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Impact of the Covid-19 pandemic on the percentage of positive urine tests for *Trichomonas vaginalis*

Impacto da pandemia de Covid-19 na percentagem de testes de urina positivos para *Trichomonas vaginalis*

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ABSTRACT

Introduction: Trichomoniasis is the most common non-viral sexually transmitted infection in the world. It is caused by the protozoan *Trichomonas vaginalis* (*T. vaginalis*), and most infections are asymptomatic – making difficult the diagnosis and allowing the parasite to spread. Due to the Covid-19 pandemic in 2020, social isolation measures were taken to prevent the transmission of SARS-Cov-2. Interestingly, some studies have shown an increase in the number of sexually transmitted infections during and after the lockdown ended. **Objective:** To evaluate the impact that the Covid-19 pandemic had on the percentage of positive urine tests for *T. vaginalis* in an outpatient service of a teaching hospital, through a retrospective descriptive study. **Material and Methods:** A total of 21,762 urine tests were analyzed (0.20% [n= 43] positive for *T. vaginalis*) among January 2018 and July 2023. **Results:** The temporal analysis showed a percentage of 0.05% and 0.09% of positive urine tests for *T. vaginalis*, respectively, in the pre-pandemic period (2018 and 2019). There was a trend towards an increase in 2020 (0.18%) which was confirmed in the following years with the relaxation of social isolation measures in Brazil (0.30% and 0.33% in 2021 and 2022, respectively). This increase continued in the following year (0.18% until July 2023), coinciding with the end of the public health emergency declared by the World Health Organization. Of the 38 infected individuals, 34 were women (44.7% pregnant) and 4 were men. Additionally, 50% of the diagnosed trichomoniasis received specific treatment and only 21% of sexual partners were indicated for treatment. **Conclusion:** The study highlights the increase in trichomoniasis during and after the Covid-19 pandemic and the reduced number of individuals – and sexual partners – treated. Establishing protocols for early diagnosis and health education are necessary to reduce the number of cases of this sexually transmitted infection in the community.

Keywords: Trichomonas Infections; Epidemiology; Covid-19.

RESUMO

Introdução: A tricomoníase é a infecção sexualmente transmissível não-viral mais comum no mundo. É causada pelo protozoário *Trichomonas vaginalis* (*T. vaginalis*), cuja maioria das infecções são assintomáticas, dificultando o diagnóstico e permitindo a disseminação do parasito. Com a chegada da pandemia de Covid-19 em 2020, medidas de isolamento social foram tomadas para prevenir a transmissão do SARS-Cov-2. Interessantemente, alguns estudos mostraram um aumento do número de infecções sexualmente transmissíveis durante e logo após o término do lockdown. **Objetivo:** Avaliar o impacto que a pandemia de Covid-19 teve no percentual de exames de urina positivos para *T. vaginalis* em um serviço ambulatorial de um hospital de ensino, por meio de um estudo descritivo retrospectivo. **Resultados:** Um total de 21.762 exames de urina foram analisados (0,20% [n= 43] positivos para *T. vaginalis*) entre janeiro de 2018 e julho de 2023. A análise temporal mostrou que no período pré-pandemia (2018 e 2019) um percentual de 0,05% e 0,09% exames de urina positivos para *T. vaginalis* foram observados, respectivamente. Houve uma tendência ao aumento no ano de 2020 (0,18%), que foi confirmado nos seguintes anos com o relaxamento das medidas de isolamento social no Brasil (0,30% e 0,33% em 2021 e 2022, respectivamente). Esse aumento manteve-se no ano seguinte (0,18% até julho de 2023), coincidindo com o final da emergência de saúde pública declarada pela Organização Mundial de Saúde. Dos 38 indivíduos infectados, 34 eram mulheres (44,7% gestantes) e 4 homens. Adicionalmente, 50% dos casos de tricomoníase diagnosticados receberam tratamento específico e apenas 21% dos parceiros sexuais tiveram indicação de tratamento. **Conclusão:** O estudo chama a atenção para o aumento da tricomoníase durante e após a pandemia de Covid-19 e para o reduzido número de indivíduos – e parceiros sexuais – tratados. O estabelecimento de protocolos para diagnóstico precoce e educação em saúde são necessários para redução do número de casos dessa infecção sexualmente transmissível na comunidade.

Palavras-chave: Tricomoníase; Epidemiologia; Covid-19.

