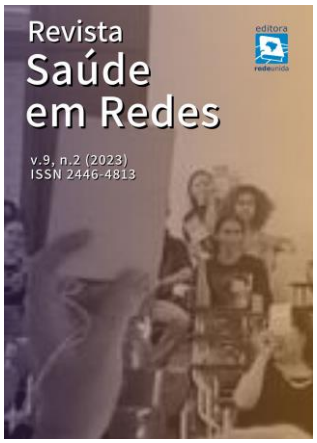

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Seroprevalence of antibodies against herpesvirus type 2 in a female prison population in Mato Grosso

Soroprevalência de anticorpos contra herpesvírus tipo 2 em população prisional feminina mato-grossense

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Abstract: To describe the seroprevalence of antibodies against herpes simplex virus 2 in inmates of a female public prison in Mato Grosso in the year 2016. This is a cross-sectional study with a quantitative approach, carried out with 50 inmates of a female public prison from Mato Grosso. Data collection was carried out through interviews with 50 women. To determine the seroprevalence of HSV-2 infection, serum samples were analyzed by the ELISA method in search of IgG antibodies at the Laboratory of Viral Immunology of Instituto Oswaldo Cruz – RJ. The HSV-2 seroprevalence found in the evaluated population was 80%, a value much higher than that reported in the general Brazilian population and in other studies with prison populations around the world. The profile of the inmates predominated among young, brown women, with low education, single and with low monthly income. The present study found a high seroprevalence of antibodies against HSV-2 in this population. These data provide

important information that can assist in the implementation of effective actions that better prevent and control genital herpes, as well as other STIs in incarcerated populations.

Keywords: Prisoners; Women; Genital Herpes; Simplexvirus.

Resumo: Descrever a soroprevalência de anticorpos contra herpes vírus simples 2 em reeducandas de uma cadeia pública feminina de Mato Grosso no ano de 2016. Trata-se de um estudo transversal com abordagem quantitativa, realizado com 50 reeducandas reclusas de uma cadeia pública feminina de Mato Grosso. A coleta de dados foi realizada por meio de entrevista com 50 mulheres. Para determinar a soroprevalência da infecção por HSV-2, foram analisadas amostras de soro pelo método ELISA em busca de anticorpos do tipo IgG no Laboratório de Imunologia Viral do Instituto Oswaldo Cruz – RJ. A soroprevalência de HSV-2 encontrada na população avaliada foi de 80%, valor muito superior ao relatado na população geral brasileira e em outras estudos com populações prisionais em todo o mundo. O perfil das reeducandas predominou entre mulheres jovens, pardas, com baixa escolaridade, solteiras e com renda mensal baixa. O presente estudo encontrou alta soroprevalência de anticorpos contra HSV-2 nesta população. Esses dados fornecem importantes informações que podem auxiliar na implementação de ações efetivas que melhor previnam e controlem a herpes genital, bem como as demais ISTs em populações encarceradas.

Palavras-chave: Prisioneiros; Mulheres; Herpes genital; Simplexvirus.

Introduction

Brazil has one of the largest prison populations in the world, second only to the United States and China.[1] According to data from the Ministry of Justice, in 2022 the country reached the mark of 800,000 people in all prison sentence regimes and a deficit of almost 200,000 vacancies.[2] This high number of individuals in deprivation of liberty in the country represents a serious public health problem, since the process of confinement and physical proximity, intrinsic to the environment, increases the risk of dissemination of transmissible pathogens.[3,4]

The right to health of every Brazilian citizen is guaranteed by the Brazilian Federal Constitution of 1988. This achievement represents an obligation of the State, which must make it possible through social and economic policies with the aim of reducing the risk of diseases and other injuries; as well as ensuring universal and equal access to actions and services for its promotion, protection and recovery.[5]

Despite the constitutional guarantees, access to healthcare represents a challenge in Brazil, especially for certain social groups such as the population deprived of liberty (PPL), which experiences an even more worrying context of inequity in access.[6] This is because prisons, in addition to being overcrowded places, certain risk practices for sexually transmitted infections (STIs) are more frequent, such as unprotected sexual intercourse, prostitution, violence and drug use. These situations reinforce the risks of spreading transmissible pathogens and the high prevalence of diseases found in this population.[7]

In the epidemiological context, the female PDL represents 4.38% of the total number of individuals in deprivation of liberty.[2] However, despite representing a smaller contingent among inmates, the intrinsic biological characteristics of women in association with the lack of preventive practices offered by the Brazilian prison health system, contribute to making them more vulnerable to infectious diseases when compared to men.[8]

