such as small-scale farming, and a significant portion of the population is unemployed. Gem has about 40 health facilities, including private health facilities, dispensaries, health centres, a faith-based health facility, and one sub-county referral hospital. Additionally, there is one School for the Blind and another one School for the Deaf. Common societal challenges in Gem sub-county include poverty, indiscriminate defecation, school drop-outs, alcohol and substance abuse, widow inheritance, taboos, and community rites. The study area faces high morbidity and mortality rates due to communicable diseases, with diarrheal disease epidemics being common. Water pollution from waste dumping and open defecation contributes to these health challenges, as most households use untreated water due to the high cost and limited availability of water treatment facilities. Malnutrition contributes significantly to the area's increased morbidity and mortality rates [31].

➢ *Study Design*

A descriptive cross-sectional study investigated the person-related factors associated with IPIs among the PWDs in Gem Subcounty, Siaya County, Western Kenya. Quantitative data were collected using structured questionnaires and laboratory examination of the participants' stool samples for intestinal parasites.

➢ *Inclusion and Exclusion Criteria*

Persons with disabilities aged at least 5 years; who had been living in Gem for 12 months before the study and signed the written informed consent form were included. Those who had received antiparasitic drugs within 2 weeks before data collection, were excluded from the study. All children below 5 years of age were also excluded from this study; it is evidenced that the transmission of IPIs is lower among them [32].

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➢ *Sample Size Determination*

Cochran's formula was applied to calculate the sample size [33] $n = \frac{z^2pq}{d^2}$. Where: n = the desired sample size, z = the standard normal deviation at 1.96, corresponding to 95% confidence interval (CI), p = the prevalence of IPIs which was estimated at 12.9% [34], hence p = 0.129, q = 1.0 – p = 1.0 – 0.129, d = degree of accuracy desired at 0.05 corresponding to the 1.96. A 10% adjustment was factored in to consider the possibility of non-response and this brought the total sample to 190 PWDs.

➢ *Sampling Procedure*

Gem Subcounty was divided into 9 strata using administrative units for stratified sampling. In each unit, two Community Health Volunteers (CHVs) were randomly selected and trained as research assistants. Each CHV then randomly selected eligible participants in proportion to the population of each stratum.

➢ *Data collection*

The primary data were collected by administration of pre-tested structured questionnaires and laboratory examination of stool samples from the participants. The structured questionnaires were then administered to the consenting PWDs to capture sociodemographic characteristics and data on person-related factors associated with IPIs. The stool specimens were examined by direct technique (saline and iodine mounts) to detect cysts and trophozoites of intestinal protozoa, and formol-ether concentration technique for eggs and larvae of the helminths at Dophil Maternity and Nursing Home, using the standard laboratory protocols.

➢ *Data Processing and Analysis*

The collected quantitative data were entered, cleaned, coded and then analysed using STATA version 14. Descriptive statistics were applied to summarize the participants' sociodemographic characteristics. These were summarized into frequencies, means, proportions and confidence intervals. Chi-square and logistic regression tests were computed to determine the significance of the association between the variables of interest ($\alpha = 0.05$).

➢ *Study Approval*

Scientific approval was obtained from the JOOUST Board of Postgraduate Studies while ethical approval from the JOOTRH Ethical Review Committee before beginning fieldwork. Permissions were obtained from NACOSTI, NCPWD, the Ministry of Health, Dophil Maternity and Nursing Home and the local authority within Gem. The participants with IPIs were treated at Dophil Maternity and Nursing Home, using Metronidazole and Albendazole group for protozoan and helminthic infections, respectively. The participants with chronic complications were closely monitored at the facility. The study collaborated with CHVs for deworming and follow-up, leveraging MDA drugs from the Government of Kenya local health facilities.

➢ *Consenting*

Each of the study participants and/or a legally authorized representative (parent or guardian or unbiased witness) was verbally taken through the details of this study, including the study purpose, procedures, benefits, potential risks and alternatives to participation, and then allowed to ask questions at each stage. The study participant and/or a legally authorized representative (parent or guardian or unbiased witness) was then issued an IRB-approved written consent form. An appropriately translated consent form was then issued to those who could not read and write in English. The participants/legal representatives were then given sufficient time to evaluate potential risks and benefits, procedures and alternatives and thereafter to make a well informed decision. Each one was given enough time to go through the consent form and were allowed to ask questions for further clarification on anything they did not understand. Those who had agreed signed and dated the consent form; those with disabilities that limited their ability to sign, put a mark on the consent form. The consent form was also signed and dated by the investigator, and a copy was given to the participant. They were then informed of their right to decline or even withdraw at any time and assigned unique numbers to maintain a high level of confidentiality.

