Revista Brasileira de Enfermagem
REBEn

RESEARCH

Low completion rate of hepatitis B vaccination in female sex workers

Baixa completude da vacina contra hepatite B em mulheres profissionais do sexo

Esquema incompleto de vacunación contra hepatitis B en mujeres profesionales del sexo

Rosilane de Lima Brito Magalhães[I], Sheila Araújo Teles[II], Renata Karina Reis[III], Marli Teresinha Gimeniz Galvão[IV], Elucir Gir[III]

[I] *Universidade Federal do Piauí, Postgraduate Program in Nursing. Teresina, Piauí, Brazil.*
[II] *Universidade Federal de Goiás, College of Nursing and Nutrition, Nursing Department. Goiânia, Goiás, Brazil.*
[III] *Universidade de São Paulo, Ribeirão Preto College of Nursing. Ribeirão Preto, São Paulo, Brazil.*
[IV] *Universidade Federal do Ceará, Nursing Department. Fortaleza, Ceará, Brazil.*

How to cite this article:
Magalhães RLB, Teles SA, Reis RK, Galvão MTG, Gir E. Low completion rate of hepatitis B vaccination in female sex workers. Rev Bras Enferm [Internet]. 2017;70(3):489-94. DOI: http://dx.doi.org/10.1590/0034-7167-2016-0567

Submission: 10-24-2016 **Approval:** 11-04-2016

ABSTRACT

Objective: to assess predictive factors for noncompletion of the hepatitis B vaccination schedule in female sex workers in the city of Teresina, Northeastern Brazil. **Method:** 402 women were interviewed and, for those who did not wish to visit specialized sites, or did not know their hepatitis B vaccination status, the vaccine was offered at their workplaces. Bi- and multivariate analyses were performed to identify potential predictors for noncompletion of the vaccination schedule. **Results:** of the 284 women eligible for vaccination, 258 (90.8%) received the second dose, 157/258 (60.8%) and 68/258 (26.3%) received the second and third doses, respectively. Working at clubs and consuming illicit drugs were predictors for noncompletion of the vaccination schedule. **Conclusion:** the high acceptability of the vaccine's first dose, associated with low completion rates of the vaccination schedule in sex workers, shows the need for more persuasive strategies that go beyond offering the vaccine at their workplaces.
Descriptors: Sex workers; Immunization; Hepatitis B; Women; Vulnerable Populations.

RESUMO

Objetivo: avaliar fatores preditores de não completude do esquema vacinal contra hepatite B em mulheres que se prostituem em Teresina, Nordeste do Brasil. **Método:** Um total de 402 mulheres foi entrevistado e, para as que se negaram a irem a lugares especializados, ou desconheciam sua situação vacinal contra hepatite B, a vacina foi oferecida no local do trabalho. Análises bi e multivariadas foram realizadas para identificar potenciais preditores de não completude do esquema vacinal. **Resultados:** Das 284 mulheres elegíveis para vacinação, 258 (90,8%) receberam a primeira dose, 157/258 (60,8%) e 68/258 (26,3%) receberam a segunda e terceira doses. Trabalhar em boates e consumir drogas ilícitas foram preditores de não completude do esquema vacinal ($p < 0,05$). **Conclusão:** A elevada aceitabilidade da primeira dose da vacina, associada à baixa completude do esquema vacinal em profissionais do sexo, evidencia a necessidade de estratégia mais persuasiva que vá além da oferta da vacina no local de trabalho.
Descritores: Profissionais do Sexo; Imunização; Hepatite B; Mulheres; População Vulnerável.

RESUMEN

Objetivo: Evaluar factores predictores del no completamiento del esquema de vacunación contra la hepatitis B en mujeres que se prostituyen en Teresina, noreste de Brasil. **Método**: Fueron entrevistadas 402 mujeres. Para las que se negaron a ir a lugares especializados o desconocían su situación de vacunación contra la hepatitis B, la vacuna fue ofrecida en lugar de trabajo. Fueron efectuados análisis multivariados para identificar potenciales predictores del no completamiento del esquema de vacunación. **Resultados**: de las 284 mujeres elegibles para vacunación, 258 (90,8%) recibieron primera dosis, 157/258 (60,8%) y 68/258 (26,3%) recibieron segunda y tercera dosis. Trabajar en burdeles y consumir drogas fueron factores predictores de no completamiento del esquema ($p < 0,05$).
Conclusión: La elevada aceptación de la primera dosis, asociada al bajo completamiento del esquema de vacunación en profesionales del sexo, evidencia necesidad de una estrategia más persuasiva, más allá de la oferta de vacunación en el lugar de trabajo.
Descriptores: Trabajadores Sexuales; Inmunización; Hepatitis B; Mujeres; Poblaciones Vulnerables.

