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*Keywords: marginalized people, parasites, al -turbah city, yemen.*

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# Prevalence and Associated Risk Factor of Intestinal Parasitic Infection between Marginalized and Non- marginalized People in AL-Turbah City. Taiz Governorate, Yemen

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*Methods:* The study was carried out from areas in Al-Turbah city, during March to December 2016.

*Methodology:* cross-sectional descriptive and comparative study a total of 322 cases were randomly collected, aged between 5 and 45 years were examined using examined by direct wet mount technique and formalin- ether concentration technique, the questionnaire data was used for determining the correlation between parasites infection and other factors such as race, age, sex, Family size, educational level, water source and type of job.

*Statistical analysis:* The data analyzed by SPSS program.

*Results:* The study found that 124 cases of parasites infection are positive for marginal people from a total of 153 and 89 cases are positive for non-marginal (other people)from a total of 169 specimens were collected from areas in Al-Turbah city. Also found from 124 +ve in marginal people 60 cases (78.9%) are mal and 64 cases (64%) female are positive while found from 89 cases in other people 44 cases (51.2%) are male and 45 cases (54.2%) are female. The results of the study indicate that there was highly significant associated between positive of parasites infection and marginal people (p=0, 01) and there significant differences between age (p=0.04), illiterate (p=0.05) and secondary school (p=0.05), while there was no significant associated between positive of parasites infection and other factors. Infected by parasites infection in this study there is a relation between parasites infection and marginalized people.

*Keywords: marginalized people, parasites, al -turbah city, yemen.*

## I. Introduction

An intestinal parasitic infection (IPI) caused by intestinal helminthes and protozoan parasites are one of the most prevalent infections in humans residing in developing countries [1]. It is estimated that 3.5 billion people are affected, the majority being children [2]. The happening and prevalence of intestinal parasitic infections varies in countries due to environmental, social and geographical factors [3]. high prevalence of intestinal parasitic infections in human are positively correlated with poverty and poor personal hygiene, lack of safe water supply and contamination of the environment by human excreta and animal wastes [4]. Morbidity and mortality due to intestinal parasitic infections are usually more pronounced in children compared to adults due to their higher nutritional requirements and less mature immune systems [5]. Intestinal protozoan infections are endemic worldwide. In developed countries the prevalence of human intestinal parasitic protozoan infection is estimated to be between 1-7%, but it may be as high as 50% in developing countries. All age groups are equally affected during epidemics, but both subclinical infection and clinical disease are more common in children in endemic areas. Outbreaks occur regularly in childcare facilities. Immuno-compromised individuals are also more commonly affected than members of the general population [6].

## II. Methods

The study conducted in the Faculty of Medical Sciences, Taiz University, Taiz city, Yemen. From March to December 2016, 322 fecal samples from 153 marginal people and 169 non-marginal people (other people) selected in Al- Turbah city, Taiz governorate,

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aged between 5 and 45 years were tasted. As a standard protocol, after reached the samples in the laboratory, the fecal specimens also processed by the formalin-ether concentration technique.

Were examined for detection the present of ova, larva, cyst, and trophozoites, using Wet mount method with both saline and iodine were prepared within 2 h of sample collection [7]. Stool samples were also processed by the formalin-ether concentration technique, Each wet-mount method and formalin-ether concentration technique were examined by team researchers independently and findings were cross-checked.

## III. Statistical Analysis

Data was presented in form of tables by using SPSS, after those demographic data and other factors were collected in a standard questionnaire. Next, findings of positive intestinal parasites were analyzed data was presented in form of tables by using SPSS.

## IV. Results

The study results illustrated in Table1 to Table9. The prevalence of intestinal parasites in marginalized were 81% while, in the other people were (52.7%). There was significant association between marginalized people and non-marginalized (OR= 3.84 times, P=0.01), and shows statistically significant among the illiterate (p=0.05, OR=OR=1.69), secondary school (p=0.05, OR=OR=0.55, while there was no significant association between positive of marginalized and non-marginalized people and others factors studied.

## V. Discussion

Intestinal parasitic infections of humans are important threats to healthy living in developing countries [8]. These infections are usually associated with poor sanitary habits, lack of access to safe water and improper hygiene. The degree of each factor and prevalence of infections varies from one region to the non- marginalized [9].

