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Reproductive tract infections among geriatric population in a block of West Bengal: knowledge and risk behaviour assessment

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ABSTRACT

Reproductive tract infections (RTIs) among the geriatric population remains neglected, causing increase in morbidity. This study aimed to elicit knowledge, identify risk behaviour for RTIs among the elderly residing in a block of West Bengal, to determine any associations between sociodemographic profile with knowledge and risk behaviour respectively, and to assess any correlation between knowledge and risk behaviour. A community-based study was conducted using multistage sampling, among 158 geriatric residents of a rural block in West Bengal, India for a period of 3 months in 2023. Face-to-face interviews were carried out using an interview schedule. Overall median scores were calculated separately for knowledge and risk behaviour domains. Score < median score was categorized as 'inadequate knowledge' and score ≥ median was classified as 'high risk' behaviour. Nearly 30% reportedly had 'inadequate knowledge' while 77% had 'high risk' behavior for RTIs. Higher odds of inadequate knowledge and high-risk behavior were observed among those who were employed and those who availed of any social security scheme(s). Moderately positive correlation was obtained between knowledge and risk behavior.

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1. INTRODUCTION

Reproductive tract infections (RTIs) are conditions affecting the genital tract in both men and women across all age groups. While some RTIs are transmitted sexually, others arise from poor hygiene practices or unsafe medical procedures [1]. According to WHO estimates, there were 374 million new infections globally in 2020, including 129 million cases of chlamydia, 82 million of gonorrhoea, 7.1 million of syphilis, and 156 million of trichomoniasis [1], [2]. Community-based studies further suggest that approximately 30–35 million new RTI cases occur annually [2]. In India, around 40% of women are affected by RTIs at any given time, yet only about 1% complete the full course of treatment for both partners [3], [4].

In women, the excessive growth of endogenous microorganisms normally present in the vagina can lead to RTIs, such as yeast infections and bacterial vaginosis [5]. During transcervical procedures, these endogenous organisms or sexually transmitted pathogens from the cervix may be introduced into the upper genital tract, resulting in severe infections [6]. In the United States, the prevalence of bacterial vaginosis among women is estimated at 29.2%, while nearly 75% of adult women—and occasionally men—experience vulvovaginal candidiasis (VVC) at least once in their lifetime. In the United Kingdom, bacterial vaginosis occurs at twice the rate of VVC and affects approximately one-third of women at least once [7]. A study

conducted in China in 2010 found that although 52.8% of participants (768 subjects) had heard of RTIs, 14.6% (112 subjects) were unaware of its symptoms [8], [9].

Syndromic management, which relies on identifying consistent symptom clusters and recognizable signs, provides effective treatment against the majority or most severe pathogens responsible for a syndrome. This approach is applicable to both women and men [10], [11]. Curable sexually transmitted infections (STIs)—including syphilis, gonorrhea, chlamydia, and trichomoniasis—can cause serious complications in pregnancy, such as premature rupture of membranes, preterm labor, preterm delivery, chorioamnionitis, low birth weight, congenital infections, and even stillbirth or neonatal death. Moreover, recent evidence suggests that bacterial STIs may increase the risk of mother-to-child transmission of human immunodeficiency virus (HIV) [12], [13].

Reproductive tract infections (RTIs) directly affect sexual and reproductive health, contributing to stigmatization, infertility, cancers, and pregnancy-related complications [13]. They represent a substantial disease burden, causing significant suffering among both men and women, including older adults, with serious consequences. Globally, RTIs remain a major health, social, and economic challenge, with their complications ranking among the leading causes of morbidity and mortality, particularly in developing nations. Growing attention has been directed toward RTIs and their management, as infection in one partner increases the likelihood of HIV transmission to the other [14]. In addition, RTIs account for a considerable share of gynecological morbidities in elderly women, which are more prevalent than reproductive or contraceptive morbidities and contribute substantially to overall disease burden [14], [15].