In this scenario, human alpha-herpesvirus 2 (HSV-2) represents a potential risk for this population. This is because HSV-2, in addition to being widely distributed throughout the world, is responsible for one of the most prevalent sexually transmitted infections, genital herpes. The virus is known to establish permanent and subclinical infection, which contributes to the fact that many infected individuals are not aware of their status and screening strategies are more complex.[9]

The initial infection usually manifests as an ulcerative lesion on the genitalia, being more common in sexually active adolescents and adults.[9] Some behaviors can favor HSV-2 infection, such as unprotected sexual activity, partner turnover and sexual violence, and these are risk behaviors often associated with individuals in prison.[10-12]

Despite this, data on the prevalence of HSV-2 in Brazil are still limited, since there is no compulsory notification for HSV-2 infections, therefore, there is a need for studies in this area and, consequently, expansion of prevention, monitoring and control programs, in addition to early identification of the infection and counseling for women deprived of their liberty. Given the uniqueness of the penitentiary system, this research was conducted with the objective of describing the seroprevalence of herpes simplex virus HSV-2 infection in women deprived of liberty in a prison unit in Tangará da Serra - Mato Grosso, in 2016.

Methods

This is a cross-sectional and quantitative study, carried out in the Women's Public Prison in the municipality of Tangará da Serra, whose total capacity is for 58 people.[13] The population of this study consisted of 50 women, which corresponds to all female inmates, both in provisional prison and convicted.

The instrument used for data collection was a semi-structured form, prepared by the authors based on a bibliographic survey, which included aspects related to factors associated with herpes virus infection in vulnerable populations, with emphasis on PPL.

The form was previously tested and collections took place in the last quarter of 2016, through interviews in a private environment lasting 30 minutes for each participant, followed by peripheral blood collection for carrying out the ELISA test to detect anti-inflammatory IgG antibodies. - HSV-2. The

biological material samples were stored and transported to the Molecular Virology Laboratory at Instituto Oswaldo Cruz/Fiocruz. Serology was performed using the commercial kits Euroimmun and Virion/Serion, in which the protocols were followed according to the manufacturers' instructions.

The variables of interest for this study were based on scientific articles on the prevalence and factors associated with the herpes virus in PDL and involved sociodemographic and criminal characteristics (age, race/color, marital status, education and income prior to imprisonment), sexual behavior (Age at onset of sexual activity, number of sexual partners in the last six months, condom use, history of prostitution) for the evaluation of HSV-2 infection (outcome variable).

The data were systematized in electronic spreadsheets through double typing and later confronted to search for possible failures. Additionally, the database was imported into the Minitab 19 statistical software, in order to proceed with the descriptive and inferential analysis of the data. In the descriptive analysis, the results were presented in tables of distribution of absolute and relative frequencies. And in the inferential analysis, 95% confidence intervals were used for a proportion.

All ethical aspects in research with human beings were respected, according to Resolution 466/12 and Resolution nº 441 of 2011 of the National Health Council, under approval opinion 1,457,621/2016 of the Ethics Committee in Research with human beings from the State University of Mato Grosso.

Results

Table 1 shows the sociodemographic characteristics of the population analyzed for HSV-2 seroepidemiology. Of the total of 50 women included in the analysis, there was a predominance of women younger than 30 years old, non-white, with low education, without a partner and income before imprisonment of less than 2 minimum wages.

Table 1. Sociodemographic characteristics of women deprived of their liberty in a Public Women's Prison in Mato Grosso, Brazil, 2016 (n=50).

Variables	Total individuals		
	N	%	IC95%
Age (years)			
< 21	03	6,0	(1,25 ; 16,55)*
21 to 30 years old	24	48,0	(33,66 ; 62,59)
> 30 years	23	46,0	(31,81 ; 60,68)
Schooling			
Non-literate	03	6,0	(1,25 ; 16,55)
Primary school	37	74,0	(59,66 ; 85,37)*
High school	08	16,0	(7,17 ; 29,11)
Higher education	02	4,0	(0,49 ; 13,71)
Color/Ethnicitty			
White	06	12,0	(4,53 ; 24,31)
Not white	44	88,0	(75,69 ; 95,47)*
Marital Status			
With partner	21	42,0	(28,19 ; 56,79)
No partner	29	58,0	(43,20 ; 71,81)
Income before prison			
No income	07	14,0	(5,82 ; 26,74)
From 1 to 2 minimum wages*	30	60,0	(45,18 ; 73,59)*
Above 3 minimum wages	13	26,0	(14,63 ; 40,34)

*: 1 minimum wage corresponds to R$ 880.00. IC95%: Confidence interval for a proportion.
Source: Prepared by the authors (2022).