In our result, table (1) shows that the marginalized was much higher infected by IPIs [124/153(81%] compared to non-marginalized people [89/169(52.7%)] and was statistically significant (p .value=0.01). These variations in prevalence of IPIs among two race might be due to the majority of marginalized do not care for education, poor sanitary disposal of sewage system, poverty of personal hygiene, also the randomly, crowdedness, and type of job play role in the transmission of parasites where the majorities of marginalized worker in the refuse collector and clean worker …ect.

Also, the results showed were three species of protozoa were found in the population studied, (*E. histolytica* was the most frequent intestinal protozoan infection in marginalized and non-marginal- -ized was (41.2% and 29.6%) respectively. followed by *E. Coli* 67(20.8%), were in marginalized and non-marginalize (29.4%), (13%) respectively, *G. Lamblia* 39(12.1%) were marginalized and non- marginalized people (11.1%), (0.6%) respectively. There high significant between *E. histolytica* and marginalized people. As in table (2). In contrast, other studies conducted in Yemen found that the most predominant parasite was *G. lamblia* [10].

The results in table (3) which showed the type of parasites infection, find the rate prevalence of H. nana10.5%, 0.6%, *A. lambricoides*3.6%, 3.6%, *S. mansoni* 4.6%, 0.65, *Teania. Spp*2.6%, 0.0%, *E. vermecularis* 0.7%, 0.6% in Marginalized, Non-marg. respectively. There are only significant among *H. nana and T.spp*. Parasites and marginal people. Our results agree with the results in Soudia Arabia, Who confirmed H. nana was dominant followed by A. lambricoides, S. mansoni and E. vermicularis [11]. In table (4) The majorities of the positive cases of IPI among 213/322 were single infections among race[50.6] with p=0.02 and OR=1.99 and was [ 91/124(59.5%) , 72/89(42.6% )] , in marginalized and non- marginalized at respectively, followed by double infection was [14.6] with p =0.01 ,followed by triple infection that was =0.9 with 0R=2.23.and p=0.5052and was [(1.3),1(0.6)] in the marginalized and non - marginalized at respectively. It is clear that double infection and triple infection because of the highly exposure to the infection sources such as contaminated food or water [12].

From the table (5) in our result shows there no significant between parasites infection and gender (p=0.46) the rate of infection was slightly higher in females than males the modes of transmission of the parasites, study population and the methods used probable attribute to this observed difference in detections of various parasites, a recent study in Cameroon found that the higher prevalence of human intestinal protozoan in females was attributed to the fact that women usually eat unwashed fruits and vegetables or un boiled salads which may be contaminated with protozoan cysts [13], also other study showed Female participants the highest infection rate (41.0%), followed closely by male participants (38.6%) [14] While, the study detect significant association between the occurrence intestinal parasitic infection and age group 5-15 [94/129(72.9%)] when compared to age group 16-45 [119/193(61.7%)] (p=04) and OR=1.67 ,which indicated that younger children are more exposed since the usually play in the open fields and eat food without washing hands .thus, as age increases (16-45yr) the prevalence of parasitic infection decreases possibly due to improved personal hygiene and reduced contact with soil (These findings are in agreement with that reported by [15].

Table (6) in our result shows no significant between IPI and family size, but the IPIs was related to



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family size ≥6 person [115/152 (75.7) (p>0, 43, OR=1.22 times) when compared to family size ≤5 person (p=0.43 and OR=0.82time). Studies of [16]. supported our study, large families are more susceptible to parasitic infections than small families, because of the crowding in houses leading to participation in food tools, clothes and bed finally these lead to poor personal hygiene thus, increasing the infection.

Table (7) shows statistically significant among the illiterate (p=0.05, OR=OR=1.69), secondary school (p=0.05, OR=OR=0.55) and IPI. 60/87(69%), IPI was related to primary school (p=more than 0.05) when compared to high school (p=more than 0.05) and diploma (P. value more than 0.05), our results similar of study of [17].their illiterate showed high significant than other levels of education.

Table (8) shows relationship between parasites infection and source of water in marginal and non-marginal people, the rate of prevalence of intestinal parasites was 83.9%, 51.6% in the protect water in marginal, and 76.6%,66.7% in Non-protect water in marginal, non-marginal respectively. according to study of [17]it was significant between parasites infection and source of water, this study disagree with our results.

