

Knowledge Regarding Ringworm Among the Peoples of Gazaria, Mushiganj

ABSTRACT:

Background: Ringworm (tinea) is a contagious superficial fungal infection caused by dermatophytes, characterized by characteristic ring-shaped lesions and pruritus. The World Health Organization estimates that dermatophytes affect 20–25% of the global population. Despite its high prevalence, public knowledge regarding its transmission and prevention remains variable.

Objective: To assess the level of knowledge regarding ringworm among residents of Gazaria Upazila in the Munshiganj District of Bangladesh.

Methods: A cross-sectional survey was conducted among 165 participants in Gazaria Upazila. Data were collected using a structured, self-administered questionnaire divided into two sections: sociodemographic characteristics and ringworm-related knowledge (transmission, symptoms, and prevention). Statistical analyses were performed using IBM SPSS Statistics version 20.0.

Results: Overall, participants demonstrated high awareness regarding the communicable nature of ringworm: 81.8% recognized it as an infectious condition, 83.6% understood person-to-person transmission, and 79.4% identified direct contact as a route of spread. Sharing personal belongings and clothing was widely acknowledged as a transmission risk (89.1%), while 56.4% identified zoonotic spread from domestic animals. Common clinical features identified included pruritus (84.2%), nail discoloration and thickening (52.7%), hair involvement (51.5%), and an association with sweating (68.5%) or seasonality (53.3%). Regarding management, 87.9% identified avoiding the sharing of personal items as an effective preventive measure, and 89.1% recognized antifungal therapy as the primary treatment.

Conclusion: Although baseline awareness of ringworm transmission and hygiene measures was notably high among respondents, gaps remain concerning zoonotic risks and specific non-cutaneous manifestations. Targeted public health interventions

are needed to address these knowledge gaps, encouraging early clinical presentation and rational antifungal use.

Keywords: Ringworm, Dermatophytosis, Health knowledge, Public health, Munshiganj, Bangladesh

1. INTRODUCTION

1.1. Background

A contagious fungal infection caused by common mold-like parasites that live on the cells in the outer layer of skin is called ringworm. It is known as a "ringworm" because it can result in a ring-shaped rash that is often itchy and red ^[1]. Ringworm, also known as '*Tinea corporis*', is a superficial infection of the skin caused by dermatophytes ^[2]. Fungi called dermatophytes infect keratinized tissues like skin, hair, and nails by invading and growing there ^[3].

Dermatophytes can be divided into three groups based on their genera:

- **Trichophyton:** which causes infections of the skin, hair, and nails.
- **Epidermophyton:** which affects the skin and nails.
- **Microsporum:** which causes infections of the skin and hair.

These have been categorized as anthropophilic, zoophilic, and geophilic based on the mode of transmission: *Tinea capitis* (head), *tinea faciei* (face), *tinea barbae* (beard), *tinea corporis* (body), *tinea manus* (hand), *tinea cruris* (groin), *tinea pedis* (foot), and *tinea unguium* (nail) have all been clinically diagnosed based on the affected place. *Tinea imbricata*, *tinea pseudoimbricata*, and Majocchi granuloma are other clinical variations ^[4].



Figure-1: Ringworm on different places of the body

According to Ayurveda, ringworm is termed as **Dadru**. In Ayurveda, all the skin diseases have been classified under the broad heading of “**Kushtha**”, which are further categorized into **Mahakushtha** and **Kshudrakushtha**.

Acharya Sushruta mentioned **Dadru Kushtha** in **Mahakushtha**, whereas Acharya Charaka mentioned **Dadru** in **Kshudrakushtha** [5].

According to most Ayurvedic texts, all types of **Kushtha** have been considered as **Rakta Doshaja Vikara**. Dadru is one of the **Kapha-Pitta Pradhana Twak Vikara** [6].

Acharyas did not explain a separate **Nidana (cause)** for Dadru Kushtha. However, Dadru Kushtha spreads from person to person by **Malaja Krimi** through **Sweda** (contact with an infected person, contact with clothes of an infected person, etc.) [7].

Sharing towels, bed sheets, soap, handkerchiefs, etc. with an infected person can cause the spread of microorganisms from one person to another [8].