INTRODUCTION

Trichomoniasis is a sexually transmitted infection (STI) caused by the protozoan *Trichomonas vaginalis*. It usually presents as an asymptomatic infection, however can have various physical, emotional, sexual, and social impacts on the lives of women[1] – the main group affected. When they do not receive treatment, they may experience discomfort, embarrassment, reduced sexual satisfaction, social isolation, and emotional distress.[1] The diagnosis is based on the finding of trophozoites in pap smears, however the sensitivity of this test is low and many individuals remain without diagnostic confirmation. Therefore, underreporting of trichomoniasis cases is real and needs to be investigated. In Brazil, the occurrence can vary from 5% to 35% depending on the population studied and the diagnostic method used.[2,3,4]

During the course of the Covid-19 pandemic, a reduction in several STIs was observed due to social isolation.[5] Nevertheless, with the return of social activities, the number of diagnosed STIs increased significantly[6,7] – including trichomoniasis.[6] Treatment is carried out through the administration of antibiotics (metronidazole, secnidazole, or tinidazole), with metronidazole being indicated even for pregnant and postpartum women.[4,6,8] In Brazil, metronidazole is available through the *Sistema Único de Saúde* (SUS) for the community.

In this context, the objective of the present study is to describe the impact of the Covid-19 pandemic on the number of positive urine tests for *T. vaginalis* in a population treated in an outpatient service of a teaching hospital from Brazil.

MATERIAL AND METHODS

This retrospective descriptive study evaluated information contained in medical records in the periods before, during, and after the Covid-19 pandemic (January 2018 to July 2023). The study location was the Dom Bosco unit of the University Hospital of Universidade Federal de Juiz de Fora (DB/HU-UFJF), a public outpatient care service. The present study was approved by the Human Research Ethics Committee of the University Hospital of the UFJF (protocol n. 65563122.2.0000.5133).

The information contained in medical records included: sex, age, results of urinalysis and pap smear, comorbidities, as well as prescribed pharmacological treatment (drug of choice, dosage) and treatment of sexual partner. The inclusion criterion was to select individuals who had a urine tests requested at the University Hospital of UFJF (Dom Bosco Unit). The exclusion criteria were individuals <18 years old and with incomplete data in the system were excluded. A statistical analysis was performed to determine in software *Microsoft Excel* 2019.

RESULTS

A total of 21,762 urine tests were performed in DB/HU-UFJF from January 2018 to July 2023. The presence of *T. vaginalis* trophozoites was identified in 0.20% (43/21,762) of urine samples (Table 1).

In the years leading up to the Covid-19 pandemic (2018 and 2019), a low number of urine tests were positive for *T. vaginalis* (Figure 1). However, an increase in the percentage of cases was observed in 2020 (0.18%) and in the following years 2021 and 2022 (0.30% and 0.33%, respectively) with the relaxation of social isolation measures. This increase continued until July 2023 at 0.18%

A total of 38 *T. vaginalis*-infected individuals were found (43 positive urine tests), in which 34 were women (89.5%) and four men (10.5%) (Table 2). Four individuals had more than one positive test for the protozoan (repeated positive test). Only 16% of individuals (all women) had genital symptoms. Twelve women (35.3%, 12/34) had a pap smear requested and, in only two patients, *T. vaginalis* was detected (16.7%, 2/12). Other associated STIs were found in 24% of individuals: 13% of individuals had HIV, 8% syphilis, and 3% HPV.

Considering the age group, the majority of

Table 1: Positivity for *Trichomonas vaginalis* in urine tests, from January 2018 to July 2023.

Year	Total N	Positive for *Trichomonas vaginalis*	
		N	%
2018	3,423	2	0.05
2019	4,366	4	0.09
2020	2,219	4	0.18
2021	3,606	11	0.30
2022	4,836	16	0.33
2023*	3,312	6	0.18
Total	21,762	43	0.20

*Until July 2023.