Table (9) shows association between IPI and kind of occupation there high significant among parasites infection and workers, while there was no significant associated between positive of parasites infection and others occupations studied.

Level especially in primary and secondary schools' students about the intestinal parasite infections, sources and routes of parasites transmission, some students frequently eating street cooked foods that may be contaminated or not properly cooked could attributed to the infections by intestinal parasites some Childs like working without shoes which could assists the infections by intestinal parasites especially soil transmitted parasites, food that may increase the infections by intestinal parasites in housewives who considered the most connecting with water compared to other of the family members ,agriculture working and the connection with animal and their wastes may although responsible for prevalence of IPIs among housewives, the dealing with wastes and low personal hygiene with culpa hand washing before eating practices mentioned among refuse collectors, that make them more prone to the infection by intestinal parasites, the present findings showed that those who do not practice proper hand washing before eating was at two fold higher risk of acquiring E. histolytica /dispar infection[18].

## VI. Conclusion

The study highlights the high prevalence of parasites infection between marginal people and non-marginal people in Yemen. The clinicians in Yemen need to be aware that parasites are a potential cause of endemic specially in children.

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*Conflict of interest*

"No conflict of interest associated with this work".

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## Tables Legends

*Table 1:* The Prevalence of intestinal parasites among 153 marginalized and 169 other people in Al-Turbah city- Yemen

| Race | Number | Percentage% | OR | $\chi 2$ | P |
|---|---|---|---|---|---|
| Marginalized | 124 | 81.0 | 3.84 | 28.89 | 0.01 |
| Non- Marginalized | 89 | 52.7 | 0.26 | 28.89 | 0.01 |

*Table 2:* The prevalence of intestinal protozoa parasites (IPI) between 153 marginalized and 169 non -marginalized (other people)

| | Marginalized | | Non-marg. | | | | |
|---|---|---|---|---|---|---|---|
| Type of parasites Infection | Number | Percentage% | Number | Percentage% | Total | OR | P |
| *E.histolytica* | 63 | 41.2 | 50 | 29.6 | 113(35.1%) | 1.66 | 0.03 |
| *E.coli* | 45 | 29.4 | 22 | 13.0 | 113(35.1%) | 2.78 | 0.01 |
| *G.lamblia* | 17 | 11.1 | 1 | 0.6 | 39(12.1%) | 0.84 | 0.60 |

*Table 3:* The prevalence of intestinal helminthes parasites (IPI) between 153 marginalized people and 169 non- marginalized (other people)

| Type of parasites Infection | Marginalized | | Non-marg. | | | | |
|---|---|---|---|---|---|---|---|
| | Number | Percentage% | Number | Percentage% | Total | OR | P |
| *H. nana* | 16 | 10.5 | 1 | 0.6 | 17(5.3%) | 1.9 | 0.01 |
| *A. lambricoides* | 6 | 3.6 | 6 | 3.6 | 12(3.7%) | 1.1 | 0.8 |
| *S. mansoni* | 7 | 4.6 | 1 | 0.6 | 8(2.5%) | 0.85 | 0.2 |
| *Teania. Spp* | 4 | 2.6 | 0 | 0.0 | 4(1.2%) | 2.1 | 0.03 |
| *E. vermecularis* | 1 | 0.7 | 1 | 0.6 | 2(0.6) | 1.1 | 0.9 |

*Table 4:* Type of infection by IPI in153 marginalized and169 non - marginalized

| Type of Infection | Marginalized | | Non-marg. | | | | |
|---|---|---|---|---|---|---|---|
| | Number | Percentage% | Number | Percentage% | Total | OR | P |
| Single infection | 91 | 59.5 | 72 | 42.6 | (163)50.6% | 1.98 | 0.02 |
| Double infection | 31 | 20.3 | 16 | 9.5 | (47)14.6% | 2.4 | 0.03 |
| Triple infection | 2 | 1.3 | 1 | 0.6 | (3) 0.9 | 2.2 | 0.5 |



