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RESEARCH ARTICLE

KNOWLEDGE REGARDING RINGWORM AMONG THE PEOPLES OF GAZARIA, MUSHIGANJ

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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%).

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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.

Introduction:-

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 on the skin, hair, and nails.

Epidermophyton: which affects the skin and nails.

Microsporum: which causes infections on 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 1.1. Tinea capitis



Figure 1.2. Tinea corporis



Figure 1.3. Tinea pedis

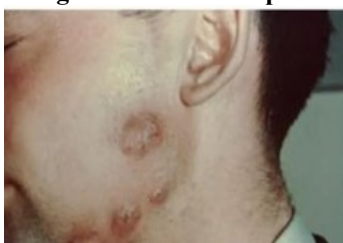


Figure 1.4. Tinea barbae



Figure 1.5. Tinea manuum



Figure 1.6. Tinea unguium

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 maha kushtha & kshudra kushtha. Acharya Shushruta mentioned dadru kushtha in maha kushtha and Acharya Charaka mentioned dadru in kshudra kushtha ^[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 separate nidana (cause) for dadru kushtha. But dadru kushtha spread from person to person by malaja krimi through sweda (contact with infected person, contact with clothes of infected person etc. ^[7]. Due to sharing of towels, bed sheets, soap, handkerchief etc. of infected person causes the spreading of micro-organism from one person to another person ^[8].

It is referred to as ring worm as an annular lesion. It takes one or more lesions with inflammatory edges and ring-like shapes. Additionally, reportable symptoms are itching and blisters, redness, and scaling edges ^[9]. This infection affects both healthy and immune-compromised patients ^[10]. Despite not being a life-threatening fungus, 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 co-morbidities (such as diabetes mellitus, hypothyroidism, malnutrition, etc.)^[12-13]. There are certain typical characteristics of dermatophyte infections. It can occasionally be confused with other skin conditions^[11]. A tinea corporis eruption that presents as more papulo-squamous 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 typically characterized by a pruritic, erythematous rash with an active, palpable, scaly border, which may occasionally be accompanied by pustules or vesicles. The infection commonly produces annular lesions of varying sizes due to its centrifugal pattern of spread^[18]. Clinically, tinea cruris may be confused with several other dermatological conditions, including inverse psoriasis, seborrheic dermatitis, candidiasis, erythrasma, lichen simplex chronicus, Darier's disease, and pemphigus vegetans^[19]. Unlike tinea cruris, which predominantly affects men, vaginal candidiasis is more frequently observed in women. Candidal infections may also present with characteristic satellite lesions and white pustules, features that are generally absent in dermatophyte infections^[20].

Therefore, prompt and systematic laboratory diagnosis is essential for the accurate identification of dermatophyte infections and to minimize the risk of misdiagnosis^[14,20]. Conventional phenotypic identification of dermatophytes primarily relies on direct mycological microscopy and fungal culture^[21]. Microscopic examination is a simple, rapid, and cost-effective diagnostic method; however, it may yield false-negative results in up to 15% of cases^[15]. Although fungal culture is considered a reliable method for identifying dermatophytes, fungal growth and species identification may require approximately four weeks^[21]. To overcome the limitations of conventional diagnostic approaches, molecular techniques have been developed as more precise alternatives for dermatophyte identification^[22]. Among these, internal transcribed spacer (ITS)-targeted sequencing is one of the most commonly used molecular approaches for definitive identification of fungal strains. Accurate and timely diagnostic methods are therefore essential for ensuring appropriate and effective treatment of dermatophytosis^[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 the ringworm provides a clearer understanding of future epidemiologic trends, hazard 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. So, this research was conducted to determine the knowledge regarding ringworm infection in the region.

Rationale of the study:-

Ringworm is a common, itchy, and contagious superficial fungal infection of the skin, typically characterized by circular or ring-shaped lesions. It represents one of the most prevalent superficial fungal infections worldwide and remains an important public health concern, particularly in developing countries and tropical regions where warm and humid climatic conditions favor fungal transmission and growth.