CORRESPONDING AUTHOR **Rosilane de Lima Brito Magalhães** E-mail: rosilane@ufpi.edu.br

INTRODUCTION

The hepatitis B virus (HBV) can cause acute and/or chronic hepatitis B and its complications, such as cirrhosis and hepatocellular carcinoma[1]. Globally, around two billion people have already been infected with this virus and 240 million are chronic carriers[2-3]. In Brazil, where hepatitis B endemicity is low[4], a higher prevalence for this infection has been observed in more vulnerable populations, such as sex workers[5-6].

The hepatitis B vaccine is the most effective measure for prevention. In Brazil, since the end of the 90s, that measure has been part of the vaccination calendar for children and also for some specific population groups, such as sex workers. Currently, it is offered for the whole population below the age of 50 and populations at higher risk, such as sex workers, drug users and men who have sex with men (MSM)[8]. Despite this policy, hepatitis B vaccination coverage is still low among its target demographics[5,9-12]. Thus, some strategies have been suggested for this population subgroups, such as the use of accelerated schedules and vaccination at the workplace[13-14].

The objective of this study was to assess predictive factors for noncompletion of the hepatitis B vaccination schedule in female sex workers in the Teresina, Northeastern Brazil.

METHOD

Ethical aspects

The research project was approved by the local Human Research Ethics Committee of the Federal University of Piauí.

Study setting and design

A cross-sectional, analytical study was conducted from March 2012 to March 2015. Participants were female sex workers from the city of Teresina, Northeastern Brazil. The vaccine's first dose was offered to everyone who declined to answer or did now know their hepatitis B vaccination status and a cohort was created to assess their schedule completion.

Population

Teresina has an estimated population of 844,245 inhabitants and an HDI of 0.751v[15]. According to the Piauí Association of Prostitutes (APROSPO, as per its acronym in Portuguese), there is an estimate of 600 sex workers in Teresina (personal communication). Thus, considering an HBV susceptibility of approximately 80% in female sex workers (FSWs) [5-6], with a 5% tolerable error, a 95% confidence level and 2.0 design effect, the estimated number of women to compose the sample was 350. In order to compensate for losses and refusals, 15% were added to the previous number.

Inclusion criteria were: being a FSW, aged 18 or above, without previous hepatitis B vaccination or without knowledge of their vaccination status and living in Teresina, state of Piauí. Exclusion criterion was being transsexual women.

Study protocol

Verbal reports and/or records in the vaccination card were considered when assessing previous vaccinations.

Because this is a difficult population to find, the snowball technique was employed in order to obtain participants[16]. Thus, initially, through the APROSPI, five key-FSWs were contacted and invited to participate in the study. These women worked at different parts of the city of Teresina. They were asked to invite other women who, in turn, would invite their peers and so on, until reaching the desired sample size.

All participants were interviewed for sociodemographic (age, education, marital status and work location) and behavioral data [(number of sexual partners/week, use of condom during sexual intercourse, tattoos and/or body piercings, prior history of drug use and prior history of sexually transmitted diseases (STDs)], in addition to information on prior vaccinations. Interviews took place at a private site previously agreed upon by the research team and participants, and they were conducted by a previously trained team. In case participants were eligible according to the interview, the first dose of the hepatitis B vaccine was offered. The following doses were scheduled at times and days chosen by the participants. After three unsuccessful scheduled vaccinations, they were considered lost to follow-up.

The variable for conclusion of the study was completion of the three hepatitis B vaccine doses. Predictive variables were: age, education, stable partnership, another work activity, place of prostitution, presence of tattoos and/or body piercings, prior drug use, use of condoms during sexual intercourse, number of sexual partnerships and history of STDs.

