

## Potential Risk Factors of Intestinal Parasitic Infection in AlAhssa, Saudi Arabia

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### ABSTRACT

**Background:** Intestinal parasitic infections (IPIs) are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease. Low income, poor personal hygiene, environmental sanitation, and limited access to clean water are the factors associated with spread IPIs. Therefore, the purpose of this study was to determine the community awareness to IPIs and their related risk factors among people in Al- Ahssa. **Subjects and Methods:** A cross- section study was conducted in April 2014. A random sample of 120 participants was included. Data collection was gathered through the questionnaire form which includes inquires about social-demographic data, personal hygiene and habits.

**Results:** Results showed that 92.7% of the participants were lacking awareness of IPIs. The proportions of participants who wash fruits and vegetables with only water before eating were 80% and 94% of them used to eat in restaurants at variable frequencies which was considered as a high risk factor for acquiring IPIs. However, the percentages of participants practice good hand washing before eating and after toilet were 67.7% and 90%, respectively which indicates lower risk.

**Conclusions:** There is a need for campaigns to create awareness regarding the importance of prevention against the intestinal parasitic infection, and improve delivery of hygiene and health information.

**Keywords:** Risk factors of intestinal parasites, hygiene, Saudi Arabia

### INTRODUCTION

Intestinal parasitic infections (IPIs) are globally endemic and have been described as constituting the greatest single worldwide cause of illness and disease<sup>(1)</sup>. In 2002, WHO estimated the number of people infected by intestinal parasites at 3.5 billion and the number of people made ill by them at 450 million<sup>(2)</sup>. Parasites found in the human intestinal tract can be largely categorized into two groups, protozoa and Helminths. Protozoa can allow serious infections to develop, such as, *Entameba histolytica*– the most common-, *Giardia lamblia* and *Cyclospora*. Helminths, such as *Ascaris lumbricoidis*, *Ancylostoma duodenale* (hook worm)<sup>(3)</sup>

and *Enterobius vermicularis*. Thus, while still found in North America and Europe, their prevalence is highest in areas of intense poverty in low- and middle-income countries in the tropical and subtropical regions of sub-Saharan Africa, Asia and Latin America and the Caribbean<sup>(4- 6)</sup>. Amoebic dysentery from *Entamoeba histolytica* is the second most common cause of death from parasitic disease worldwide<sup>(7)</sup>. It estimates that approximately 50 million people worldwide suffer from invasive amoebic infection each year, resulting in 40-100 thousand deaths annually<sup>(8)</sup>. The soil-transmitted helminths (*Ascaris lumbricoides* and *Ancylostoma duodenale*) are the most prevalent, helminths infecting an estimated one- sixth of the global population<sup>(9)</sup>.

Generally, symptoms signaling the presence of an intestinal parasite are related to the intensity of

infection. Thus, a light parasitic infection is often asymptomatic whereas a mild to heavy infection can be associated with painful and severe symptoms<sup>(3)</sup>.

Intestinal parasitic infections are associated with abdominal discomfort, anorexia, diarrhea and flatus<sup>(10)</sup>. Complications of intestinal parasitic infections include intestinal ulceration, abscesses, peritonitis, reactive arthritis usually involving lower extremities and hypersensitivity reactions<sup>(11)</sup>. IPIs rarely cause death but because of the size of the problem, the global number of related deaths is substantial<sup>(12)</sup>. In a study that was carried in Al Madinah Al Munawarah, Kingdom of Saudi Arabia (KSA), a total of 2732 stool samples were screened for intestinal parasites. Positive cases were recorded among 407 stool samples (14.9%). The detected intestinal parasites were *Giardia lamblia* (21.9%), *Entamoeba histolytica/Entamoeba coli* (17.8%), *Trichuris trichiura* (16.2%), *Ascaris lumbricoides* (15.8%), hookworm (13%), and *Enterobius vermicularis* (0.43%)<sup>(13)</sup>.

Many factors may contribute to transmission of parasites. Intestinal parasites are infectious diseases of poverty. It is closely associated with low income, poor personal hygiene, environmental sanitation, lack of pure water supply, limited access to clean water, tropical climate, and low altitude<sup>(14)</sup>. According to the prevalence, the aim of the research is to determine the community awareness to intestinal parasitic infections and their related risk factors among people in Al-Ahssa.

**SUBJECTS AND METHODS**

**Study design**

A cross-sectional study was conducted to determine the awareness and exposure to risk factors of acquiring intestinal parasitic infections among participants.

**Study area and population:**

This study was performed in April 2014 among randomly selected residents in Al- Ahssa Governorate located in the Eastern province of Saudi Arabia (450 Km from Riyadh).