It is referred to as **ringworm** because of its annular lesions. It presents as one or more lesions with inflammatory edges and ring-like shapes. Additionally, reported symptoms include itching, blisters, redness, and scaling at the edges [9]. This infection affects both healthy and immunocompromised patients [10]. Despite not being a life-threatening fungal infection, dermatophytes pose a serious hazard to public health because of their high morbidity and cosmetic harm [11]. Their geographic distribution varies significantly [12]. The varying frequency results from various factors, including the environment, way of life, participation in outdoor activities, and pre-existing comorbidities (such as diabetes mellitus, hypothyroidism, malnutrition, etc.) [12–13].

There are certain typical characteristics of dermatophyte infections. They can occasionally be confused with other skin conditions [11]. A **tinea corporis** eruption that presents as more papulosquamous could be mistaken for psoriasis, nummular eczema, seborrheic dermatitis, or pityriasis rosea [15].

The crural region may also be infected by other dermatophytes with clinical characteristics of **tinea cruris** [16]. Male young adults and adolescents are most commonly affected with tinea cruris in the upper thigh region next to the scrotum [17]. Tinea cruris is characterized by a pruritic, erythematous rash with an active, palpable, scaly margin, where pustules or vesicles may be seen. Annular patches of various sizes are the result of the infection's centrifugal spread [18].

Tinea cruris may be confused with inverse psoriasis, seborrheic dermatitis, candidiasis, erythrasma, lichen simplex chronicus, Darier's disease, and pemphigus vegetans [19]. In contrast to tinea cruris, which typically affects men, vaginal candidiasis frequently affects women. Candida satellite lesions and white pustules can be observed, whereas dermatophytes cannot [20].

Therefore, the identification of dermatophyte infections requires prompt and methodical laboratory diagnosis to avoid misdiagnosis [14, 20]. Identification of dermatophyte infections phenotypically requires mycological light microscopy and fungal culture [21]. Microscopic examination is a simple, quick, and affordable diagnostic technique, although it can occasionally produce false-negative results (up to 15% of the time) [15].

Although culture techniques are precise diagnostic tests for dermatophyte identification, the development of fungi needs around 4 weeks to develop in a culture of a given species [21]. For dermatophyte identification, molecular methods have been developed to offer more precise alternatives [22]. For the purpose of conclusively identifying a fungal strain, ITS-targeted sequencing techniques are the most often utilized approach. To provide effective treatment for dermatophytosis, the precision of diagnostic techniques is crucial [22, 23].

Some studies have investigated the etiology of cutaneous fungal infections in the developing world, and, consequently, there is less knowledge of any changes to their epidemiology. Knowledge of ringworm provides a clearer understanding of future epidemiologic trends, hazards to public health, and cosmetic harm [24].

Like many other areas of the country, there is no research done on dermatophyte infections in Gazaria, Munshiganj. Therefore, this research was conducted to determine the knowledge regarding ringworm infection in the region.

1.2. Rationale of the study

Ringworm is an itchy, contagious fungal infection that causes a ring-shaped pattern on the skin. It is one of the major superficial fungal infections. It is a universal concern, with increasing prevalence in the developing world, especially in tropical countries. Despite its high prevalence, there is a lack of knowledge among people. Hence, the lack of knowledge makes it a significant public health problem in the developing world, with a disproportionate burden among children living in poor,

overcrowded tropical areas. It also poses a serious hazard to public health because of its high morbidity and cosmetic harm.

There are very few previous studies on ringworm in the population of our country, and there is no previous similar study in Gazaria, Munshiganj. Through this study, people in the selected area will be able to learn about this disease, including its signs and symptoms, transmission, prevention, treatment, etc. Additionally, this study may help lower the risk of this disease and mitigate this serious health problem.

1.3. RESEARCH QUESTION

What is the level of knowledge regarding ringworm among the people of Gazaria, Munshiganj?