The vaccine employed in the study was the VrHB-IB®, produced by the Butantan Institute and available at public health services. The vaccine was administered intramuscularly at the deltoid muscle, in three doses (1 mL/dose), at 30 and 150-day intervals; between the first and second doses, and second and third doses, respectively[17].

Analysis of results and statistics

Interview data and adherence to vaccination were coded and doubly entered in a Microsoft® Excel for Windows 2007 spreadsheet. All data were then exported to the IBM® SOSS® 15.0 software. Descriptive statistical analysis was then conducted, with absolute frequency, relative frequency, mean, median and standard deviation (SD) values estimated. The chi-squared test and Student's t-test were employed to analyze differences between proportions and means, respectively. Variables that presented p-values <0.10 were included in a backward logistic regression model. Variables with p-values <0.05 were considered statistically significant.

RESULTS

A total of 402 female sex workers in Teresina, state of Piauí, Brazil, participated in the study. Their mean age was 31.3 years (SD = 9.6) (Table 1). Of all FSWs, 2.7% reported having over 11 years of education, 29.4% from 9 to 11 years, 45.8% from 5 to 8 years, 12.7% from 1 to 4 years and the remaining (9.5%) never attended school. Most (71.9%) reported monthly incomes close to one minimum wage (from R$ 600.00 to R$ 1,000.00). As for marital status, 232 (57.7%) reported having partners.

Almost half of the women (45.5%) worked at squares and bars in the city, 36.8% at brothels and 17.7% at clubs/show houses.

Table 1 – Sociodemographic characteristics of 402 female sex workers in Teresina, Piauí, Brazil

Variable	n	%
Age (years) (mean; SD)	28,5 (10,25)	
Stable partnership		
Yes	232	57.7
No	170	42.3
Education (years of study)		
None	38	9.5
1-4	51	12.7
5-8	184	45.8
9-11	118	29.4
>11	11	2.7
Another professional occupation		
Yes	101	25.1
No	301	74.9
Place of prostitution		
Club	71	17.7
Brothels	148	36.8
Squares and bars	183	45.5

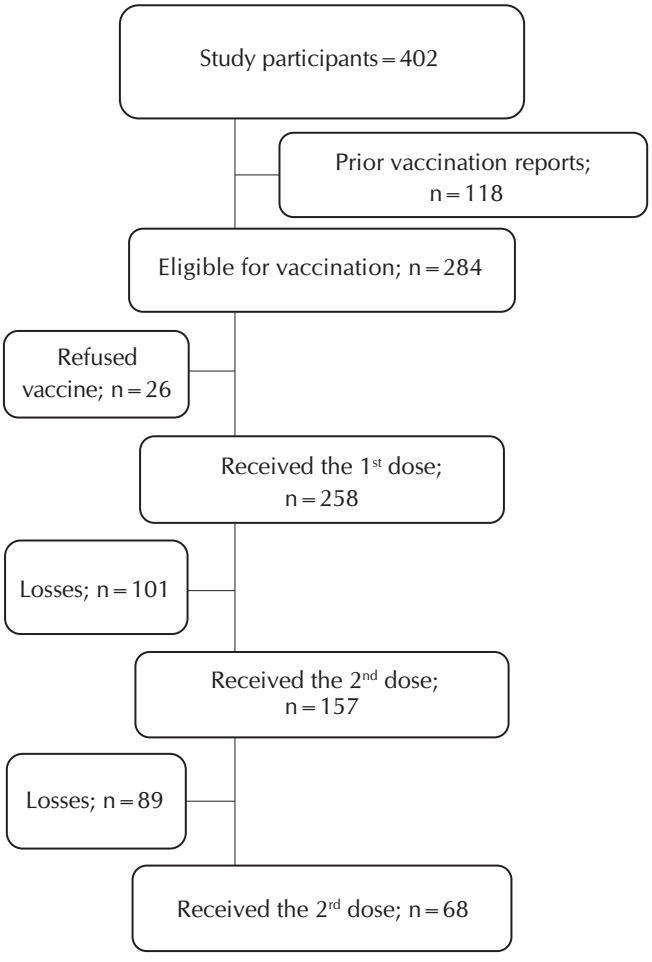

Figure 1 – Flowchart of hepatitis B vaccination in female sex workers in Teresina, Piauí, Brazil

Of the 402 women, 118 reported prior vaccination, 34 could not answer and the remaining (n = 250) reported not having received the hepatitis B vaccine. Thus, 284 were eligible for vaccination. Of that total, 258 (90.8%; 95% CI: 86.92-93.68) accepted receiving the first dose of the vaccine. However, the second and third doses were administered to 157 (60.8%; 95% CI: 57.78%-66.61%) and 68 (26.3%; 95% CI 21.36%-32.05%), respectively (Figure 1).