With regard to the aspects of risk for sexually transmitted infections of the investigated inmates, the age that marked the beginning of sexual activity, number of partners in the last six months, use of condoms in sexual activities and history of prostitution were observed (Table 2).

Table 2. Behavioral characteristics of women deprived of liberty in a Women's Public Prison in Mato Grosso, Brazil, 2016 (n=50)

Variables	Total of individuals		
	N	%	IC95%
Age of first sexual intercourse			
≤ 13 years	03	6,0	(1,25 ; 16,55)*
14 a 16	24	48,0	(33,66 ; 62,59)
17 a 19	23	46,0	(31,81 ; 60,68)
Number of sexual partners in the last six months			
0	03	6,0	(1,25 ; 16,55)
1	37	74,0	(59,66 ; 85,37)
2	08	16,0	(7,17 ; 29,11)*
3 or more	02	4,0	(0,49 ; 13,71)*
Sexual intercourse without a condom			
Yea	23	46,0	(31,81 ; 60,68)
No	27	54,0	(39,32 ; 68,19)
Worked as a sex worker			
Yea	22	44,0	(29,99 ; 58,75)
No	28	56,0	(41,25 ; 70,00)

IC95%: Confidence interval for a proportion.
Source: Prepared by the authors (2022).

Table 3 details the seroprevalence of antibodies against HSV-2 in the tested samples, which was 80% in this population. Regarding the behaviors adopted by the inmates, sharing a cell with more than 3 women and having sexual intercourse without a condom are the most prevalent characteristics among the seropositive women.

Table 3. Aspects of the history of risk and prevalence of HSV-2 infection in women deprived of liberty in Mato Grosso, Brazil, 2016 (n=50).

Variables	Total individuals		Reagent for HSV-2		
	N	%	N	%	IC95%
Current partner					
Women	08	16,0	07	17,5	(7,34 ; 32,78)
Man	18	36,0	16	40,0	(24,87 ; 56,67)*
Does not have	24	48,0	17	42,5	(27,04 ; 59,11)*
Homosexual experience					
Before prison	09	18,0	08	20,0	(9,05 ; 35,65)
In prison	03	6,0	02	5,0	(0,61 ; 16,92)
Does not have	38	76,0	30	75,0	(58,80 ; 87,31)*
Active sex life					
Yea	08	16,0	08	20,0	(9,05 ; 35,65)
No	42	84,0	32	80,0	(64,35 ; 90,95)*
Vaginal discharge					
Yea	07	14,0	03	7,5	(1,57 ; 20,39)
No	43	86,0	37	92,5	(79,61 ; 98,42)*
Genital wound					
Yea	04	8,0	03	7,5	(1,57 ; 20,39)
No	46	92,0	37	92,5	(79,61 ; 98,42)*
How many women per cell					
1	-		-		-
2	07	14,0	05	12,5	(4,19 ; 26,80)
3 or more	43	86,0	35	87,5	(79,61 ; 98,43)*
Number of sexual partners in the last six months					
0	29	58,0	23	57,5	(40,89 ; 72,96)*
1	16	32,0	12	30,0	(16,56 ; 46,53)*
2	02	4,0	02	5,0	(0,61 ; 16,92)
3 or more	03	6,0	03	7,5	(1,57 ; 20,39)
Sexual intercourse without a condom					
Yea	23	46,0	21	52,5	(36,13 ; 68,49)
No	27	54,0	19	47,5	(31,51 ; 63,87)

IC95%: Confidence interval for a proportion.
Source: Prepared by the authors (2022).