III. RESULTS

Table 1 summarizes sociodemographic characteristics of the study participants. Age, disability type, level of education, occupation, monthly income and marital status had significant differences ($p<0.05$).

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Table 1 Sociodemographic Characteristics by IPI Infection Status

Variables	N (%)	Intestinal Parasitic Infections		p-value
		Negative n (%)	Positive n (%)	
Disability type				
Hearing impairment	16(8.47)	11(68.75)	5(31.25)	<0.001
Mental impairment	38(20.11)	10(26.32)	28(73.68)	
Physical impairment	119(62.96)	65(54.62)	54(45.38)	
Vision impairment	13(6.88)	13(100.00)	0(0.00)	
Other type	3(1.59)	3(100.00)	0(0.00)	
Age category (years)				
Below 10	4(2.12)	0(0.00)	4(100.00)	0.008
11 – 20	47(24.87)	20(42.55)	27(57.45)	
21 – 30	26(13.76)	12(46.15)	14(53.85)	
31 – 40	24(12.70)	12(50.00)	12(50.00)	
41 – 50	24(12.70)	13(54.17)	11(45.83)	
51 – 60	24(12.70)	20(83.33)	4(16.67)	
Above 60	40(21.16)	25(62.50)	15(37.50)	
Gender				
Female	95(50.26)	53(55.79)	42(44.21)	0.614
Male	94(49.74)	49(52.13)	45(47.87)	
Education level				
None	47(24.87)	21(44.68)	26(55.32)	0.006
Primary education (completed)	32(16.93)	20(62.5)	12(37.5)	
Primary education (not completed)	79(41.8)	36(45.57)	43(54.43)	
Secondary education (completed)	21(11.11)	17(80.95)	4(19.05)	
Secondary education (not completed)	7(3.70)	7(100.00)	0(0.00)	
Tertiary education (completed)	1(0.53)	0(0.00)	1(100.00)	
Tertiary education (not completed)	2(1.06)	1(50.00)	1(50.00)	
Marital status				
Divorced separated	10(5.29)	6(60.00)	4(40.00)	0.003
Married	66(34.92)	47(71.21)	19(28.79)	
Single	79(41.8)	32(40.51)	47(59.49)	
Widowed	34(17.99)	17(50.00)	17(50.00)	
Religion				
Christian	186(98.41)	100(53.76)	86(46.24)	0.656
Islamic	3(1.59)	2(66.67)	1(33.33)	
Occupation				
Employed	1(0.53)	0(0.00)	1(100.00)	0.001
Farmer	38(20.11)	26(68.42)	12(31.58)	
Self-employed	12(6.35)	12(100.00)	0(0.00)	
Student	34(17.99)	15(44.12)	19(55.88)	
Unemployed	104(55.03)	49(47.12)	55(52.88)	
Monthly income				
Below KShs 5000	178(94.18)	92(51.69)	86(48.31)	0.036
Kshs5000 – 10000	7(3.70)	6(85.71)	1(14.29)	
Above KShs. 10000	4(2.12)	4(100.00)	0(0.00)	

Table 1 shows that the age had a significant influence on the prevalence of IPIs among the participants (p=0.008). The participants aged 11 – 20 years had the highest prevalence, whereas those aged below 10 years had the lowest prevalence.

Disability type had a significant association with the prevalence of the IPIs (p<0.001); the highest rates of infection were observed among those with physical impairment (62.07%) followed by mental impairment (32.18%) and then hearing impairment (5.75%).

The male and female participants were almost equally represented, 94(49.74%) and 95(50.26%) respectively. The sex of the individual had no significant influence on the prevalence of IPIs (p=0.614).

Education level had a significant influence on the prevalence of IPIs among the study participants (p=0.006). The individuals who had not completed primary school education had the higher prevalence of IPIs.

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The study population consisted of only two religions, Christians and Muslims; however, religion had no significant influence (p=0.656) on the prevalence of the IPIs.

The findings show that the participant's occupation was significantly associated with IPI prevalence (p=0.001). The IPI prevalence was highest among those unemployed participants, followed by students and then farmers.

Further analysis revealed a significant association between monthly income and the IPI prevalence (p=0.036). The participants whose monthly income was below KShs. 5000 had the highest prevalence (48.31%) among the rest.