Among reasons given for missing follow-up, geographic mobility was the main cause (n = 155). Other reasons were: no free time on the scheduled dates (n = 4), prison detention (n = 4); hospitalization (n = 3); quitting prostitution (n = 11) and refusal (n = 12).

Table 2 presents the bivariate analysis of potential predictors for noncompletion of the hepatitis B vaccination schedule in female sex workers in Teresina, Northeastern Brazil.

Table 2 – Bivariate analysis of potential predictive factors for noncompletion of the three doses of hepatitis B vaccine in female sex workers in Teresina, Piauí, Brazil

Variable	Complete schedule				*p* value
	Yes	%	No	%	
Education (years)					
≥ 12	2	40.0	3	60.0	
9-11	16	20.3	63	79.7	0.556
5-8	34	29.8	80	70.2	
1-4	10	29.4	24	70.6	
None	6	23.1	20	76.9	
Stable partnership					
Yes	35	23.6	113	76.4	0.252
No	33	30.0	77	70.0	
Another professional activity					
Yes	23	37.1	39	62.9	
No	45	23.0	151	77.0	0.028
Place of work					
Bars/streets/squares	39	33.6	77	66.4	**<0.001**
Brothel	28	29.2	68	70.8	
Club	1	2.2	45	97.8	
Tattoo					
No	41	30.4	94	69.6	
Yes	27	22.0	96	78.0	0.125
Piercing					
No	58	30.9	130	69.1	
Yes	10	14.3	60	85.7	0.007
Use of illicit drugs					
No	54	30.3	124	69.7	
Yes	14	17.5	66	82.5	0.030
Condom during sexual intercourse					
Regularly	40	28.34	101	71.6	
Sometimes	14	21.5	51	78.5	
Never	11	23.9	35	76.1	0.552

To be continued

Table 2 (concluded)

Variable	Complete schedule				*p* value
	Yes	%	No	%	
Number of partners/week					
1-5	28	29.8	66	70.2	
6-10	10	17.9	46	82.1	0.221
>10	29	29.3	70	70.7	
Prior STD					
No	59	26.7	162	73.3	
Yes	9	25.7	26	74.3	0.903
	n	**Mean**	**n**	**Mean**	***p* value**
Age (years)	68	33.8	190	30.4	0.011

The mean age of women who did not complete the schedule was lower when compared to those who completed it (30.7 vs. 33.8 years; p = 0.023). In addition, higher proportions for noncompletion of vaccination schedule were observed in women who reported only prostitution as their source of income, who had body piercings, used illegal drugs and who worked at brothels (p < 0.5). These variables were included in a multivariate logistic regression model (Table 3).

Table 3 – Multivariate analysis of potential predictive factors for noncompletion of the three doses of hepatitis B vaccine in female sex workers in Teresina, Piauí, Brazil

Variable	Incomplete schedule		*p* value
	OR adjusted	95% CI	
Age (mean)[1]	0.99	0.96-1.03	0.70
Piercing[2]			
No	1.00		
Yes	1.46	0.65-3.27	0.357
Another professional activity[3]			
Yes	1.0		
No	1.64	0.85-3.17	0.142
Place of work[4]			
Bars/streets/squares	1.00		
Brothel	1.14	0.63-2.07	0.664
Club	23.21	3.08-175.39	0.002
Use of illicit drugs[4]			
No	1.00		
Yes	2.19	1.11-4.31	0.024

Note: [1]adjusted by age, other professional activities, work place, body piercings and use of illicit drugs; [2]adjusted for body piercings, other professional activities, place of work and illicit drugs; [3]adjusted for other professional activities, place of work and use of illicit drugs; [4]adjusted for place of work and use of illicit drugs; OR - odds ratio; CI – confidence interval.