Discussion

HSV-2 seroprevalence studies represent an important tool to better understand the status of a given disease in a population. In this study, the sample consisted mostly of young women, with a low level of education, non-white, single and low income, characteristics that follow the national trend observed in the female prison population.[11,14]

In Brazil, the epidemiological situation of the infection caused by HSV-2 is not well known, due to the fact that this disease does not present compulsory notification. In prison environments, this problem becomes more evident. This is because morbidity data in Brazilian prisons are scarce, which makes it difficult to know the real situation in the penitentiary system.[14]

Despite the limited knowledge about the real extent of HSV-2 infection in penal institutions in Brazil, it is clear that the consequences arising from STIs go beyond the intimacy of private sexual life, with biological and psychosocial impacts both at the individual and collective levels, configuring a serious public health problem.[15]

In the present study, the seroprevalence of HSV-2 observed was 80%, higher than the prevalence found in the adult population of Brazil[16] and higher than the rates observed in adults from Germany[17] and Índia.[18]

A study carried out with women of childbearing age residing in six different countries (Mexico, Brazil, Germany, Poland, Turkey and China) showed a higher seroprevalence of antibodies against HSV-2 (40%) in serum samples from Brazilian women compared to other five countries.[19]

A similar finding was obtained in a study that evaluated serum samples from various populations, including children, blood donors and other groups, residents of Brazil, India, Morocco and Sri Lanka. In this study, the highest rates of HSV-2 infection by age for men and women were also found in Brazilian individuals.[20]

In another study, carried out with 552 adult women who participated in research on cervical cancer as a control group in Brazil (N = 181) and in the Philippines (N = 371), the seroprevalence of HSV-2 identified was 42% in Brazilian women, while in the Philippines the rate found was only 9.2%.[21]

In addition to these, other studies with different methodologies and populations obtained seroprevalence lower than that found in our study17,19,20,22. However, it should be noted that this discrepancy in HSV-2 seroprevalence can be explained by differences in prophylaxis strategies in each country to prevent this infection.[19]

In Brazil, there are few studies evaluating the seroepidemiology of HSV-2 among incarcerated people. Despite this limitation, the seroprevalence found in this study (80%) was higher than the 43.1% reported in a unit in Mato Grosso do Sul. [24]

The seroprevalence of HSV-2 infection observed in this study is also higher than that found in previous studies carried out with the prison population of other countries, such as the 14.5% described in Nigeria[25] and 19.9% from Portugal.[26]

Additionally, the scarcity of studies with information related to HSV-2 infection in women deprived of liberty makes it difficult to understand the reality that permeates the prevalence and

behaviors associated with this infection. Although potentially all women are vulnerable to HSV-2 infection, there are some groups particularly more exposed to certain conditions that make them more susceptible and, consequently, at greater risk of developing the disease.[15]

In this sense, several risk factors have been described in the literature as facilitators in the acquisition of HSV-2. Among them are early sexual intercourse, previous history of STIs and multiple sexual partners.[22] In the present study, although the history of STIs was not evaluated, most women reported having experienced their first sexual intercourse before the age of sixteen, as well as having already worked as a sex worker, in addition to not making frequent use of condoms. This finding may explain the high prevalence of HSV-2 found, since risky sexual behavior can facilitate the acquisition of the disease.

Furthermore, the condition of sharing a cell with three or more women was statistically significant in the seroprevalence of antibodies against HSV-2 in this population. This finding corroborates the study by GHEBREKIDAN et al.[27] (1999) which identified greater susceptibility in socioeconomically vulnerable groups, with greater frequency of physical contact. Similarly, ALMEIDA[24] (2018) observed that prisoners who share a cell with more people are 7.3 times more likely to have active HSV-2 infection. This is because overcrowding increases contact between prisoners, facilitating the acquisition of infection due to intimate contact and lack of hygiene.

It is important to take into account that, only from the discussion on the social determinants of health (SDH), did it come to understand that the circumstances in which populations live, work and age directly impact life and health. In this way, inequalities in access to minimum living conditions become unjust and avoidable inequalities. Unfortunately, these ills are reinforced in the prison environment.[28]

It should be noted that direct comparisons with the results obtained in this study must be made with care due to the specificities of the population studied, as well as the methodological path employed.

There are some limitations in our study. Firstly related to obtaining data based on intimate behavior, which may be susceptible to memory bias, in addition to possible adequacy of responses, especially in relation to variables related to sexual behavior, favoring the formation of biases among the study variables. In addition, the scarcity of works and data in the literature on HSV-2 infection in the female prison population around the world limited the discussion of the results, evidencing the lack of more information about this type of population.

It is also important to mention the difficulty in identifying the health status of these women prior to imprisonment, so that this condition makes it impossible to indicate whether they were first infected in the penal establishment or not, considering that in the case of herpes simplex 2 infection it

is not possible to estimate the incidence, since there is a possibility of viral latency. Despite this, these women present risky practices and are exposed to situations previously identified in the literature as facilitators for the acquisition and transmission of HSV-2 in these establishments.