As mentioned earlier, RTIs can affect people of all age groups, including the elderly [16]. In the geriatric age group (≥60 years of age), screening for RTIs is not given much importance, as more emphasis is given primarily on adolescents and those belonging to the reproductive age group. The WHO generally has reported HIV/AIDS rates only up to 49 years of age [17]. Some national health agencies do not provide stratified RTI data beyond 45 years of age, potentially missing important variations in RTI rates within the last three to four decades of life. Many national surveys concentrate mainly on the younger populations; hence, RTIs often go unnoticed in the geriatric people, leaving them undiagnosed and untreated [18]. However, few studies have shown that the incidence of RTIs among the elderly has dramatically increased in recent years, especially among those who are widowed and divorced. It is possible that older individuals have different susceptibility to RTIs than their younger counterparts. Physiological changes can affect the sexual responses of men and women and may inhibit or enhance sexual function as people age [18], [19]. Lack of awareness, inadequate knowledge, and negligence are believed to have led to an increase in the incidence of RTIs among the elderly in all over the world. Diagnosis and treatment of these infections in geriatric patients vary when compared to younger patients and are often difficult due to the absence of specific symptoms and lack of clear clinical history [19].

There is not much information pertaining to various aspects of RTIs in the elderly in India. The knowledge and risk assessment among them is of utmost public health relevance, not only for timely diagnosis and management but also for implementing awareness campaigns and policies for the betterment of the geriatric population [19]. With this background, the current study aimed at assessing the knowledge and risk behaviour regarding RTIs among the geriatric population residing in a rural block of West Bengal.

2. METHOD

Study type, study design, and study setting: This descriptive, community-based cross-sectional study was conducted among the geriatric population residing in the Budge Budge-II block of South 24 Parganas district, West Bengal, India. The study area also serves as the rural field practice site for the Institute of Post Graduate Medical Education and Research (IPGME&R) and Seth Sukhlal Karnani Memorial (SSKM) Hospital, Kolkata.

Study duration and study participants: The study was conducted from May to July, 2023 (approx. 3 months). All geriatric residents (≥60 years of age) of Budge Budge-II block were chosen as study participants. The geriatric residents of Budge Budge-II block, belonging to any gender, and residing in the block for ≥1 year were included, while those who were not present at their homes during data collection, those who were seriously ill, and those who did not give informed written consent to participate in the study were excluded.

Sample size estimation and sampling technique: The sample size was calculated by applying Cochran's formula, which is- $Z^2 \times pq/d^2$ where p (proportion of geriatric population having adequate knowledge of RTIs = 50% or 0.5, since there is dearth of literature stating the adequacy of knowledge of RTIs among the geriatric age-group), q = (1-p), Z (standard normal deviate) = 1.98, d (absolute precision) = 10%. After multiplying with a design effect of 1.5, the sample size became 144. Then, after considering 10% non-response rate, the final sample size obtained was 158. Multistage random sampling was employed to achieve the final calculated sample size.

There were 24 Health and Wellness Centres (HWCs) at Budge Budge-II block, during the study period. In the first stage, 4 HWCs were randomly chosen, namely- Muchisa, Chandipur, Deuli, and Dongaria. In the next stage, random selection of 4 villages from each of the 4 HWCs was done, namely- Chakdaulat (from Muchisa), Chandramoukhali (from Chandipur), Talberia (from Deuli), and Dongaria village (from Dongaria). Finally, from each of the 4 selected villages, households containing the eligible geriatric subjects were again randomly selected. If any household had >1 eligible participant, then any one of them was drawn randomly into the sample for the purpose of data collection. The detail of the sampling technique is presented in Figure 1.

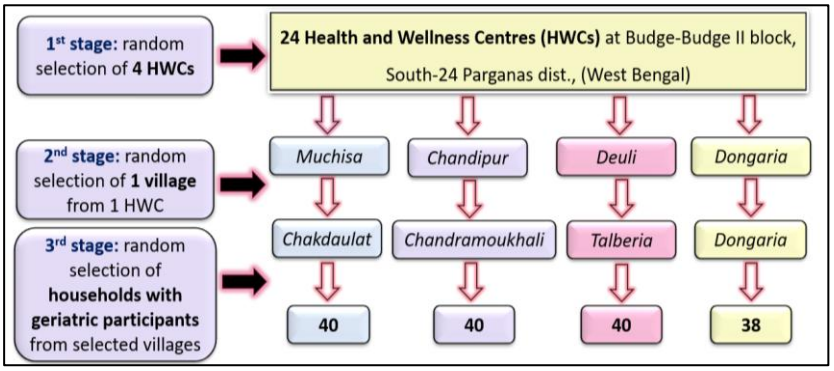

Figure 1. Multistage random sampling for selection of study participants (n = 158)