1.4. OBJECTIVES:

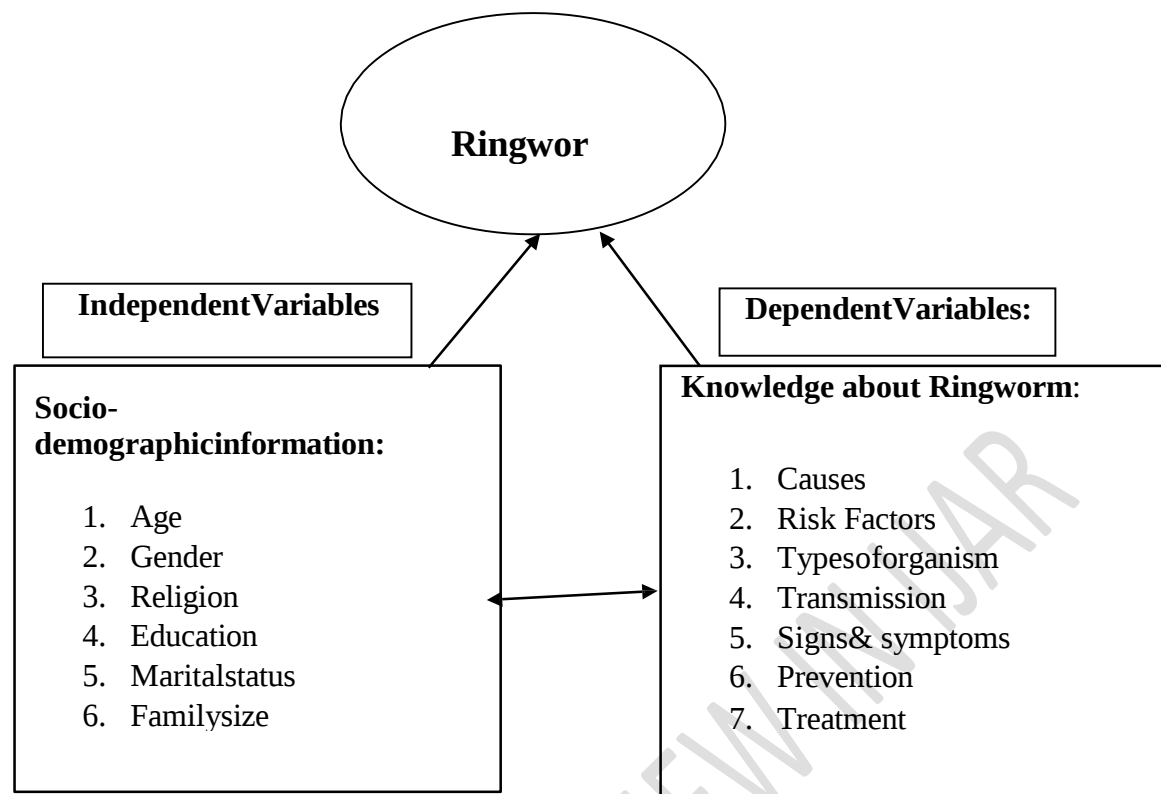
1.4.1. General Objectives:

To find out the knowledge level regarding ringworm among the peoples of Gazaria, Munshiganj.

1.4.2. Specific objectives:

- To find out the knowledge level about ringworm (mode of transmission, sign & symptoms of ringworm, preventive and curative measures of ringworm).
- To identify the socio-demographic data of the respondents.

1.5. CONCEPTUAL FRAMEWORK:



2.0. LITERATURES REVIEW

A descriptive study on Influence of Community Exposure to Tinea Corporis on Knowledge and Prevention Practices among 422 respondents was conducted by Ogombo et al. in 2022 at Teso South Sub-County, Kenya. The data was analyzed using both descriptive and inferential statistics on SPSS version 23 software. The major findings of the study were 60% exposure to Tinea Corporis among the study participants; 58.4% (n=233) had poor knowledge of the disease and 68.9% (n=275) had good practice towards prevention of the disease ^[25].

A cross-sectional study on Risk Factors on Dermatophytes Infections on Patients Knowledge, Attitude and Hygiene Practice among 400 Patients conducted by Boualem Belmiloud, Hayati Kadir Shahr et al. in 2022 in Setif Province, Algeria. The major findings of the results revealed that 49% of respondents had good knowledge on dermatophyte infection ^[26].

A cross-sectional study on knowledge, attitude and behaviour of patient towards dermatophytosis and importance of maintaining personal hygiene among 100 patients conducted by Sivaramakrishnan Sangaiah S., Arun Karthikeyan S. et al. in 2021 at Chennai, India. The major findings of the results of the study were 45% of patients have knowledge about the spread of fungal infection from person to person and 91% and

96% of patients had no knowledge about the spread of infection through sharing clothes and collectively washing clothes of other family members ^[27].

A cross-sectional study on Isolation and Identification of Dermatophytes Causing Dermatophytosis among 246 samples conducted by Samia Afreen Khan, SM Shamsuzzaman et al. in 2021 at a Tertiary Care Hospital in Bangladesh. The results showed that 92 (37.40%) yielded presence of dermatophytes ^[28]. The present study will assess the knowledge regarding ringworm among the peoples of Gazaria, Munshiganj.