About one third, 66(34.92%) of the participants were married, while the others were single, divorced or separated. There was a significant association between marital status and IPIs prevalence (p=0.003); with the highest prevalence among the single participants (54.02%).

Table 2 Logistic Regression of Person-Related Factors Associated with IPIs

Variables	N (%)	IPI		p-value	COR (95% CI)	P-Value	AOR (95% CI)	P-value
		Negative n (%)	Positive n (%)					
Water source								
Borehole	35(18.52)	18(51.43)	17(48.57)	0.471	Ref		Ref	
Rainwater	9(4.76)	5(55.56)	4(44.44)		0.85(0.19-3.69)	0.825	0.55(0.07-4.07)	0.559
Spring	67(35.45)	41(61.19)	26(38.81)		0.67(0.29-1.53)	0.344	0.89(0.3-2.61)	0.829
Stream river	74(39.15)	35(47.3)	39(52.7)		1.18(0.53-2.64)	0.687	1.48(0.52-4.22)	0.465
Other	4(2.12)	23(75)	1(25)		0.35(0.03-3.73)	0.387	0.17(0.01-2.47)	0.194
Treat water								
No	55(29.1)	20(36.36)	35(63.64)	0.002	Ref		Ref	
Yes	134(70.9)	82(61.19)	52(38.81)		0.36(0.19-0.69)	**0.002**	0.41(0.18-0.94)	**0.036**
Storage water								
Canister	63(33.33)	34(53.97)	29(46.03)	0.768	Ref		Ref	
No storage	123(65.08)	67(54.47)	56(45.53)		0.98(0.53-1.8)	0.948	0.59(0.26-1.34)	0.206
Open	3(1.59)	1(33.33)	2(66.67)		2.34(0.2-27.2)	0.496	0.22(0.01-7.7)	0.403
Soap hand wash (after toilet use)								
No	47(24.87)	16(34.04)	31(65.96)	0.002	Ref		Ref	
Yes	142(75.13)	86(60.56)	56(39.44)		0.34(0.17-0.67)	**0.002**	2(0.61-6.55)	0.251
Soap hand wash (before eating)								
No	40(21.16)	15(37.5)	25(62.5)	0.019	Ref		Ref	
Yes	149(78.84)	87(58.39)	62(41.61)		0.43(0.21-0.88)	**0.02**	0.72(0.25-2.06)	0.54
Have toilet/latrine in the homestead								
No	18(9.52)	4(22.22)	14(77.78)	0.004	Ref		Ref	
Yes	171(90.48)	98(57.31)	73(42.69)		0.21(0.07-0.67)	**0.008**	0.23(0.04-1.44)	0.115
Toilet/latrine used well maintained								
No	38(20.11)	11(28.95)	27(71.05)	0.001	Ref		Ref	
Yes	151(79.89)	91(60.26)	60(39.74)		0.27(0.12-0.58)	**0.001**	0.81(0.19-3.46)	0.774
Use utensils rack regularly								
No	89(47.09)	40(44.94)	49(55.06)	0.019	Ref		Ref	
Yes	100(52.91)	62(62)	38(38)		0.5(0.28-0.89)	**0.019**	0.81(0.34-1.9)	0.626
Eat raw food								
No	2(1.06)	1(50)	1(50)	0.91	Ref			
Yes	187(98.94)	101(54.01)	86(45.99)		0.85(0.05-13.82)	0.91	1(-)	
Wash raw food before eating								
No	55(29.41)	16(29.09)	39(70.91)	<0.001	Ref		Ref	
Yes	132(70.59)	85(64.39)	47(35.61)		0.23(0.11-0.45)	**<0.001**	0.26(0.1-0.69)	**0.006**