Study tools and study technique: A predesigned, pretested, and structured schedule was prepared, which collected data across the following domains: i) Sociodemographic profile of the study participants ii) Risk behaviour for RTIs. Data on the knowledge domain were collected by modifying items from the validated sexually transmitted diseases- knowledge questionnaire (STD-KQ) [20]. The interview schedule had a mix of open and closed-ended, single and multiple-response questions, which was validated for its content by three subject matter experts belonging to IPGME&R and SSKM Hospital- two from Community Medicine and one from Obstetrics-Gynaecology, followed by incorporation of necessary changes before pretesting. Pretesting was done on 15 geriatric patients attending the out-patient department (OPD) of L.B. Dutta Rural Hospital located at Muchisa village of Budge Budge-II block, which is the Rural Health Training Centre (RHTC) of IPGME&R and SSKM Hospital. These 15 elderly participants were later excluded from the final sample. The schedule was initially constructed in English, later translated into Bengali and Hindi languages by respective language experts and was finally retranslated to English to ensure validity.

The STD-KQ [20] is a pre-validated questionnaire, which gives a brief but comprehensive measure of knowledge about sexually transmitted diseases (STDs). There were 27 items in the said questionnaire with options ranging from 'True', 'False', and 'Don't know'. Each correct answer (True) was given 1 point, and for both 'False' and 'Don't know' = 0 points. Items from this questionnaire were slightly modified and used to frame questions for the knowledge domain. After thoroughly explaining the purpose of the study and obtaining written consent from the selected study participants, face-to-face interviews were conducted using the schedule. Study variables: Study variables comprised of the dependent and independent variables. Independent variable was the sociodemographic characteristics of the study subjects. The dependent variables were the knowledge and risk behaviour for RTIs.

Statistical analysis: Data were tabulated in MS Office Excel 2021 (Microsoft Corp, Redmond, WA, USA) and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0. (IBM Corp., USA). Categorical data were represented as proportions and with the help of suitable diagrams. Continuous data were represented as mean/median and other suitable measures. The Knowledge domain had 8 items, and each item was scored 0 or 1, with the maximum and minimum scores being 8 and 0, respectively, and then an overall median score (4) was calculated. Knowledge was categorized as 'adequate' and 'inadequate' based on the overall median score; those who scored ≥4 were considered as having 'Adequate knowledge' while those scoring <4 were categorized as having 'Inadequate knowledge'. There were 9 items in the Risk behaviour domain, each item was scored as 0 or 1, with the maximum and minimum scores being 9 and 1, respectively. The items 4-8 in the schedule were reversely scored. An overall median score (2) was calculated. Those who scored ≥2 were categorized as having 'high' risk behaviour, and for those scoring <2, risk behaviour was considered as 'low'. Univariate regression analysis was performed to examine the association between sociodemographic characteristics and participants' knowledge and risk behaviors. Variables with a $p<0.2$ in the univariate logistic regression were considered biologically plausible and subsequently included in the

multivariable regression model to assess model fitness for both domains, following checks for multicollinearity (variance inflation factor >10 and tolerance <0.1). The relationship between knowledge and risk behavior scores was evaluated using Spearman's correlation. Statistical significance was defined as a p-value < 0.05 at the 95% confidence interval (CI).

Operational definition: reproductive tract infections (RTIs)- An infection of the reproductive tract, caused by bacteria, virus or parasites, due to unhygienic practices or through sexual contact [21]. In this study, any participant having one or more of the following symptoms: Painful and/or burning micturition, itching in groin, excess white discharge P/V, lower abdomen pain, purulent penile/vaginal discharge (foul-smelling/odourless), abnormal penile/vaginal bleeding, bleeding after intercourse, warty lesions on the genitals, painful scrotal swelling, dyspareunia, were considered as having an RTI.