Despite its high prevalence, public awareness and knowledge regarding ringworm remain inadequate in many communities. This lack of knowledge may contribute to delayed diagnosis, inappropriate treatment, and continued transmission, making ringworm a significant public health problem in developing countries. The disease disproportionately affects children living in low-income and overcrowded communities in tropical areas. Although it is rarely life-threatening, ringworm can cause considerable morbidity, persistent discomfort, and cosmetic problems, which may adversely affect the quality of life of affected individuals.

There are limited studies investigating the prevalence and awareness of ringworm among the population of Bangladesh, and, to the best of our knowledge, no similar study has previously been conducted in Gazaria, Munshiganj. Therefore, this study aims to assess knowledge and awareness of ringworm among the selected population, including its signs and symptoms, modes of transmission, preventive measures, and treatment options. The findings may help improve community awareness, promote early recognition and appropriate management, reduce transmission, and ultimately contribute to addressing this important public health problem.

Research Question:-

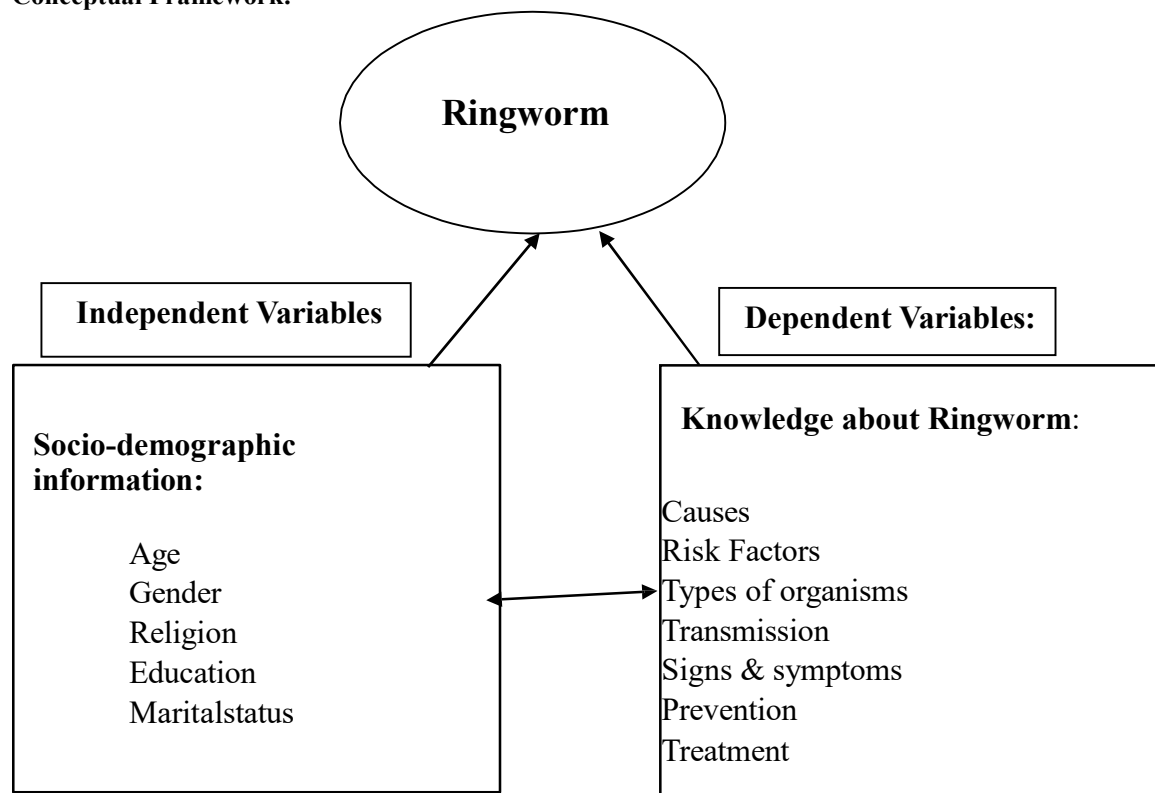
What is the level of knowledge regarding ringworm among the peoples of Gazaria, Munshiganj?