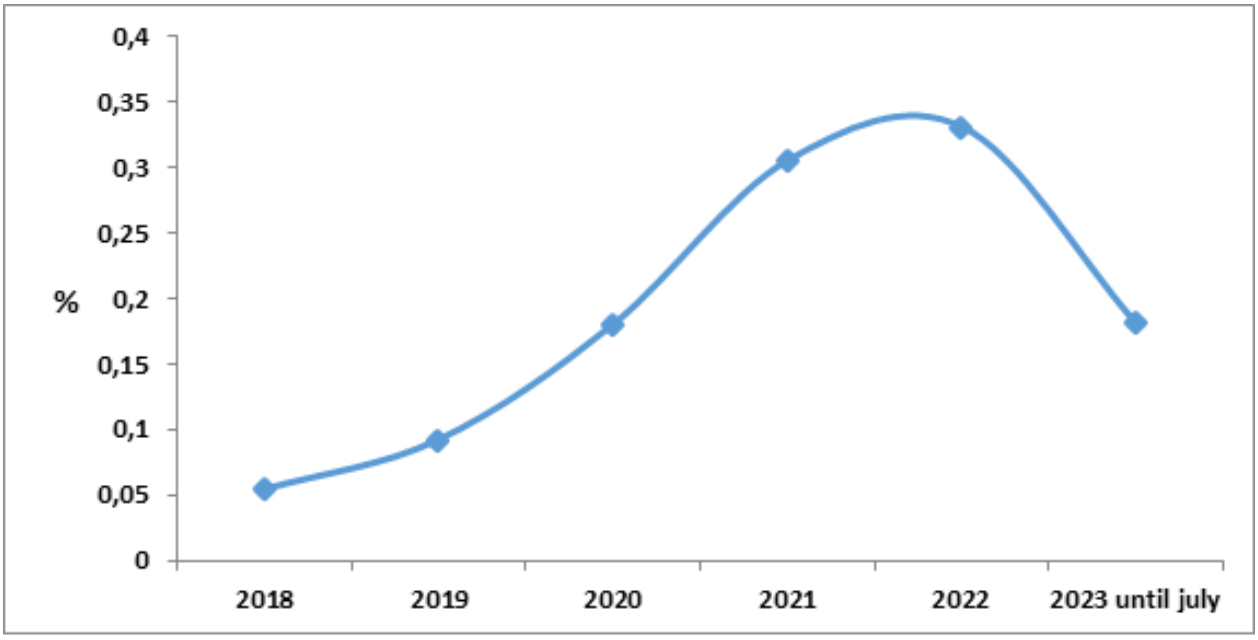

Figure 1: Percentage of positive urine tests for *Trichomonas vaginalis* by year.

Table 2: Individuals with positive urine test for *Trichomonas vaginalis* in DB HU-UFJF, January 2018 to July 2023.

ID	Age (years)	Symptoms	Pap smear result	Specific treatment		Pregnancy	Other STIs
				Patient	Sexual partners		
			Female				
DB01	31	-	NEG	×	×	×	
DB02	29	-	NP	×	×	✓	
DB03	24	-	NEG	MTZ	MTZ	✓	
DB04	24	Yellow-green vaginal discharge	NEG	MTZ	×	✓	HIV
		NEG	MTZ	MTZ	NEG	MTZ	
DB05	37	-	NEG	×	×	✓	
DB06	18	-	NP	MTZ	SEC	✓	
DB07	37	-	NP	×	×	✓	
DB08	22	Yellow-green and malodorous vaginal discharge, vulvar irritation	NEG	MTZ	SEC	✓	
DB10	41	-	NEG	MTZ	×	×	
DB11	31	-	NEG	MTZ	SEC	✓	
DB13	56	-	NP	×	×	×	
DB14	78	-	NP	×	×	×	Syphilis
DB15	20	-	NP	MTZ	×	✓	
DB16	18	-	NP	MTZ	SEC	×	
DB17	30	-	NEG	MTZ	×	✓	HIV
DB18	41	-	NP	×	×	×	
DB19	22	-	NP	×	×	✓	
			NP	×	×		
DB20	31	Yellow vaginal discharge	NEG	MTZ	×	✓	HIV

DB21	51	-	NP	×	×	×	
DB22	60	-	NP	×	×	×	
DB23	92	-	NP	×	×	×	HPV
DB24	20	-	NP	×	×	✓	Syphilis
DB25	26	-	NEG	MTZ	×	×	
DB26	50	Vaginal discharge and vulvar irritation	NP	MTZ	×	×	
			NP	×	×		
			NP	×	×		
DB27	66	-	NEG	×	×	×	
DB28	30	-	POS	MTZ	MTZ	✓	HIV
DB29	52	Yellow-green vaginal discharge	POS	MTZ	×	×	
DB31	21	-	NP	MTZ	×	✓	Syphilis
DB32	29	Malodorous vaginal discharge	NEG	×	×	×	
DB33	61	-	NP	×	×	×	
DB34	29	-	NP	×	×	✓	
DB36	61	-	NP	×	×	×	
DB37	29	-	NP	MTZ	SEC	✓	
DB38	48	-	NP	×	×	×	
			Male				
DB09	60	-	-	MTZ	×	-	
DB12	45	-	-	×	×	-	HIV
			-	MTZ	×		
DB30	37	-	-	MTZ	×	-	
DB35	76	-	-	×	×	-	

NEG: negative result. POS: positive result. NP: not performed. MTZ: metronidazole. SEC: secnidazole. HIV: Human Immunodeficiency Virus. HPV: Human Papiloma Virus. ✓: Yes. ×: No.

individuals (79%, 30/38) were among 18 and 59 years old. Furthermore, 44.7% of positive cases for *T. vaginalis* were pregnant women. It is noteworthy that 50% of *T. vaginalis*-positive cases did not receive specific treatment and that only 21% of sexual partners were treated (Table 2).