3. RESULTS AND DISCUSSION

The mean age of study participants was 65.8 (±4.8) years. Among them, 74% were females and 67.1% belonged to Lower-middle (Class IV) socioeconomic status (as per Modified B.G. Prasad Socioeconomic status scale, updated in 2023). Around 65% of them availed of any social security scheme, the most common being Swasthya Saathi card (32.6%). None of the participants had a past history of any diagnosed RTI, and none of their respective spouses currently suffered from any RTI. Table 1 clearly depicts the above-mentioned findings.

Table 1. Sociodemographic characteristics of the study participants (n = 158)

Sociodemographic profile		Number (%)
Age of the study subjects (in completed years)	60-70	107 (67.7)
	71-80	49 (31.0)
	≥ 81	2 (1.3)
Gender	Male	40 (25.3)
	Female	118 (74.7)
Religion	Hinduism	75 (47.5)
	Islam	79 (50.0)
	Christianity and others	4 (2.5)
Marital status	Married	85 (53.8)
	Unmarried	9 (5.7)
	Widowed (widow/widower)	64 (40.5)
Highest level of education attained	Illiterate	73 (46.2)
	Primary school	53 (33.5)
	Middle school	25 (15.8)
	Secondary school and above	7 (4.4)
Occupation of study subjects	Unemployed	0
	Employed	43 (27.2)
	Homemaker/Retiree	115 (72.8)
Socioeconomic status (Modified B.G. Prasad Scale, updated in 2023)	Class II (Upper middle)	4 (2.5)
	Class III (Middle)	24 (15.2)
	Class IV (Lower middle)	106 (67.1)
	Class V (Lower)	24 (15.2)
Any known comorbidities of study subject	Yes	124 (78.5)
	No	34 (21.5)
Whether availing any social security scheme?	Yes	104 (65.8)
	No	54 (34.2)

Xu *et al.* [7] reported that in China, 49.0% of participants practiced daily genital hygiene and 34.9% bathed each day. Interestingly, the study found that individuals who maintained less frequent genital cleaning and bathing, and those who used condoms or oral contraceptives, exhibited a lower prevalence of sexually transmitted infections. On the contrary, the current study revealed that 29.4% and 21.9% did not clean their intimate areas during bathing and after sexual intercourse, respectively, while those elderly people who had any known comorbidity and did not avail any social security schemes had higher odds of inadequate knowledge and presence of risk behavior for any RTI.

In a study conducted by Poynten *et al.* [22] a cross-sectional clinic-based study in South Korea, which enrolled 1804 men and women aged over 60 years, there was a very low prevalence of syphilis (4 cases, 0.2%), chlamydia (14 cases, 0.8%), and gonorrhoea (0 cases). While in our study, there were no reported RTI cases in the last 12 months among the elderly participants as well as among their respective spouses.

According to a study done by Freeman and Anglewicz [23] in sub-Saharan Africa, 6.7% and 73.8% of women and men aged more than 65 years reported having sex in the last year respectively, while men's average number of sexual partners remained above one. This is in contrast to our study which showed that the

participants that only two elderly study subjects, who were men, had reported having multiple sex partners in the last 12 months. Thus, it can be concluded that the level of sexual activity declines steadily at older ages, but again remains considerable, particularly for men.

In this study, 85% of study subjects had heard about RTIs, and among them, the most common sources of information were family and neighbors (70%), followed by social media (15%). Among those who knew about the risk factors for RTIs, the most common responses were not bathing regularly (56%) and having unprotected coitus (32%). Upon asking whether RTIs are preventable or not, 3% responded as 'No' while 11% as 'Don't know'. Only 3 (~2%) of the study subjects could name HIV/AIDS as an STD. None of them knew about any available screening and/or treatment services for RTIs in their residential block or district. It was revealed that 30.4% participants had 'inadequate knowledge' regarding RTIs as illustrated in Figure 2.