A cross-sectional study on **Dermatophytosis: An Epidemiological Study** was conducted by Shazia Bano, Kousar Parveen, et al. in 2021 at a tertiary care center in rural Sindh, Pakistan. The results showed that out of 93 suspected cases, 84 (90.3%) samples were positive for fungal infection, and among them, 68 (73.1%) cases showed positive fungal growth [29].

3.0. MATERIALS AND METHODS

3.1. Study Design and Setting

This community-based descriptive cross-sectional study was conducted in Gazaria Upazila of Munshiganj District, Bangladesh, over a four-month period from January to April 2023.

3.2. Study Population and Eligibility Criteria

The target population comprised adult residents of Gazaria Upazila.

- **Inclusion Criteria:** Adult men and women aged 20 to 60 years who provided informed consent.
- **Exclusion Criteria:** Individuals with severe physical or cognitive impairments that precluded participation, and those who declined to participate.

3.3. Sample Size Determination and Sampling Technique

The sample size was estimated using Cochran's formula:

$$n = \frac{Z^2 \cdot p \cdot q}{d^2}$$

Assuming a standard normal deviation (Z) of 1.96 at a 95% confidence interval, an expected population knowledge proportion (p) of 50% (0.50), $q = 1 - p = 0.50$, and an acceptable margin of error (d) of 0.076, the required minimum sample size was determined to be 165 participants. A convenience sampling strategy was used to enroll responsive and accessible community members who met the inclusion criteria.

3.4. Operational Definitions

- Ringworm (Dermatophytosis): A contagious, superficial fungal infection of keratinized tissue (skin, hair, nails) characterized by erythematous, pruritic, annular, or ring-shaped lesions.
- Knowledge: The cognitive awareness and understanding of etiology, clinical manifestations, transmission routes, preventive practices, and medical treatment of ringworms.

3.5. Data Collection Instrument and Procedure

Data were gathered via face-to-face interviews using a pre-tested, semi-structured questionnaire. The tool consisted of two main sections:

1. Sociodemographic characteristics (e.g., age, sex, occupation, education).
2. Assessment of knowledge concerning ringworm etiology, symptom recognition, transmission vectors, and control measures.

The questionnaire was initially pilot-tested on a representative subset outside the final cohort to ensure content validity, clarity, and cultural relevance. Collected forms were visually inspected daily for completeness, accuracy, and internal consistency prior to data entry.

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208 **3.6. Data Management and Statistical Analysis**

209 Data was coded, cleaned, and entered into IBM SPSS Statistics version 20.0 (IBM
210 Corp., Armonk, NY, USA). Descriptive statistics were used to summarize variables:
211 continuous variables were presented as means with standard deviations, while
212 categorical variables were expressed as frequencies and percentages. Tabular and
213 graphical representations were generated to display key response distributions.

214 **3.7. Ethical Considerations**

215 Ethical approval was granted by the Hamdard University Bangladesh Review Ethical
216 Committee (HUBREC). The study complied with the principles of the Declaration of
217 Helsinki:

- 218 • Informed Consent: Both verbal and written informed consent were obtained
219 from every participant prior to questionnaire administration. The consent
220 form provided in clear, local Bengali detailed the study title, objectives,
221 procedures, voluntary nature, and absent clinical risks.
- 222 • Autonomy and Withdrawal: Participants were informed that participation was
223 entirely voluntary, with the right to decline answering specific questions or
224 withdraw at any stage without consequence.
- 225 • Confidentiality and Data Protection: Identifiable personal information was
226 anonymized using unique identification codes. All electronic records were
227 password-protected and accessible exclusively to the principal investigator and
228 the institutional review board for auditing purposes.

229 **3.8. Funding**

230 This research was self-funded by the authors; no external financial support was
231 received.

232 **3.9. Ethical Oversight and Informed Consent**

Prior to enrollment, written informed consent was obtained from all participants. A standardized consent document detailing the study title, objectives, procedures, voluntary nature, and absence of physical risks was prepared and explained in plain, accessible local Bengali. Participants were explicitly informed of their autonomy to accept or decline participation without consequence. The consent forms were formally signed by both the participant and the principal investigator before data collection commenced.