It is noteworthy that women who used illicit drugs presented a 2.19 (CI 95%: 1.11 - 4.31) chance of not completing the schedule when compared to those who did not use those drugs. As for women who worked at clubs, the chance was 23.21 (95% CI: 3.08 - 175.39) when compared to those who worked at streets and squares around the city.

DISCUSSION

The studied population was composed, mostly, of young women with low education. These characteristics seem common among female sex workers in Brazil and in other countries[9,18-22].

In this study, as well as in others conducted with difficult to reach populations, adherence to the first dose was good, demonstrating this population's willingness for vaccination[9-10,23]. However, the second and, especially, the third doses challenged the health workers. In fact, almost all eligible women received the first dose of the vaccine. However, almost a third of the women did not return in the interval between the first and second doses, and practically a fourth (26.3%; 95% CI 21.36-32.05) of those who received the first dose completed the vaccination schedule, which is a worse result than the previous ones.

In Belgium, a multi-centric study[24] demonstrated an overall completion rate of 40.2% (95% CI: 35.21-45.46) in 358 women. Another research, also conducted in Belgium[23], assessed 474 women who received the conventional schedule and observed a rate of 47.9% (95% CI: 43.43 - 52.39). In Brazil, in a study conducted in two midwestern state capitals, 37.5% (95% CI: 32.84-42.44) of the 389 women who received the first dose completed the vaccination schedule[9].

Despite the high frequency of missed follow-ups, especially due to the participants geographical mobility, two factors remained independently associated with noncompletion of the schedule: use of illicit drugs and working at clubs.

In the context of HIV/AIDS, studies demonstrate that use of illicit drugs is associated with lower adherence to antiretroviral treatment[25-26]. Interestingly, a similar behavior has been observed in relation to the hepatitis B vaccination in female sex workers. This study and the one conducted in Belgium[24] found a negative effect of illicit drug use on completion of the vaccination schedule.

In Teresina, there is a high turnover of women who work at clubs and, in general, they receive higher pay per session when compared to those who work at public spaces, bars or brothels (data not presented). This may have contributed for the low completion of the vaccination schedule. Only 2.2% of women who worked at clubs received the three vaccine doses vs. 33.6% of those who worked at bars/streets and squares. A study conducted in MPS, midwestern Brazil, showed higher chance for completion of vaccination schedule for women who worked on streets or brothels, which suggests that the strategy of vaccination at the workplace reached the most vulnerable women[9]. Our results confirm this assumption.

Study limitations

The number of losses must be considered a study limitation, despite being a common limitation of studies involving follow-up in difficult to reach populations, such as sex workers.

Contributions to the nursing field

The identification of predictive factors in this study can guide better strategies for hepatitis B vaccination schedule completion, according to workplace and individual characteristics of female sex workers, for infection reduction, considering the good

acceptance of vaccination by this population. There is also the need for participation of nurses and other professionals, aiming to vaccinate these women at workplaces and provide guidance on the importance of completing the vaccination schedule.

CONCLUSION

Analysis of predictive factors for hepatitis B vaccination schedule completion in female sex workers in Teresina, Piauí, Brazil, enabled the knowledge that age, work location, body piercings, illicit drug use and other professional activities were related to noncompletion of the proposed vaccination schedule.

The high acceptability of the vaccine's first dose, associated with low completion of the vaccination schedule in female sex workers, shows the need for more persuasive strategies that go beyond offering the vaccine at their workplaces, also making them aware of the importance of completing the schedule, especially for drug users and those working at clubs.

FUNDING

To the STD/AIDS and Viral Hepatitis Department of the Brazilian Ministry of Health, to the United Nations Office on Drugs and Crime. Agreement letter 130/2013.