Almost 22% of the study participants had sexual intercourse in the last 1 month (prior to the data collection period), out of which only 3.2% had used male condoms. 2 (1.3%) of the study subjects gave a history of having multiple sex partners in the last 1 year. 70.3%, 84.8% and 77.8% participants reportedly did not clean their intimate areas during bathing, after micturition, and after coitus, respectively. None of them had any history of injectable drug usage. The majority (77%) of the participants had 'high risk' behavior for RTIs. Figure 3 is a pie diagram that shows 25% of the participants had 'high risk' behavior for RTIs. 16 (4.4%) study subjects had signs and symptoms of RTIs for the last 1 year, out of which the most commonly reported was burning, painful micturition. Figure 4 thoroughly depicts these findings.

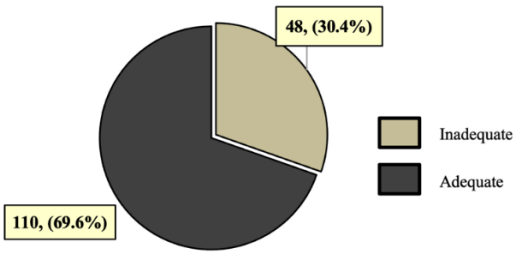

Figure 2. Pie chart illustrating the distribution of participants based on their knowledge of RTIs (n = 158)

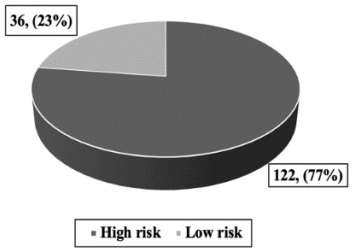

Figure 3. Pie chart illustrating the distribution of participants based on their risk behaviors related to RTIs (n = 158)

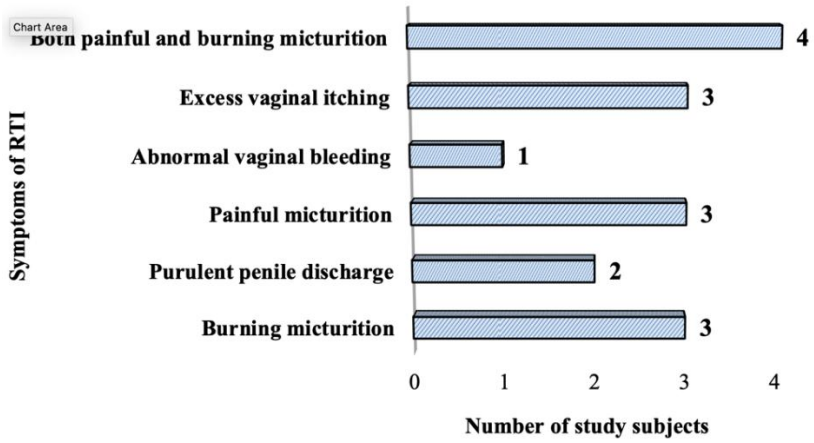

Figure 4. Horizontal bar chart depicting the distribution of study participants by currently reported RTI symptoms (n_3 = 16)

In a study conducted by Relhan *et al.* [24] in New Delhi, which recruited 123 geriatric subjects, the most common age group of participants was 60-65 years. 5 patients gave a history of injection drug use, and 2.4% patients gave a history of homosexual contact. The most common complaint was a history of ulcers over the genitalia in 28.4% (35) of cases, and none of the patients were found to be HIV positive. On the other hand, our study recruited 158 geriatric people, and the mean age was 65 years. The most commonly reported symptom was burning micturition, followed by vaginal discharge. However, none of them had a history of

injectable drug abuse or same-sex partners, and none of them were HIV positive. In the current study, it was found that two elderly study subjects who were men had reported having multiple sex partners in the last 12 months. Thus, it can be concluded that the level of sexual activity declines steadily at older ages, but again remains considerable, particularly for men.

A high incidence of unsafe sexual practices among the elderly, such as a decreased rate of condom usage, contact with male/female sex workers, recreational drug use, and multiple sexual partners, was observed, and such behaviors may be attributed to the fact that the geriatric population does not perceive themselves as being susceptible to the acquisition of STDs [25]. Contact with a regular partner, menopause, and subsequent infertility also contribute to reduced condom usage [25], [26]. The elderly in general are not considered at risk for acquiring RTIs, leading to a delay in diagnosis and management [26].