Objectives:-**General Objectives:-**

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

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.

Conceptual Framework:-**Literature 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 were analysed 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 crosssectional study on Risk Factors on Dermatophytes Infectionson Patients Knowledge, and hygiene practices among 400 Patients conducted by Boualem Belmiloud, Hayati Kadir Shahr et al. in 2022 in Sétif Province, Algeria. The major findings of the results revealed that 49% of respondents had good knowledge of dermatophyte infection ^[26].

A cross-sectional study on knowledge, attitude and behaviour of patients towards dermatophytosis and the importance of maintaining personal hygiene among 100 patients was conducted by Sivaramakrishnan Sangaiah S., Arun Karthikeyan S. et al. in 2021 in Chennai, India. The major findings of the results of this study were that 45% of patients had 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 was 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%) showed the presence of dermatophytes ^[28]. The present study aimed to assess the knowledge regarding ringworm among the people of Gazaria, Munshiganj.

A cross-sectional study on dermatophytosis: An Epidemiological Study conducted by Shazia Bano, Kousar Parveen et al. in 2021 at a Tertiary Care Centre in Rural Sindh in Pakistan. The results showed that out of 93 suspects, 84(90.3%) samples were positive for fungal infection, and among them, 68 (73.1%) cases gave positive growth ^[29]. The present study aimed to assess knowledge regarding ringworm among the people of Gazaria, Munshiganj.

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 four months from January to April 2023.

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.

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.

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 ringworm.

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 aetiology, 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.

Data Management and Statistical Analysis:-

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

Ethical Considerations:-

Ethical approval was granted by the Hamdard University Bangladesh Review Ethical Committee (HUBREC).

The study complied with the principles of the Declaration of Helsinki:-

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

Funding:-

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

Ethical Oversight and Informed Consent:-

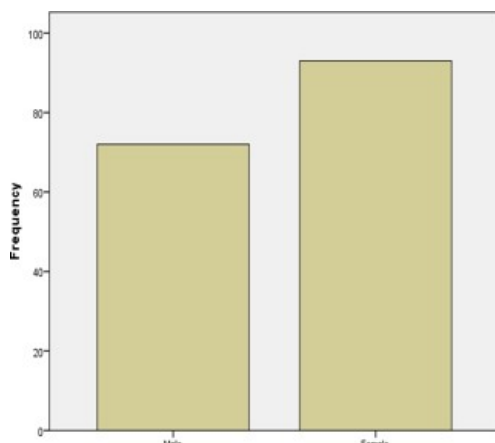
Prior to enrollment, written informed consent was obtained from all participants. A standardized consent document detailing the study title, objectives, procedures, voluntary nature, and absence of physical risks was prepared and explained in plain, accessible local Bengali. Participants were explicitly 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.

Confidentiality and Data Protection:-

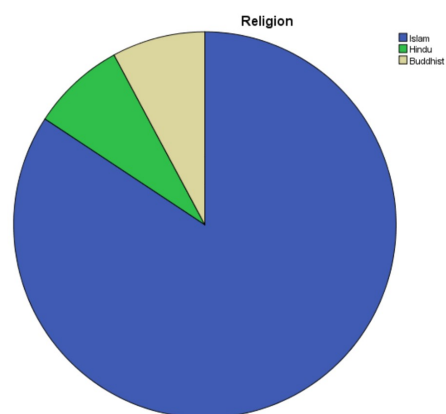
Participant confidentiality was strictly maintained throughout all phases of the study. Individual responses were de-identified and assigned unique alphanumeric codes to ensure that personal identifying information could not be linked to the analytical datasets or published findings. Primary records 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.