REFERENCES

1. Trepo C, Chan HL, Lok A. Hepatitis B virus infection. Lancet [Internet]. 2014 [cited 2016 Dec 10]; 384(9959):2053-63. Available from: http://thelancet.com/journals/lancet/article/PIIS0140-6736(14)60220-8/abstract
2. Ott JJ, Stevens GA, Groeger J, Wiersma ST. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. Vaccine [Internet]. 2012 [cited 2016 Dec 10];30(12):2212-9. Available from: https://www.ncbi.nlm.nih.gov/pubmed/22273662
3. World Health Organization. Prevention & Control of Viral Hepatitis Infection: Framework for Global Action. Geneva: WHO; 2012.
4. Pereira LMMB, Ximenes RAA, Moreira RC. Estudo de prevalência de base populacional das infecções pelos vírus das hepatites HEPATITES A, B e C nas Capitais do Brasil. Recife: Universidade Federal de Pernambuco [Internet]. 2010 [cited 2010 Jul 28]. Available from: http://www.aids.gov.br/sites/default/files/anexos/publicacao/2010/50071/estudo_prevalencia_hepatites_pdf_26830.pdf
5. Passos ADC, Figueiredo JFC, Martinelli ALC, Villanova MG, Nascimento MP, Gaspar AMC, et al. Hepatitis B among female sex workers in Ribeirão Preto - São Paulo, Brasil. Rev Bras Epidemiol. 2007;10:517-24.
6. Schuelter-Trevisol F, Custodio G, Silva AC, Oliveira MB, Wolfart A, Trevisol DJ. HIV, hepatitis B and C, and syphilis prevalence and coinfection among sex workers in Southern Brazil. Rev Soc Bras Med Trop[Internet]. 2013[cited 2016 Dec 10];6(4):493-7. Available from: http://www.scielo.br/pdf/rsbmt/v46n4/0037-8682-rsbmt-00-00-13.pdf
7. Romano L, Paladini S, Van Damme P, Zanetti AR. The worldwide impact of vaccination on the control and protection of viral hepatitis B. Dig Liver Dis [Internet]. 2011 [cited 2016 Dec 10];43(Supl 1):S2-7. Available from: http://www.dldjournalonline.com/article/S1590-8658(10)60685-8/pdf
8. Brasil. Nota informativa nº. 149, de 2015/CGPNI/DEVIT/MS. Brasília: Ministério da Saúde; 2015.
9. Carneiro LM, Mousquer GJ, Pinheiro RS, Castro AR, Franca DD, Caetano K, et al. Outreach hepatitis B vaccination of female sex workers in central-west Brazil: immunization status, compliance, and immune response. J Public Health Manag Pract [Internet]. 2014 [cited 2016 Dec 10];20(6):662-6. Available from: https://www.ncbi.nlm.nih.gov/pubmed/24378607
10. Silva LN, Silva Franca DD, Del-Rio NH, Santos Carneiro MA, Martins RM, Guimaraes RA, et al. Low prevalence, low immunization and low adherence to full hepatitis B vaccine scheme and high-risk behaviors among crack cocaine users in central Brazil. J Infect Public Health [Internet]. 2016 [cited 2016 Dec 10];10(1):76–83. Available from: http://www.jiph.org/article/S1876-0341(16)30009-0/abstract
11. Ferreira RC, Rodrigues FP, Teles SA, Lopes CL, Motta-Castro AR, Novais, AC, et al. Prevalence of hepatitis B virus and risk factors in Brazilian non-injecting drug users. J Med Virol [Internet]. 2009 [cited 2016 Dec 10];81(4):602-9. Available from: https://www.ncbi.nlm.nih.gov/pubmed/19235862
12. Oliveira SA, Hacker MA, Oliveira ML, Yoshida CF, Telles PR, Bastos FI. A window of opportunity: declining rates of hepatitis B virus infection among injection drug users in Rio de Janeiro, and prospects for targeted hepatitis B vaccination. Rev Panam Salud Publica [Internet]. 2005 [cited 2016 Dec 10];18(4-5):271-7. Available from: http://www.scielosp.org/pdf/rpsp/v18n4-5/28089.pdf
13. Baars JE, Boon BJ, Garretsen HF, Van de Mheen D. Vaccination uptake and awareness of a free hepatitis B vaccination program among female commercial sex workers. Womens Health Issues [Internet]. 2009 [cited 2016 Dec 10];19(1):61-9. Available from: http://www.whijournal.com/article/S1049-3867(08)00135-7/pdf
14. Christensen PB, Fisker N, Krarup HB, Liebert E, Jaroslavtsev N, Christensen K, Georgsen J. Hepatitis B vaccination in prison with a 3-week schedule is more efficient than the standard 6-month schedule. Vaccine. 2004; 22(29-30): 3897-901.
15. Brasil. Instituto Brasileiro de Geografia e Estatística. IBGE. Estimativas de população [Internet]. 2015 [cited 2016 Dec 10]. Available from: ftp://ftp.ibge.gov.br/Estimativas_de_Populacao/Estimativas_2015/estimativa_dou_2015_20150915.pdf