RTIs are the cause of severe gynaecological and maternal morbidity in India, according to a study by Thomas and Narayan [27]. In marginalized communities, women persevere quietly when faced with a culturally sensitive health issue such as an RTI. An exploratory study in a coastal fishermen community in South India was conducted. Public health practitioners and social workers should delve into recommendations relevant to addressing health issues in marginalized communities. Another study done by Zeng *et al.* [28] revealed that *Chlamydia* infection rate was the highest in people under 20 years old, and the infection showed a tendency toward young individuals. The current study revealed that 29.4% and 21.9% did not clean their intimate areas during bathing and after sexual intercourse, respectively, while those elderly people who had any known comorbidity and did not avail any social security schemes had higher odds of inadequate knowledge and presence of risk behavior for any RTI. Therefore, the publicity of sexual health knowledge must be strengthened, and the prevention and treatment of venereal diseases among young and middle-aged people must be improved.

Kaida *et al.* [29] reported a high prevalence of asymptomatic RTIs and noted that the low sensitivity of symptom-based reporting limits the effectiveness of syndromic RTI management, thereby weakening HIV prevention strategies among young people. This approach fails to adequately address the sexual health needs of youth, highlighting the need for policy reforms that incorporate advanced diagnostic innovations for genital tract infections (GTIs) to reduce RTIs and HIV-related risks. Similarly, studies by Manjate *et al.* [30] and Zhou *et al.* [31] identified a high prevalence of chlamydia, trichomoniasis, and HIV-1/2 among women of reproductive age presenting with urogenital complaints. Syndromic management of vaginal discharge demonstrated poor diagnostic accuracy, particularly low specificity, leading to under-treatment of true RTI cases and unnecessary treatment of women who tested negative for non-viral STIs. In Songjiang, Shanghai, Ureaplasma infection was found to be common among men of reproductive age, whereas HPV prevalence was relatively low. Enhanced screening is recommended for men in this age group, particularly smokers and those with lower educational attainment. The current study revealed that 29.4% and 21.9% did not clean their intimate areas during bathing and after sexual intercourse, respectively, while those elderly people who had any known comorbidity and did not avail any social security schemes had higher odds of inadequate knowledge and presence of risk behavior for any RTI.

In a study done by Zhang *et al.* [32], 47% of women had lower genital tract infections (LGTIs). UU was the most common infection (35.5%), followed by bacterial vaginosis (BV) (10.5%), yeast infection (3.7%), CT (2.2%), and Trichomonas vaginalis (1.7%). BV was associated with an increased risk of HR- HPV. Another study done by Jung and Brubaker [33] in postmenopausal women with frequent RTI, the diagnosis of acute RTI should be made using a combination of the symptom assessment and urine diagnostic studies. The current study revealed that 29.4% and 21.9% did not clean their intimate areas during bathing and after sexual intercourse, respectively, while those elderly people who had any known comorbidity and did not avail any social security schemes had higher odds of inadequate knowledge and presence of risk behavior for any RTI. The choice of RTI antibiotic should include consideration of efficacy, collateral effects, and side effects.

In the current study, Table 2 shows Binary Logistic Regression analyses that revealed participants who were married (aOR = 4.11, 95% CI, 1.95-7.65; p<0.001), employed (aOR = 7.55, 95% CI, 3.46-10.45; p<0.001), had no known comorbidities (aOR = 2.19, 95% CI, 1.02-7.32; p<0.001) and did not avail any social security scheme (aOR = 5.18, 95% CI, 2.50-8.22; p<0.001), had statistically significant higher odds of inadequate knowledge on RTIs, as compared to those who were unmarried/ divorced, unemployed/retired, had known comorbidities and availed any social security scheme respectively. Omnibus Test of model coefficients was significant (p<0.001), and Hosmer-Lemeshow goodness of fit test was not significant (p=0.936), suggesting a good fit of the model.