3.10. Confidentiality and Data Protection

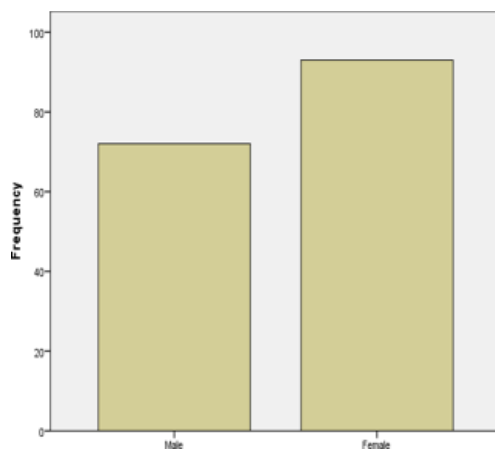
Participant confidentiality was strictly maintained throughout all phases of the study. Individual responses were de-identified and assigned unique alphanumeric codes to ensure that personal identifying information could not be linked to the analytical datasets or published findings. Primary records were securely archived under the direct custody of the principal investigator, with access restricted solely to authorized research personnel, institutional regulatory bodies, and the ethical review committee.

4.0. RESULTS AND DISCUSSION

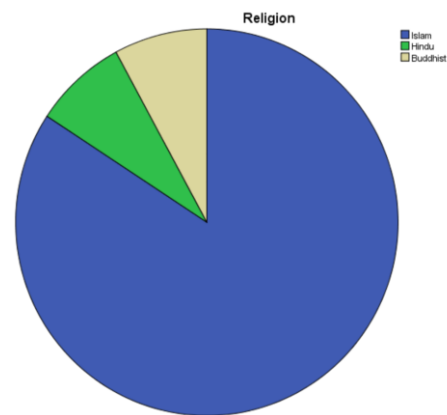
4.1. Socio-demographic Characteristics of the Respondents

A total of 165 respondents were included in the study. More than half of the respondents (53.9%) were aged 20–25 years, while 40.6% were aged 26–31 years. The mean age was 22.37 ± 1.99 years, with an age range of 20–30 years. Female respondents comprised 56.4% of the study population, whereas 43.6% were male. The majority of respondents were Muslim (84.2%), followed by Hindu (7.9%) and Buddhist (7.9%). Most respondents had attained Honours-level education or higher (92.7%), while 5.5% had completed Higher Secondary Certificate (HSC) education and 1.8% had primary-level education. Regarding marital status, 88.5% of respondents were single, 10.9% were married, and 0.6% were divorced or separated. Most respondents (91.5%) belonged to families with 2–6 members, whereas 8.5% had 7–11 family members. Nearly all respondents (97.0%) reported a monthly family income of Tk 10,000–100,000, while 1.8% and 1.2% reported monthly incomes of Tk 110,000–200,000 and Tk 310,000–400,000, respectively. With respect to living arrangements,

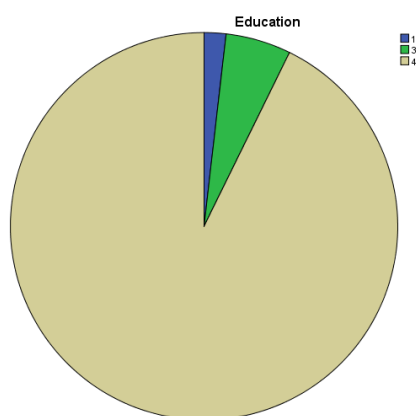
262 three-quarters of the respondents (75.2%) resided in hostels, followed by apartments
 263 (9.1%), tin-shed houses (7.3%), rented houses (6.1%), and high-rise buildings (2.4%).



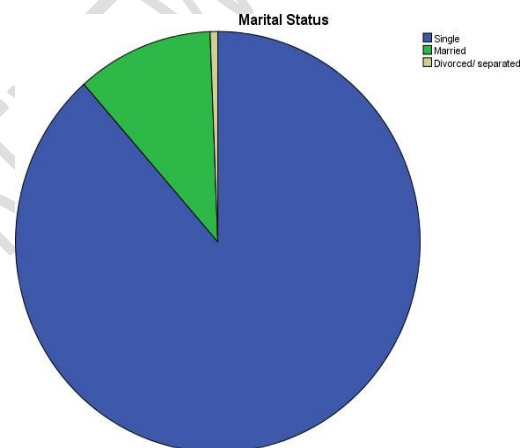
Graph 4.1: Distribution of respondents according to sex