Conclusion

The seroprevalence of antibodies against herpes simplex virus 2 in this study was high. These findings show how fundamental the health care of the population deprived of liberty is. Additionally, the results of this study indicate that there is a need to structure health education actions that consider the specificities of this population, as well as the urgency in implementing adequate care for individuals with STIs in penal institutions, in order to reduce situations that increase the vulnerability of this population.

Referências

1. World Prison Brief [Internet]. Highest to lowest – Prison Population Total. [citado 2 dezembro 2022]. Disponível em: https://www.prisonstudies.org/highest-to-lowest/prison-population-total?field_region_taxonomy_tid=All

2. Brasil. Ministério da Justiça e Segurança Pública, Departamento Penitenciário Nacional. Levantamento Nacional de Informações Penitenciárias – junho de 2022. Disponível em: https://app.powerbi.com/view?r=eyJrIjoiNWQ0ODM1OTQtMmQ2Ny00M2IyLTk4YmUtMTdhYzI4N2ExMWM3IiwidCI6ImViMDkwNDIwLTQ0NGMtNDNmNy05MWYyLTRiOGRhNmJmZThlMSJ9

3. Barros MAR, Nascimento ML, Galiza DDF. Perfil sexual de presidiárias. Revista de enfermagem UFPE online. 2017; 11(10): 3830-5. http://DOI:10.5205/reuol.12834-30982-1-SM.1110201717

4. Utida EG, Gomes MFP, Bravo DS, Santos MS, Lazarini CA. Incidência das infecções sexualmente transmissíveis (IST'S) da população privada de liberdade. Rev Saúde & Ciência online. 2021; 10(1):30-41. https://doi.org/10.35572/rsc.v10i1.433

5. Brasil. Constituição (1988). Constituição da República Federativa do Brasil. Brasília: Senado Federal; 1988.

6. Costa APA, Soler O, Queiroz LMD. Assistência farmacêutica prisional paraense: fatores determinantes ao acesso aos medicamentos e ao direito à saúde. Rev Ciência & Saúde Coletiva. 2022; 27(12):4579-88. https://doi.org/10.1590/1413-812320222712.10742022

7. Neves U. Sífilis: aumento mais de 4.000% dos casos no Brasil. [publicado na web]; 2019 acesso em 05 de novembro de 2021. Disponível em https://pebmed.com.br/sifilis-aumento-mais-de-4-000-dos-casos-no-brasil/

8. Borges AVSS, Matos MA, Souza JHB, Souza FR, Fiorentino VJ. Construção e validação de tecnologia educacional para prevenção do HIV/AIDS em mulheres privadas de liberdade. Rev Cogitare Enf. 2023; 28. https://doi.org/10.1590/ce.v28i0.84636

9. Omarova S, Cannon A, Weiss W, Bruccoleri A, Puccio J. Genital Herpes Simplex Virus-An Updated Review. Adv Pediatr. 2022;69(1):149-162. https://doi:10.1016/j.yapd.2022.03.010

10. Abbai NS, Wand H, Ramjee G. Socio-demographic and behavioural characteristics associated with HSV-2 sero-prevalence in high-risk women in KwaZulu-Natal. BMC Rearch Notes. 2015; 8 (185): 1-5. https:// DOI:10.1186/s13104-015-1093-0

11. Benedetti MSG, Fonseca AJ. Infecções sexualmente transmissíveis em mulheres privadas de Liberdade em Roraima. Rev Saúde Pública. 2020; 54(105): 1-11. https://doi.org/10.11606/s1518-8787.2020054002207

12. Gusmão MAJX, Nascimento VF, Hattori TY, Silva JH, Atanaka M, Lemos ERS, et al. Soroprevalência de sífilis e fatores associados ao encarceramento feminino. RUEP. 2020; 17(46):5-17.