DISCUSSION

Although the expected reduction in the occurrence of STIs due to social isolation during the Covid-19 pandemic,[5] the study demonstrated an increase in the number of positive urine tests for *T. vaginalis*. Even with the social isolation measures adopted in 2020, there was a trend to increase in the percentage of positive urine tests in the studied population, with 0.18%. In 2021 and 2022 there was an increase in positive urine tests (0.30% and 0.33%, respectively), coinciding with the end of the period of social isolation in Brazil. Previous studies have shown that with the relaxation of measures a surprising increase in the number of detected STI cases.[6,7] Furthermore, the number of *T. vaginalis*-positive tests until July 2023 appears to be in line with previous years, coinciding with the end of the health emergency declared by the World Health Organization. We draw the attention of health professionals to this increase in cases of trichomoniasis during and post-Covid-19 pandemic. This STI is not a reportable disease in Brazil and there are no recommendations for routine screening of women of reproductive age, making this STI even more neglected. Sentís et al[7] discuss whether the Covid-19 pandemic really had an influence on the number of STI cases or whether it was just an artifact. They conclude that the Covid-19 pandemic may have served only as a warning sign for the re-emergence of many STIs worldwide.

In the present study, 50% of cases did not receive specific treatment. The antibiotic metronidazole is the indicated treatment for cases of trichomoniasis, and is administered in the following dosages: single dose (2g) or over 7 days (250mg, twice a day), including for pregnant and postpartum women.[4] Alternatively, secnidazole and tinidazole can be used - both 2g as a single dose.[8] Therefore, healthcare professionals must be alert and suspect this STI even without symptoms – since most individuals have minimal or no genital

symptoms.[3,4] In this context, the study shows only 16% of individuals with specific symptoms. It is important to highlight that immediate treatment must be carried out even in these asymptomatic individuals,[4] and untreated infections might last from months to years[9] – making this individual a reservoir of infection.

Additionally, only 21% of sexual partners received treatment. It is important to highlight that the protozoan is transmitted sexually and the lack of treatment for sexual partners allows the transmission cycle to perpetuate. The results showed that some individuals had more than one repeatedly positive test and in only one case the sexual partners were treated. It is essential that sexual partners are treated to break the transmission cycle of the infection and, as well as, to differentiate a case of infection by a nitroimidazole-resistant *T. vaginalis* strain from a case of reinfection. Furthermore, it is recommended that all sexually active women treated for *T. vaginalis* be retested after three months of treatment – even if their partners are treated.[9]

The highest frequency of trichomoniasis occurred in women among 18 and 59 years old. The study is in agreement with previous studies reporting that most cases occur in sexually active women and of this age group.[3,10] However, infection in older women should not be ruled out; the occurrence of trichomoniasis in > 60 years old women (21%) is highlighted. Added to this, persistent *T. vaginalis* infection in women is associated with the development of cervical cancer.[11,12]

The study identified 38 individuals with positive urine tests for *T. vaginalis* and of these, 17 were pregnant women. It is known that *T. vaginalis* infection in these population can cause preterm birth, premature rupture of membranes, and infants who are small for gestational age.[9,12] Unfortunately, there is no specific screening routine for trichomoniasis in pregnant women.

Urine sedimentoscopy is not the recommended test for the diagnosis of trichomoniasis (study limitation), even so, several cases of trichomoniasis have been detected. Pap smears were performed on 35.3% of women and the parasite was detected in only two. For the diagnosis of trichomoniasis, the recommended methodology is the wet-mount microscopy, in which a vaginal swab is collected and motile trophozoites can be visualized at 40X magnification under the microscope. However, it is effective as a screening test for symptomatic women – due to the variable parasitic load – and, even then, the sensitivity is among 40% and 60%.[13] Alternative methodologies are: i) culture in Diamond medium (vaginal swab, male urethral swab, or urine specimens); ii) nucleic acid amplification tests (NAATs); and iii) point of care (POC) immunochromatographic assays performed on a capillary flow dipstick device with a vaginal swab specimen.[13,14]

In fact, it is possible that the real number of trichomoniasis cases in the region is underestimated and the increase in cases during and post- Covid-19 pandemic is a warning for the establishment of early diagnosis protocols and health education practices in an attempt to reduce the transmission of STIs in the country.

CONCLUSION

The social isolation measures adopted to prevent the transmission of SARS-Cov-2 appear not to have reduced the number of cases of trichomoniasis in the studied population – on the contrary, an increase in them was observed. Furthermore, the relaxation of these measures maintained the increase in trichomoniasis cases. The study draws attention to the alarming number of individuals and their sexual partners who received specific treatment and calls for the establishment of protocols for early diagnosis and health education of the population.

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