Results and Discussion:-**Socio-demographic Characteristics of the Respondents:-**

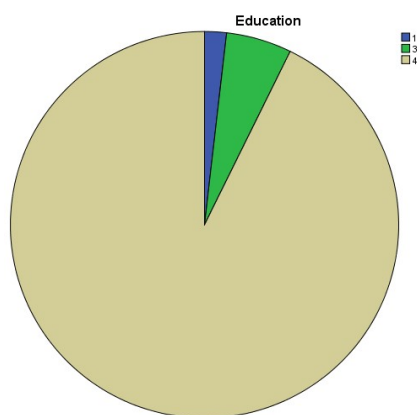
A total of 165 respondents were included in the study. More than half of the respondents (53.9%) were aged 20–25 years, while 40.6% were aged 26–31 years. The mean age was 22.37 ± 1.99 years, with an age range of 20–30 years. Female respondents comprised 56.4% of the study population, whereas 43.6% were 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, three-quarters of the respondents (75.2%) resided in hostels, followed by apartments (9.1%), tin-shed houses (7.3%), rented houses (6.1%), and high-rise buildings (2.4%).



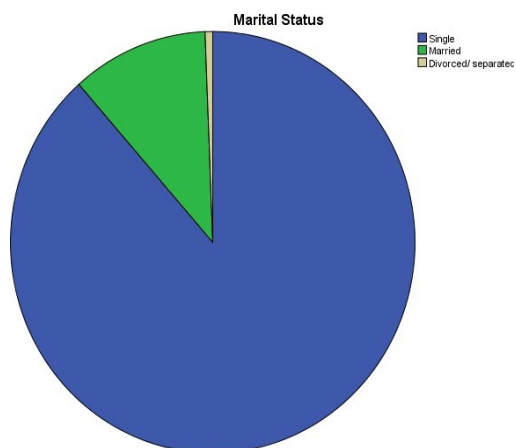
Graph 4.1: Distribution of respondents according to sex



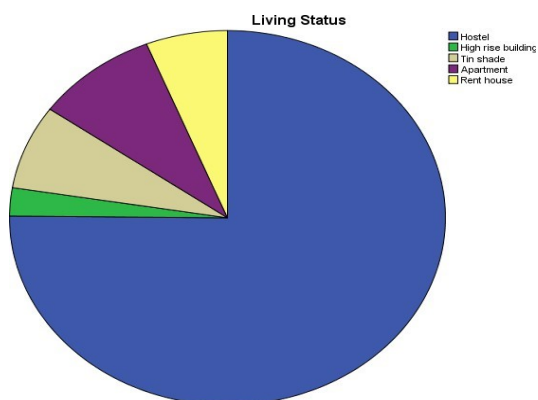
Graph 4.2: Distribution of respondents according to religion



Graph 4.3: Distribution of respondents according to Education Status



Graph 4.4: Distribution of respondents according to marital status



Graph 4.5: Distribution of respondents according to living status

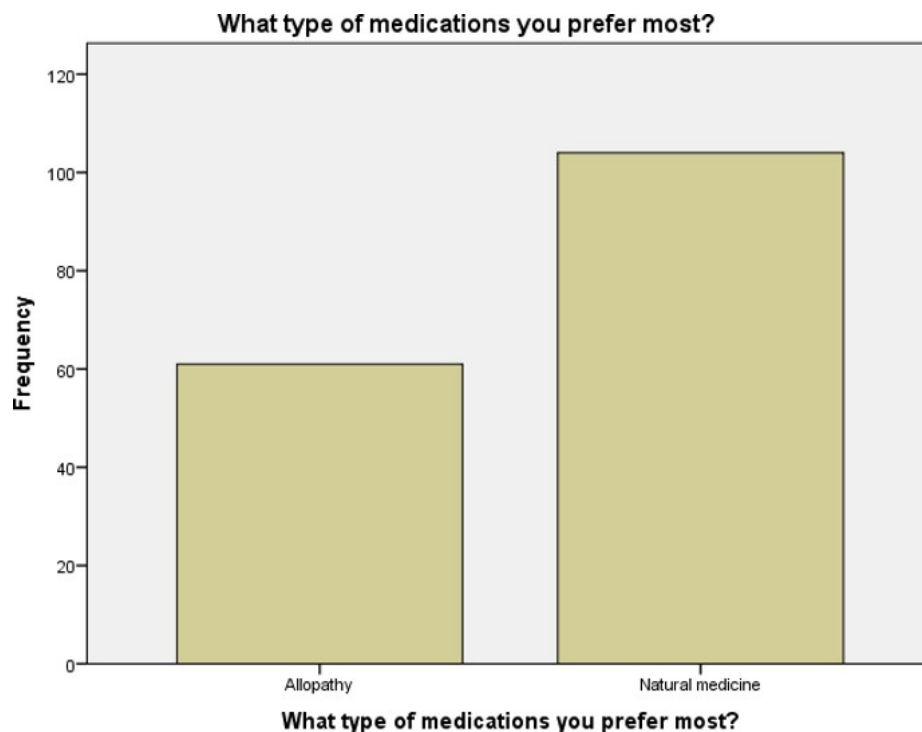
Knowledge Regarding Ringworm Among the Respondents: -