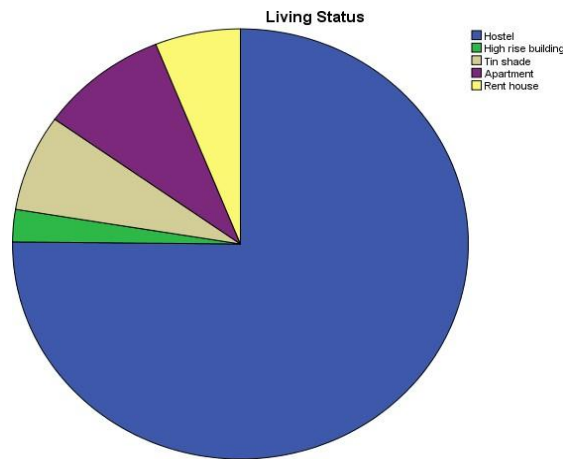
Graph 4.2. Distribution of respondents according to religion



Graph 4.3. Distribution of respondents according to Education Status



Graph 4.4: Distribution of respondent according to marital status



Graph 4.5.
Distribution of respondents according to living status

4.2. Knowledge Regarding Ringworm Among the Respondents

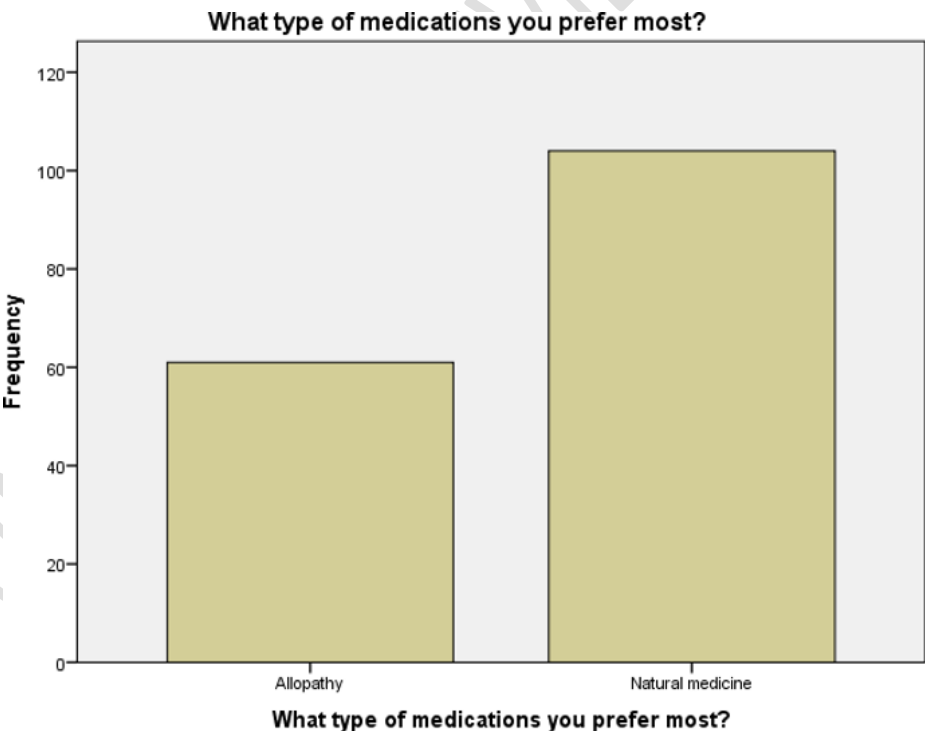
The majority of respondents (91.5%) heard about ringworm, while 8.5% had no prior knowledge of the disease. More than half of the respondents (55.2%) reported that they had never experienced ringworms, whereas 44.8% had a previous history of infection. Most respondents (81.8%) correctly identified ringworm as an infectious disease, and 83.6% recognized that it is caused by a fungus, while 16.4% incorrectly identified worms as the causative organism. Furthermore, 84.8% reported that immune-compromised individuals are more susceptible to ringworm than healthy individuals (15.2%).

Regarding the mode of transmission, 83.6% of respondents knew that ringworm can spread from person to person, and 56.4% were aware that infection can also be transmitted from pet animals. The majority (79.4%) identified contact as the primary mode of transmission, although this response also included blood transfer, while 20.6% incorrectly believed that ringworm is genetically transmitted. In addition, 89.1% recognized that sharing clothes and personal items with infected individuals can facilitate transmission, and 78.8% believed that collectively soaking and washing the clothes of all family members increases the risk of infection.