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Soil-eating behaviour								
No	154(81.48)	90(58.44)	64(41.56)	0.01	Ref		Ref	
Yes	35(18.52)	12(34.29)	23(65.71)		2.7(1.25-5.81)	**0.011**	2.77(1.03-7.47)	**0.044**
Wear shoes regularly								
No	70(37.04)	27(38.57)	43(61.43)	0.001	Ref		Ref	
Yes	119(62.96)	75(63.03)	44(36.97)		0.37(0.2-0.68)	**0.001**	0.77(0.34-1.75)	0.536
Environment cleanliness								
Fair	85(44.97)	45(52.94)	40(47.06)	0.011	Ref		Ref	
Good	71(37.57)	46(64.79)	25(35.21)		0.61(0.32-1.17)	0.136	0.82(0.32-2.1)	0.683
Poor	33(17.46)	11(33.33)	22(66.67)		2.25(0.97-5.21)	0.058	0.76(0.23-2.51)	0.65
Personal hygiene								
Fair	65(34.39)	37(56.92)	28(43.08)	<0.001	Ref		Ref	
Good	78(41.27)	53(67.95)	25(32.05)		0.62(0.31-1.23)	0.175	1.32(0.5-3.52)	0.575
Poor	46(24.34)	12(26.09)	34(73.91)		3.74(1.65-8.51)	**0.002**	4.95(1.4-17.56)	**0.013**
Floor material								
Cement	50(26.46)	28(56)	22(44)	0.737	Ref		Ref	
Mud	139(73.54)	74(53.24)	65(46.76)		1.12(0.58-2.14)	0.737	0.59(0.17-2)	0.397
Wall material								
Cement	33(17.46)	20(60.61)	13(39.39)	0.4	Ref		Ref	
Mud	156(82.54)	82(52.56)	74(47.44)		1.39(0.65-2.99)	0.401	2.21(0.53-9.19)	0.275
Domestic animals								
No	59(31.22)	33(55.93)	26(44.07)	0.715	Ref		Ref	
Yes	130(68.78)	69(53.08)	61(46.92)		1.12(0.6-2.08)	0.715	1.36(0.58-3.22)	0.478
Assistive devices								
No	174(92.06)	93(53.45)	81(46.55)	0.625	Ref		Ref	
Yes	15(7.94)	9(60)	6(40)		0.77(0.26-2.24)	0.626	1.81(0.48-6.84)	0.384

Bivariate analysis (Table 2) showed that participants who used treated water were 0.036 times less likely to have an infection (COR:0.36, 95% CI: 0.19-0.69, P=0.002). Furthermore, lower odds were observed among those who washed their hands with soap after using the toilet (COR: 0.34, 95% CI: 0.17-0.67, p=0.002) and before eating (COR:0.48, 95% CI: 0.21-0.88, p=0.02).

Nevertheless, the participants with a latrine in their homestead lower odds of IPIs than those without (COR: 0.21, 95% CI: 0.07-0.67, p=0.008). Moreover, those with well-maintained latrines had reduced odds of IPIs than those with poorly latrines (COR:0.27, 95% CI: 0.12-0.58, p=0.001).

Participants who regularly used utensils rack were 0.5 times less likely to infected with intestinal parasites (COR:0.5, 95% CI: 0.28-0.89, p=0.019). Also, the those who ate washed raw food were 0.23 times less likely to have IPIs (COR:0.23, 95% CI: 0.11-0.45, p<0.001).

Conversely, geophagious individuals were 2.7 times more likely to be infected with intestinal parasites (COR:2.7, 95% CI: 1.25-5.81, p=0.011). Moreover, participants wore shoes regularly had lower odds of infection (COR:0.37, 95% CI: 0.2-0.68, p=0.001). Also, those with poor personal hygiene were 3.74 times more likely to test positive for IPI than those with fair personal hygiene (COR:3.74, 95% CI: 1.65-8.51, p=0.002).

Multivariate logistic regression analysis revealed that those who treated drinking water were 0.41 times less likely to be infected by intestinal parasites (AOR:0.41, 95% CI: 0.18-0.94, p=0.036). Also, study participants who ate washed raw food were 0.26 times less likely to be infected by intestinal parasites (AOR:0.26, 95% CI: 0.1-0.69, p=0.006). Also, the soil-eating individuals were 2.77 times more likely to be infected with intestinal parasites (AOR: 2.77, 95% CI: 1.03-7.47, p=0.044). The individuals with poor personal hygiene were 4.98 times more likely to harbour intestinal parasites than those with fair personal hygiene (AOR:4.98, 95% CI: 1.4-17.56, p=0.013). After the adjustment, the other variables were not statistically significant (p>0.05).

IV. DISCUSSION

➢ *Introduction*

This study determined the person-related factors associated with IPIs among people with disabilities in Gem sub-county, Siaya County, Kenya. The study revealed that about half of the study participants had IPIs, and this was

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linked to their person-related factors that increase their vulnerability to IPIs, unlike the general population. This shows that IPIs is still a major public health concern that is even worse when associated with disability.