**Questionnaire sheet:**

The questionnaire was prepared in Arabic and included biographical data and 10 questions: (1) general demographic information and socio-economic status: age, gender, educational level, occupation, income level, (2) Personal hygiene, food habits, source of drinking water and the practice of hand washing before eating and after using toilet and (3) Information related to history of parasitic infections and gastrointestinal symptoms. Oral briefing was described to participants before questionnaire distribution.

**Statistical analysis**

SPSS version 17.0 was used for statistical analysis. Data were presented as frequency and percentage.

**RESULTS**

**3.1. Socio demographic characteristics**

A total of 120 subjects participated in the

study, and only 10 questionnaires were excluded. Out of all samples, 63.6% were females, and 36.4% were males (Figure1A). 8.2% of participants were age group ≤15 years old, 64.6% were between 16-35 years old, and 27.3% were above 35 years old (Figure 1B). Education levels and social of the study participants is shown in (Figure 2A&B).

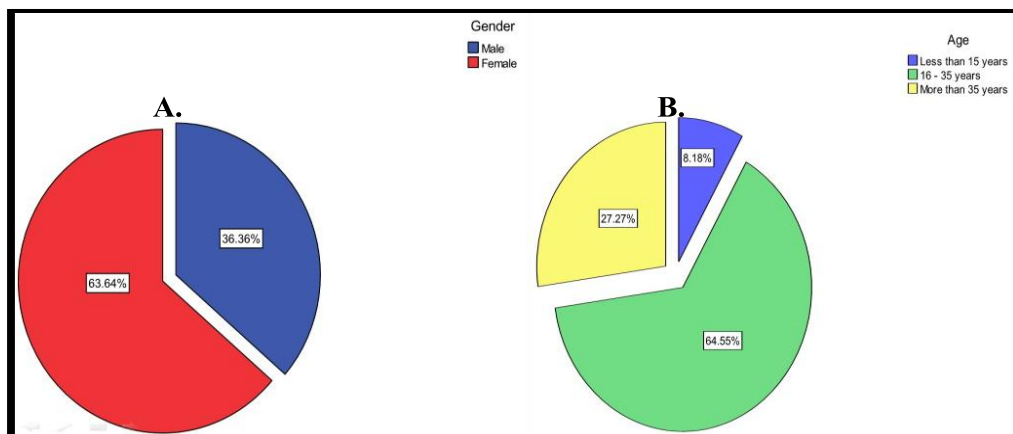
**Associated potential risk factors**

Many of the participants showed high risk behaviors of acquiring parasitic infection. The study showed that 92.7% of the participants were lacking awareness as compared to those who had attended awareness campaigns (7.3%) [Table1]. Approximately 80% of the participants mentioned that they wash fruits and vegetables with only water before eating. This study also showed that only 6% of the participants never eat from restaurants while the rest of them used to eat in restaurants at variable frequencies [Table 2].

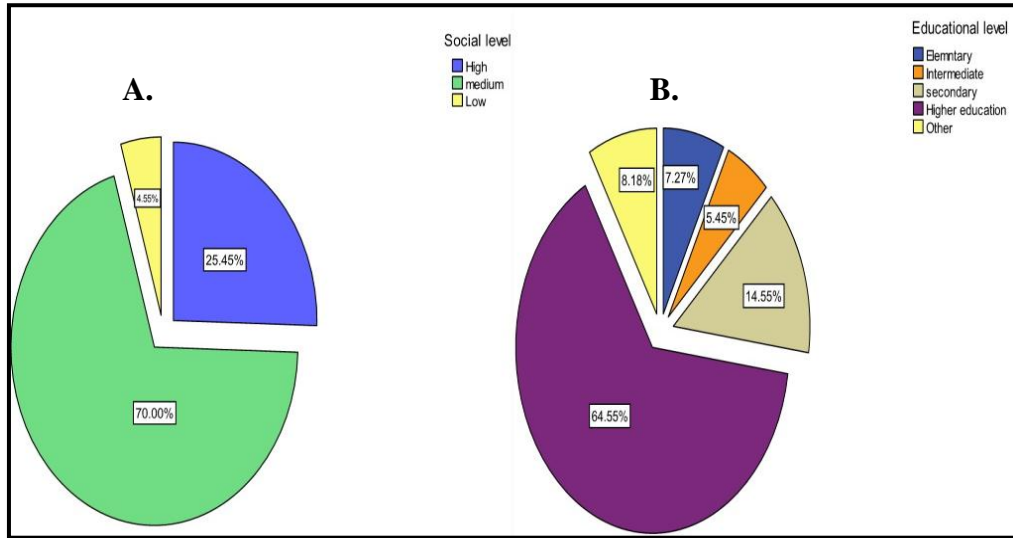
Regarding the source of water, the study demonstrated that 56.4% of the participants use bottled water while those who use other sources of water such as tank users were 34.5%. The majority of participants wash their hands with water and soap before eating and after toilet (62.7% and 90% respectively). Moreover, participants who do not breed animals represent 85.5% [Table 2]. Most of participants (75.5%) did not have history of IPI while about 80.9% had experienced some symptoms as abdominal pain, diarrhea, nausea, and vomiting [Table1].