16. Sadler GR, Lee HC, Lim RS, Fullerton J. Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. Nurs Health Sci. 2010;12(3):369-74.

17. USA. Centers for Disease Control and Prevention CDC. Hepatitis B: Epidemiology and prevention of vaccine- preventable Diseases [Internet]. 2011. [cited 2016 Dec 10]; Available from: httt:/www.cdc.gov./vaccines/pubs/pinkbook

18. Damacena GN, Szwarcwald CL, Souza Junior PR, Dourado I. Risk factors associated with HIV prevalence among female sex workers in 10 Brazilian cities. J Acquir Immune Defic Syndr [Internet]. 2011 [cited 2016 Dec 10];57(Supl 3):144-52. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21857310

19. Kassak K, Mahfoud Z, Kreidieh K, Shamra S, Afifi R, Ramia S. Hepatitis B virus and hepatitis C virus infections among female sex workers and men who have sex with men in Lebanon: prevalence, risk behaviour and immune status. Sex Health [Internet]. 2011 [cited 2016 Dec 10];8(2):229-33. Available from: http://www.publish.csiro.au/SH/SH10080

20. Locarnini S, Hatzakis A, Chen DS, Lok A. Strategies to control hepatitis B: Public policy, epidemiology, vaccine and drugs. J Hepatol [Internet]. 2015 [cited 2016 Dec 10];62(Supl 1):76-86. Available from: http://www.journal-of-hepatology.eu/article/S0168-8278(15)00049-5/pdf

21. Pando MA, Bautista CT, Maulen S, Duranti R, Marone R, Rey J, et al. Epidemiology of human immunodeficiency virus, viral hepatitis (B and C), treponema pallidum, and human T-cell lymphotropic I/II virus among men who have sex with men in Buenos Aires, Argentina. Sex Transm Dis [Internet]. 2006 [cited 2016 Dec 10];33(5):307-13. Available from: https://www.ncbi.nlm.nih.gov/pubmed/16540880

22. Todd CS, Nasir A, Stanekzai MR, Bautista CT, Botros BA, Scott PT, et al. HIV, hepatitis B, and hepatitis C prevalence and associated risk behaviors among female sex workers in three Afghan cities. AIDS [Internet]. 2010 [cited 2016 Dec 10];24(Supl 2):69-75. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3650731/pdf/nihms237453.pdf

23. Mak R, Traen A, Claeyssens M, Van Renterghem L, Leroux-Roels G, Van Damme P. Hepatitis B vaccination for sex workers: do outreach programmes perform better? Sex Transm Infect [Internet]. 2003 [cited 2016 Dec 10];79(2):157-9. Available from: http://sti.bmj.com/content/79/2/157.full

24. Wouters K, Leuridan E, Van Herck K, Van Ardenne N, Roelofs I, Mak R, et al. Compliance and immunogenicity of two hepatitis B vaccination schedules in sex workers in Belgium. Vaccine [Internet]. 2007 [cited 2016 Dec 10];25(10):1893-900. Available from: https://www.ncbi.nlm.nih.gov/pubmed/17239492

25. De Boni RB, Shepherd BE, Grinsztejn B, Cesar C, Cortes C, Padgett D, et al. Substance Use and Adherence Among People Living with HIV/AIDS Receiving cART in Latin America. AIDS Behav [Internet]. 2016 [cited 2016 Dec 10];20(11):2692-9. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27091028

26. Malta M, Magnanini MM, Strathdee SA, Bastos FI. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. AIDS Behav [Internet]. 2010 [cited 2016 Dec 10];14(4):731-7. Available from: http://link.springer.com/content/pdf/10.1007%2Fs10461-008-9489-7.pdf