The majority of respondents (91.5%) had 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 ringworm, 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 could 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 ringworm can affect the hair (51.5%) and that nail discolouration 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

Discussion:-

According to this study, regarding the knowledge about ringworm, 68.5% of respondents had very good knowledge about ringworm. 91.5% of the respondents had heard about ringworm, and 81.8% knew the type of ringworm disease as an infectious disease. Besides this, 83.6% knew that fungus is the causative organism of ringworm, and 84.8% responded that immunocompromised people are most affected. 83.6% of respondents knew that ringworm spreads from person to person & anyone can get affected from pet animals (56.4%), and 79.4% responded that ringworm spreads through Contacts/blood transfer. 89.1% knew that sharing of clothes & objects spreads it; collectively, soaking and washing of clothes of all family members increase the risk of getting infected (78.8%), and they also had knowledge of possible sites of ringworm infection (77.6%). In a study conducted by Sivaramakrishnan S et al. reported that 45% of patients had knowledge about the spread of fungal infection from person to person, and 91% and 96% of patients did not know about the spread of infection through sharing clothes and collecting clothes of other family members ^[29]. Findings also revealed that 53.3% of respondents had knowledge about the seasonal occurrence of ringworm, and 68.5% of respondents reported correctly about the association between sweating and ringworm. In another study conducted by Dsouza reported that, 155 (62%) of patients knew that increased sweating is a risk factor for dermatophytosis. ^[30]

Out of 165 respondents, 58.8% of respondents reported that certain occupations increase the risk of ringworm. These findings are not in accordance with a study conducted by Sivaramakrishnan S et al. ^[27]. About 51.5% of respondents knew that ringworm affects hair, discoloration & thickening of nails are signs of ringworm 52.7%); itchy skin is a symptom 84.2%. Also, 87.9% of respondents knew that avoiding sharing towels and other personal items with infected people is a preventive measure for ringworm; 89.1% had knowledge about the treatment of ringworm as antifungal medicines, as well as 63.0% preferred Natural medicine mostly. In another study conducted by Ogombo, C.M et al. reported that good knowledge was recorded on the signs and symptoms and on the transmission of the disease ^[25].

Conclusion:-

Though the respondents demonstrate good knowledge about the type of organism, mode of spread, signs and symptoms of ringworm, most of them fail to implement the knowledge in maintaining personal hygiene practices. Successful management of ringworm has increasingly become challenging due to changing epidemiological factors and the emergence of drug resistance. Proper knowledge, hygiene practices, early diagnosis and proper treatment help to achieve successful fungal cure. The findings from this present study will play an important role for policymakers to develop policy for increasing awareness among the people. This, in turn, will lead to early diagnosis and treatment of Ringworm, which can improve the quality of life for affected people.

Recommendation:-

Based on the study, it is recommended that:-

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

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-centre study.

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