Table 3 shows multivariable binary logistic regression analysis, which revealed that female participants, (aOR = 2.35, 95% CI, 1.05-5.21; p = 0.036) employed (aOR = 3.88, 95% CI, 1.76-6.52; p = 0.001) and those who did not avail any social security scheme (aOR = 2.05, 95% CI, 1.22-5.43; p = 0.043), had statistically significant higher odds of the presence of high-risk behaviour for RTIs, as compared to those who were males, unemployed/retired, and those who availed of social security schemes respectively. Omnibus Test

of Model coefficients was significant (p<0.001), and Hosmer-Lemeshow goodness of fit test was not significant (p = 0.994), suggesting a good fit of the model. Spearman's rank correlation test revealed 'moderately positive correlation' (Spearman's rho value = +0.33; 2-tailed) between the knowledge and risk behaviour scores, as illustrated in Figure 5.

Table 2. Multivariable binary logistic regression analysis of the association between participants' sociodemographic characteristics and their knowledge of RTIs (n = 158)

Sl. No.	Sociodemographic characteristics		Inadequate knowledge on RTIs (n_1= 48)		
			Number (%)	aOR (95% CI)	p-value
1.	Occupation of the study subject	Employed	94 (85.5)	7.55 (3.46- 10.45)	< 0.001
		Unemployed and others (Homemakers, retirees)	16 (14.5)	Ref.	
2.	Gender of the study subject	Female	118 (74.6)	1.61 (0.88- 9.41)	0.747
		Male	40 (25.4)	Ref.	
3.	Marital status	Married	70 (63.6)	4.11 (1.95- 7.65)	<0.001
		Unmarried	6 (5.5)	1.75 (0.40- 5.67)	0.449
		Widowed	34 (30.9)	Ref.	-
4.	Whether availing of any social security scheme	Yes	85 (77.3)	5.18 (2.50- 8.22)	<0.001
		No	25 (22.7)	Ref.	
5.	Any known comorbidities of the study subject	Yes	9 (8.2)	2.19 (1.02- 7.32)	<0.001
		No	101 (91.8)	Ref.	
6.	Number of children	None or 1	36 (22.7)	3.38 (1.22- 6.41)	0.512
		≥ 2	112 (70.8)	Ref.	

(Ref. cat. = 'adequate knowledge' regarding RTIs; Cox and Snell R- Square=0.430, Nagelkerke R-Square=0.653)

Table 3. Multivariable binary logistic regression table showing the association of sociodemographic characteristics of the study population with their risk behaviour for RTIs (n = 158)

Sl. No.	Sociodemographic characteristics		High risk behaviour for RTIs (n_2 = 122)		
			Number (%)	aOR (95% CI)	p-value
1.	Age of study participant (in completed years)	60-70	80 (65.6)	1.73 (0.72- 4.14)	0.219
		71-80	41 (33.6)	0.33 (0.02- 5.58)	0.448
		≥ 81	1 (0.8)	Ref.	-
2.	Gender of participant	Female	96 (78.7)	2.35 (1.05- 5.21)	0.036
		Male	26 (21.3)	Ref.	
3.	Occupatio	Employed	97 (79.5)	3.88 (1.76- 6.52)	0.001
		Unemployed and others	25 (20.5)	Ref.	
4.	Any known comorbidities	Yes	98 (80.3)	0.63 (0.27- 1.49)	0.301
		No	24 (19.7)	Ref.	
5.	Whether availing any social security scheme(s)	Yes	85 (69.7)	2.05 (1.22- 5.43)	0.043
		No	37 (30.3)	Ref.	

(Ref. Cat= 'low risk' behavior for RTIs; Cox and Snell R- Square=0.423, Nagelkerke R-Square=0.643)

Brunham and Paavonen [34] emphasized gynecological and obstetrical infectious diseases as a critical aspect of women's health. Their study recommended adopting a systemic approach to these infections, enabling the classification of microbial etiology and pathogenesis within a clinical anatomical framework that distinguishes between lower and upper genital tract syndromes. The female reproductive system encompasses the vulva, vagina, cervix, uterus, fallopian tubes, and ovaries. In another investigation, Lillis *et al.* [35] reported low testing rates for RTIs, even among patients presenting with complications commonly linked to these infections, alongside a high prevalence of potentially inappropriate presumptive treatments. In contrast, the current study noted that two elderly male participants reported multiple sexual partners within the past year. This suggests that while sexual activity tends to decline with age, it remains significant, particularly among men. These findings underscore the importance of timely and accurate RTI diagnosis, coupled with appropriate treatment strategies.