**Table 1. Awareness and history of intestinal parasitic infection.**

Variables	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Attending awareness campaign	8	7.3%	102	92.7%
History of intestinal parasitic infection	27	24.5%	83	75.5%
History of symptoms as abdominal pain, diarrhea, nausea, and vomiting	89	80.9%	21	19.1%



**Figure 1. Percentage of participants' gender (A) & age (B).**



**Figure 2. Distribution of participants according to educational (A) and social (B) levels.**

**Table 2. Risk factors of intestinal parasitic infections.**

Variables	Frequency	Percentage
<b>Source of water</b>		
- Bottled water	62	56.4%
- Refill company	38	34.5%
- Both	10	9.1%
<b>Wash fruits and vegetables before eating</b>		
- No	1	0.9%
- Yes, with water only	88	80%
- Yes, with water and detergents	20	18.2%
- Other	1	0.9%
<b>Average of eating restaurant food</b>		
- Never	6	6%
- Once to 4 <sup>th</sup> times	52	47%
- More than 4 <sup>th</sup> times	52	47%
<b>Washing hand before eating</b>		
- No	4	3.6%
- Yes, with water only	37	33.7%
- Yes, with water and soap	69	62.7%
<b>Washing hand after using toilet</b>		
- No	1	0.9%
- Yes, with water only	10	9.1%
- Yes, with water and soap	99	90%
<b>Breeding animals</b>		
- No	94	85.5%
- Yes, chicken	2	1.8%
- Yes, birds	10	9.1%
- Yes, rabbits	0	0%
- More than one	4	3.6%

## DISCUSSION

Intestinal parasitic infections are endemic worldwide and remain a major public health concern in many tropical and subtropical countries<sup>(15)</sup>. The transmission of these parasites occurs via fecal-oral route, either directly from person-to-person or indirectly by eating or drinking contaminated food and water<sup>(15)</sup>. During a time, parasitic infection patterns in the population may alter due to changes in the human behavior and life styles<sup>(16)</sup>.

This study revealed that 92.7% of participants didn't attend awareness campaign. The present study showed that most of participants (75.5%) didn't have history of IPI however 80.9% experience symptoms like abdominal pain, vomiting, diarrhea, and nausea. As the study was conducted in Jeddah it demonstrated that the diagnosis of some parasitic infection e.g. amebiasis by microscopic identification in stool is insensitive, and is still a problem in routine diagnostic laboratories. This also explains the absence of accurate prevalence data on infections<sup>(17)</sup>. In 2010, a study in Al-Ahssa revealed that the positive history of previous intestinal infections among family members increased the likelihood of infections<sup>(18)</sup>, as a result 24.5% of participants who had history of IPI were under high risk of having again.

The present study showed that 94% of the participants eat in restaurants which put them under high risk of having IPI, the spread of disease via food handlers is a common and persistent problem worldwide<sup>(19& 20)</sup>. Food handlers may be infected with parasites or act as carriers which have the potential to be directly transmitted from one person to another<sup>(21)</sup>. Additionally, 80% of the participants wash fruits and vegetables with only water before eating which could be considered as another high risk factor for acquiring IPI, using detergents, salt and antiseptic materials reduced the infection rate, even if these substances can only decrease the bacterial and parasitic charge<sup>(22)</sup>.

Intestinal parasitic infections are significantly associated with poor hand washing practice<sup>(23)</sup>. However, in this study 67.7% of the participants practice good hand washing before eating and 90% of them after toilet using soap and water which indicates lower risk of acquisition of IPI.

The present study showed that 34.5% of the participants who are tank users are under the

risk of being infected. The source of water was significant predictor for the development of intestinal parasitic infections<sup>(17&24)</sup>. Finally, animals represent a significant reservoir of infection on the farm and may also pose a risk to public health<sup>(25)</sup>. In this study 85.5% of the participants were not breeding animals which made them under lower risk of acquisition of IPI.

In conclusion, the present study reveals lack of awareness among people in al-Ahssa. The result indicates that the people who wash fruits and vegetables with only water before eating and who eat restaurant food once to forth time or more monthly are considered under high risk of IPI. Therefore, there is a need for creating awareness regarding the importance of prevention against the intestinal parasitic infection, improving information about hygiene and food health principles.

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