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*Table 5:* The prevalence rate of intestinal parasites infection (IPI) in different gender and age of tested marg. and other people

| Characters | Positive Marg. | | Positive Non-Marg. | | Total | OR | χ2 | P |
|---|---|---|---|---|---|---|---|---|
| Sex | N | % | No | % | | | | |
| Male | 60/76 | 78.9 | 44/86 | 51.2 | 104/162(64.2%) | 0.84 | 0.56 | 0.46 |
| Female | 64/77 | 83.1 | 45/83 | 54.2 | 109/160(68.1%) | 1.2 | 0.56 | 0.46 |
| Age groups | | | | | | | | |
| 5-15 years | 47/59 | 79.7 | 47/70 | 67.1 | 94/129(72.9%) | 1.67 | 4.34 | 0.04 |
| 16-45 years | 77/94 | 81.9 | 42/99 | 42.4 | 119/193(61.7%) | 0.6 | 4.34 | 0.04 |

*Table 6:* The association between IPI and family size for tested marg. and other people

| Family size | Positive Marg. | | Positive Non-Marg. | | Total | OR | χ2 | P |
|---|---|---|---|---|---|---|---|---|
| | N | % | No | % | | | | |
| ≤5 person | 37/52 | 71 | 61/118 | 51.7 | 98/170(57.6%) | 0.82 | 0.63 | 0.43 |
| ≥6 person | 87/101 | 86.1 | 28/51 | 54.9 | 115/152 (75.7%) | 1.22 | 0.63 | 0.43 |

*Table 7:* The association between IPI and educational levels for tested marg and other people

| Educational level | Positive Marg. | | Positive Non-Marg. | | Total | OR | χ2 | P |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | | | | |
| Illiterate | 59/78 | 75.6 | 17/25 | 68 | 76/103(73.8%) | 1.69 | 3.95 | 0.05 |
| Primary school | 32/34 | 94.1 | 28/53 | 52.8 | 60/87(69%) | 1.19 | 0.42 | 0.52 |
| Secondary school | 13/20 | 65 | 17/35 | 48.6 | 30/55(54.5%) | 0.55 | 3.99 | 0.05 |
| High school | 8/13 | 61.5 | 8/18 | 44.4 | 16/31(51.6%) | 1.08 | 0.04 | 0.84 |
| Diploma and above | 5/8 | 62.5 | 19/38 | 50 | 24/46(52.2%) | 0.62 | 2.22 | 0.14 |

*Table 8:* Association between IPI and source of water for marginalized and non -marginalized people

| Type of water | Positive Marg. | | Positive Non-Marg. | | OR | χ2 | P |
|---|---|---|---|---|---|---|---|
| | N | % | No | % | | | |
| protected | 78/93 | 83.9 | 81/157 | 51.6 | 0.58 | 3.24 | 0.07 |
| Non protected | 36/47 | 76.6 | 4/6 | 66.7 | 1.71 | 2.46 | 0.12 |

*Table 9:* Association between IPI and type of occupation in marginalized and non- marginalized people

| Type of job | Positive Marg. | | Positive Non-Marg. | | Total | OR | χ2 | P |
|---|---|---|---|---|---|---|---|---|
| | N | % | No | % | | | | |
| Students | 41/46 | 89 | 60/105 | 57 | 101/151(66.9%) | 1.06 | 0.07 | 0.79 |
| Teachers | 1/2 | 50 | 1/3 | 33.3 | 2/5(40%) | 0.34 | 1.55 | 0.21 |
| Workers | 16/22 | 72.7 | 3/18 | | 19/40(47.7%) | 0.41 | 7.92 | 0.01 |
| House wife | 21/22 | 95.5 | 11/12 | 16.7 | 32/44(72%) | 1.43 | 0.99 | 0.3 |
| Accountant | - | | 2/2 | | 2/2 | 0.66 | 1.03 | 0.3 |
| Disabled | 2/2 | | - | | 2/2 | 0.66 | 1.03 | 0.3 |
| Refuse collector | 18/24 | 75 | - | | 18/24 | 1.59 | 0.91 | 0.30 |
| Martial | 1/1 | | - | | 1/1 | 0.66 | 0.51 | 0.4 |
| Unemployed | 1/3 | 33.3 | - | | 1/3(33.3%) | 0.25 | 1.46 | 0.23 |



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