Knowledge regarding the clinical characteristics of ringworm was generally satisfactory. More than three-quarters of the respondents (77.6%) were aware of the possible body sites affected by ringworm. Slightly more than half (53.3%) recognized

that ringworm shows seasonal variation, while 68.5% were aware of the association between excessive sweating and the occurrence of ringworm. Similarly, 58.8% believed that certain occupations increase the risk of infection. Approximately half of the respondents knew that ringworms can affect the hair (51.5%) and that nail discoloration and thickening may be manifestations of the disease (52.7%). Most respondents (84.2%) correctly identified itchy skin as the characteristic symptom of ringworm, whereas 15.8% incorrectly considered blood poisoning to be a symptom.

Regarding prevention and treatment, the majority of respondents (87.9%) correctly identified avoiding the sharing of towels and other personal items with infected individuals as an effective preventive measure. Most respondents (89.1%) recognized antifungal medications as the appropriate treatment for ringworm, while only 10.9% incorrectly selected antibacterial medications. Despite this knowledge, natural medicine was the most preferred treatment option among respondents (63.0%), whereas 37.0% preferred allopathic medicine.



Graph 4.6. Distribution of respondents according to most preferred medications

4.3. DISCUSSION

A cross-sectional study on **Dermatophytosis: An Epidemiological Study** was conducted by Shazia Bano, Kousar Parveen, et al. in 2021 at a tertiary care center in rural Sindh, Pakistan. The results showed that out of 93 suspected cases, 84 (90.3%) samples were positive for fungal infection, and among them, 68 (73.1%) cases showed positive fungal growth [29].

The present study aims to determine the level of knowledge regarding ringworm among the people of Gazaria, Munshiganj.

Family members increase the risk of getting infected (78.8%), and 77.6% of respondents had knowledge of the possible sites of ringworm infection.

In a study conducted by Sivaramakrishnan S. et al., it was reported that 45% of patients had knowledge about the spread of fungal infection from person to person, while 91% and 96% of patients had no knowledge about the spread of infection through sharing clothes and collecting clothes of other family members, respectively [29].

The findings also revealed that 53.3% of respondents had knowledge about the seasonal occurrence of ringworm, while 68.5% of respondents correctly reported an association between sweating and ringworm. In another study conducted by D'Souza, it was reported that 155 (62%) of patients knew that increased sweating is a risk factor for dermatophytosis [30].

Out of 165 respondents, 58.8% reported that certain occupations increase the risk of ringworm. These findings are not in accordance with the study conducted by Sivaramakrishnan S. et al. [27].

About 51.5% of respondents knew that ringworm can affect the hair. Furthermore, 52.7% knew that discoloration and thickening of the nails are signs of ringworm, while 84.2% identified itchy skin as a symptom. Also, 87.9% of respondents had knowledge that.

A total of 87.9% of respondents knew that avoiding sharing towels and other personal items with infected people is a preventive measure against ringworm. Furthermore, 89.1% had knowledge that ringworm can be treated with antifungal medicines, while 63.0% mostly preferred natural medicine.

In another study conducted by Ogombo, C. M. et al., it was reported that good knowledge was recorded regarding the signs and symptoms and the transmission of the disease [25].

5.0 CONCLUSION

Though the respondents demonstrate good knowledge about the type of organism, mode of spread, sign and symptoms of ringworm, most of them fail to implement the knowledge in maintaining personal hygiene practices. Successful management of ringworms has increasingly become challenging due to changing epidemiological

factors and the emergence of drug resistance. Proper knowledge, hygiene practice, early diagnosis and proper treatment help to achieve successful fungal cure. The findings from this present study will play an important role for policy makers to develop policy for increasing awareness among the peoples. This, in turn, will lead to early diagnosis and treatment of Ringworm, which can improve the quality of life for affected people.

6.0. RECOMMENDATION

Based on the study, it is recommended that:

- To increase mass media publicity (radio, television, newspaper) regarding skin disease (causative factors, preventive measure, awareness related information).
- Skin diseases such as ringworms need to be incorporated into textbooks.
- Awareness raising campaign should be conducted among the students at school, college and university.
- Social media (Facebook, Instagram, Twitter etc.) also play a vital role for publishing positive information.

7.0. LIMITATIONS

- This study was carried out mostly by students, which is perhaps not the true representation of all people of Gazaria, Munshiganj.
- Time and resources were limited.
- Single centered study.

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