13. Graça BC, Mariano MM, Silva JH, Nascimento VF, Hattori TY, Terças-Trettel ACP. Perfil epidemiológico e prisional das detentas de um munícipio do médio norte de Mato Grosso. Semina: ciências biológicas e da Saúde. 2018; 39(1): 59-68. http://dx.doi.org/10.5433/1679-0367.2018v39n1p59

14. Carvalho FF, Takeda E, Chagas EFB, Pinheiro OL. Conhecimento da população privada de liberdade sobre infecções sexualmente transmissíveis. Revista Gaúcha de Enfermagem. 2020;41:e20190268. https://doi.org/10.1590/1983-1447.2020.20190268

15. Martins NVDN, Nichiata LYI, Bertolozzi MR, Mafra AVR, Sousa RJDA. Sexually Transmitted Infections in the context of deprivation of liberty. Research Society and development. 2021; 10(1): 1-14. https://doi.org/10.33448/rsd-v10i1.12044

16. Clemens SAC, Farhat CK. Soroprevalência de anticorpos contra vírus herpes simples 1-2 no Brasil. Revista de Saúde Pública. 2010; 44(4): 726-34. https://doi.org/10.1590/S0034-89102010000400017

17. Sauerbrei A, Schmitt S, Scheper T, Brandstadt A, Saschenbrecker S, Motz M et al. Seroprevalence of herpes simplex virus type 1 and type 2 in Thuringia, Germany, 1999 to 2006. Euro Surveill. 2011;16(44):20005.

18. Karad AB, Khade SL. Seroepidemiological study of herpes simplex virus type 2 infection in HIV positive patients, Delhi, India, 2007. International Journal of Medicine and Public Health. 2013;3(3):168-172. DOI: 10.4103/2230-8598.118968

19. Warnecke JM, Pollmann M, Loholter VB, Soto AM, Kaya S, Sener AG. Seroprevalences of antibodies Against ToRCH infectious pathogens in women of childbearing age residing in Brazil, Mexico, Germany, Poland, Turkey and China. Epidemiology and Infection. 2020;148: e271. DOI: 10.1017/S0950268820002629

20. Cowan FM, French RS, Mayaud R, Gopal R, Robinson NJ, Oliveira SA et al. Seroepidemiological study of herpes simplex virus types 1 and 2 in Brazil, Estonia, India, Marocco and Sri Lanka. Sex Transm Infect. 2003; 79:286-290. https://doi: 10.1136/sti.79.4.286.

21. Smith JS, Herrero R, Bosetti C, Muñoz N, Bosch FX, Eluf-Neto J, et al. Herpes simplex virus-2 as a human papillomavirus cofactor in the etiology of invasive cervical cancer. J Natl Cancer Inst. 2002;94(21):1604-13. DOI: 10.1093/jnci/94.21.1604

22. Caldeira TDM, Gonçalves CV, Oliveira GR, Fonseca RG, Amaral CT et al. Prevalence of herpes simplex virus type 2 and risk factors associatedwith this infection in women in southern brazil Revista Inst Med Trop. 2013;55(5): 315-21. DOI: 10.1590/S0036-46652013000500004

23. Warnecke JM, Pollmann M, Loholter VB, Soto AM, Kaya S, Sener AG. Seroprevalences of antibodies Against ToRCH infectious pathogens in women of childbearing age residing in Brazil, Mexico, Germany, Poland, Turkey and China. Epidemiology and Infection. 2020;148: e271. DOI: 10.1017/S0950268820002629

24. Almeida NAR. Estudo de prevalência do herpes vírus humano (HHV-2) na população carcerária do Estado do Mato Grosso do Sul [dissertação]. Rio de Janeiro: Instituto Oswaldo Cruz, 2018.

25. Ibrahim A, Adamu IA, Haruna A. Seroepidemiology of herpes simplex virus type 2 (HSV-2) among incarcerated population of potiskum médium security prison potiskum yobe state: study of prevalence and associated risk factors. International Journal of Current Microbiology and Applied Sciences. 2015; 4(3):632-37.

26. Marques NM, Margalho R, Melo MJ, Cunha JG, Meliço-Silvestre AA. Seroepidemiological survey of transmissible infectious diseases in a portuguese prison establishment. Braz J Infect Dis. 2011 May-Jun;15(3):272-5.

27. Ghebrekidan H, Ruden U, Coxa S, Wahre B, Grandien M. Prevalence of herpes simplex virus types 1 and 2, cytomegalovirus, and varicella-zostes virus infections in Eritrea. Journal of Clinical Virology. 1999; 12(1):53-64. https://doi.org/10.1016/S0928-0197(98)00064-6

28. Ferreira MRL, Andrade RLP, Bossonario PA, Fiorati RC, Arcêndio RA et al. Determinantes sociais da saúde e desfecho desfavorável do tratamento da tuberculose no sistema prisional. 2022; 27(12):4451-59. https://doi.org/10.1590/1413-812320222712.08632022

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