Xu *et al.* [7] found that 3.2% of participants lacked knowledge about identifying RTIs, while 22.6% were unaware of their prevention. More than 80% of respondents supported the establishment of RTI surveillance systems and the inclusion of RTI-related courses. Regarding hygiene practices, 45.1% reported changing their underwear every 2–3 days, 49.0% cleaned their genitals daily, and 34.9% took a bath each day. Among contraceptive users, 47.4% relied on condoms and 29.7% used intrauterine devices (IUDs). This is in contrast to the findings obtained in the current study, which state that 29.4% and 21.9% did not clean their intimate areas during bathing and after sexual intercourse, respectively, while those elderly people who had any known comorbidity and did not avail any social security schemes had higher odds of inadequate knowledge

and presence of risk behavior for any RTI. Selection of antibiotics for RTI management should take into account their efficacy, potential collateral effects, and associated side effects. The results underscore the importance of strengthening public awareness of sexual health and enhancing prevention and treatment strategies for venereal diseases across youth, middle-aged, and elderly populations.

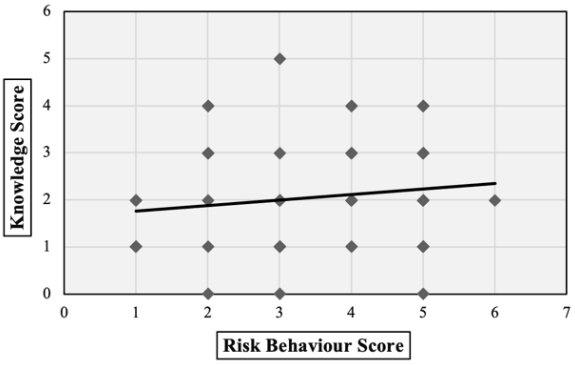

Figure 5. Scatter plot showing 'moderately positive correlation' between the knowledge score and risk behavior score for RTIs among the study participants (n = 158)

4. CONCLUSION

Very few study participants had inadequate knowledge, but most had high-risk behaviour for RTIs. Sociodemographic characteristics had statistically significant associations with their religion, marital status, highest level of education attained, availing of social security schemes, any known comorbidities, occupation, and socioeconomic status.

It was a community-based study. The study targeted a much-neglected public health problem among a vulnerable group, like the geriatric population. However, the study relied upon self-reported data based on a sensitive issue, hence it might be subject to social desirability bias. Confirmatory tests (e.g., clinical and laboratory examinations) could have been performed for corroboration of findings.

Increase in awareness campaigns, initiated mainly by the grassroots level healthcare workers [accredited social health activists (ASHA), auxiliary nurse midwife (ANM), MHWs (males and females)] among the geriatric population in the community is the need of the hour. The geriatric people residing in the study area must be made aware of the Suraksha Clinic (a clinic providing counselling and treatment facilities for RTIs/STIs) functioning in the RHTC. Robust surveillance and bolstering of screening, diagnostic, and aggressive symptomatic treatment facilities are required. Biomedical interventions, like adult voluntary medical male circumcision, microbicides, and partner treatment, may be undertaken as and when needed. Apart from these, collaborations with different ministries and stakeholders, a multisectoral approach, with involvement/training of the grassroot level workers should be implemented for tackling the problem, aiming at reducing the overall morbidity and mortality due to RTIs among a vulnerable and much neglected group like the geriatric population. More extensive research is needed regarding this neglected issue, which may help in planning and policy making by the healthcare administrators, along with sufficient funds for implementation of screening and diagnostic services for RTIs in the community.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Kuntala Ray	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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Somnath Naskar	✓	✓		✓				✓	✓	✓		✓		
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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
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R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

ETHICAL APPROVAL

The study proposal was prepared and submitted to the Institutional Ethics Committee (IEC) of IPGME&R and SSKM Hospital, Kolkata, for ethical approval (Reference: IPGME&R/IEC/2023/784). Written informed consent was obtained from all eligible participants, and strict measures were taken to ensure anonymity and confidentiality of the collected data throughout the study.

DATA AVAILABILITY

Data availability is not applicable to this paper as no new data were created or analyzed in this study.

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