Water source was not significantly associated with IPIs. Probably, this is because, through awareness campaigns, the individuals embrace water treatment, making the water safe for drinking regardless of the source. This finding is comparable to studies in Turkana [35] and Yogyakarta [36]. However, this is inconsistent with the findings of studies done in Embu, Kenya [37] and Ethiopia [38, 39]; where some water sources had strong association with infection by intestinal parasites.

Although household water storage had no significant association with IPIs; water treatment reduced the odds of infection by intestinal parasites. Individuals who treated drinking water were 0.41 times less likely to have the IPIs than those who never treated water. This is in consisted with the studies done in Rwanda [40], Mozambique [41] and Nepal [42]. Treatment of drinking water kills the infective stages of the parasites [43] and therefore reduces the risk of infection by enteric parasites.

Individuals who regularlwashed their hands with soap before eating and after toilet use were 0.48 (COR:0.48, 95% CI: 0.21-0.88, p=0.02) and 0.34 times less likely, respectively, to have the IPI than their counterparts. This is consistent with the study findings reported in Kenya [44, 45]. Proper handwashing with soap interrupts the direct and indirect transmission of the intestinal parasites.

Nevertheless, participants with latrines in their homestead were less likely to have the IPI (COR: 0.21, 95% CI: 0.07-0.67, p=0.008); and also, those with well maintained latrines were 0.27 times less likely to test positive for IPIs. This is consistent with study reports in Argentina [46]; probably because open defecation or use of unimproved latrines increases environmental contamination with the infective parasites.

Regular use of a utensils rack is associated with a lower odds of infection by intestinal parasites; individuals who used a utensils rack were 0.5 times less likely to have the IPI. The regular use of racks to dry utensils and proper handling of the utensils probably reduce the risk of contamination, especially by the STHs.

In addition, both bivariate and multivariate analyses show that study participants who washed raw food before eating were 0.23 and 0.26 times respectively less likely to have IPIs. Ingestion of raw food contaminated with cysts and eggs of enteric parasites increases the odds of infection as shown in previous studies [47-49].

Individuals with soil-eating behaviour were 2.7 times more likely to be infected intestinal parasites. This is consistent with the previous findings [34, 50]; soil-eating behaviour increases the chance of ingesting the pathogenic forms of the intestinal parasites.

Both bivariate and multivariate analyses determined that individuals with poor personal hygiene were 3.74 and 4.98 times more likely respectively to have the IPI as compared to their counterparts. Dirty and untrimmed fingernails and wearing soiled clothing are significantly associated with IPIs in this study and elsewhere [39]; This is probably due to the increased possibility of ingesting the infective forms of the intestinal parasites.

Moreover, those who wore shoes regularly were 0.37 times less likely to be infected by intestinal parasites. Regular wearing of shoes is likely to reduce direct exposure to the cysts, eggs or larvae of the parasites, especially the skin-penetrating hookworm parasites; this consistent with previous studies [51, 52].

Household characteristics were not significantly associated with IPIs. This is contrary to other studies that indicated that unimproved housing walls and floors increased the risk of IPIs [46]. The other person-related variables like; religion, sex, possession of assistive devices and association with domestic animals had no significant association with the IPIs (p>0.05).

V. CONCLUSION AND RECOMMENDATIONS

➢ *Conclusion*

Intestinal parasitic infections affects 46.03% of the study population. This confirms that it is a significant public health concern among persons with disabilities. *Ascaris lumbricoides* and *Entamoeba histolytica* were the predominant intestinal parasites, and people with physical and mental disabilities had a higher prevalence of IPIs than other forms of disability. Person-related factors like poor environmental sanitation and personal hygiene, soil-eating behaviour, handwashing with soap after toilet use and before eating, consumption of unwashed raw food, drinking of untreated water, shoe-wearing habits were associated with IPIs among the PWDs.

➢ *Recommendations*

The relatively high intestinal parasitic infection prevalence underscores the need to implement preventive measures for this high-risk population, especially individuals with mental and physical disabilities. Effective control programmes should integrate proper sanitation, personal hygiene, shoe-wearing as well as other person-related factors to eliminate IPIs.

➢ *Suggestions for Further Research*

Future research should be conducted to design and implement behavioural interventions that address person-related factors associated with IPIs such as soil-eating behaviour, handwashing, poor personal hygiene and environmental sanitation, and handwashing practices. This should investigate the effectiveness of tailored interventions in reducing the risk of IPIs among people with physical and mental disabilities.

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