Vaccination status of medical students and faculty members

Situação vacinal de estudantes e professores de um Curso de Medicina

Estado de vacunación de estudiantes y profesores de un Curso de Medicina

Aléxia Alves Cabral[1], Cecília Pereira Silva[1]*, Fernanda del Carlo Cândido[1], Igor Dutra Braz[1], Izabella dos Santos Gomes[1], Júlia de Castro Faria[1], Júlio Cesar Goulart Fonseca[1].

ABSTRACT

Objectives: To analyze the student's and professor's vaccinal situation of a medical course. **Methods:** It is a transversal and quantitative research, done in 2019, which aimed to identify if preconized vaccines of Programa Nacional de Imunização (PNI) were administered or not. The data was obtained through a questionnaire applied to professors and students from the 1st to the 12th period, under CAAE 08246918.1.0000.5237. Posteriorly, it was done an inferential and comparative analysis with literature and vaccinal data from previous research done in 2014, at the same institution, that evaluated vaccination for hepatitis B, dT, varicella, influenza, and HPV. **Results:** Despite the rise in vaccination of students from 2014 to 2019, most of PNI coverage goals were not reached in 2019. As a result, it is necessary to maintain the incentives for vaccination in the health sector since the sample is constituted of a high-risk group of infectious contagious diseases. **Conclusion:** The implementation of an action plan for the exigence of the updated vaccinal chart as a prerequisite for registration of medical students must be considered. It is expected that it would reinforce the relevance of vaccination for diseases that are preventable through immunization.

Key words: Vaccination, Students medical, Faculty medical.

RESUMO

Objetivo: Analisar a situação vacinal dos discentes e docentes de um curso de Medicina. **Métodos:** Trata-se de uma pesquisa transversal e quantitativa, realizada em 2019, que buscou identificar se as vacinas preconizadas pelo PNI foram realizadas ou não. Os dados foram obtidos por meio de questionários aplicados aos docentes e discentes do 1º ao 12º períodos, sob CAAE 08246918.1.0000.5237, sendo realizada, posteriormente, uma análise inferencial e comparativa com a literatura e com dados vacinais de uma pesquisa realizada previamente em 2014 na mesma instituição, referentes às vacinas hepatite B, dT, varicela, influenza e HPV. **Resultados:** Apesar de ter ocorrido um aumento de 2014 para 2019 entre os discentes, a maioria das coberturas vacinais ainda não alcançaram as metas preconizadas pelo PNI, o que também é observado nos docentes em 2019. Faz-se necessário manter continuamente o incentivo à vacinação no setor da saúde, visto que a amostra constitui grupo de alto risco para doenças infectocontagiosas. **Conclusão:** Portanto, deve-se considerar a implantação de um plano de ação para exigência do cartão vacinal atualizado como pré-requisito de matrícula dos estudantes de Medicina e, assim, reforçar a relevância da vacinação no enfrentamento de doenças imunopreveníveis.

Palavras-chave: Vacinação, Estudantes de medicina, Docentes de medicina.

[1] Centro Universitário de Volta Redonda, Fundação Oswaldo Aranha (UniFOA), Volta Redonda - RJ.
*E-mail: ceciliavoltaredonda@gmail.com

SUBMETIDO EM: 6/2021 | **ACEITO EM: 7/2021** | **PUBLICADO EM: 8/2021**

RESUMEN

Objetivo: Analizar el estado de vacunación de estudiantes y profesores de un curso de medicina. **Métodos:** Se trata de una investigación transversal y cuantitativa, realizada en 2019, que buscó identificar si las vacunas recomendadas por el PNI se realizaron o no. Los datos se obtuvieron mediante cuestionarios aplicados a docentes y alumnos, bajo CAAE 08246918.1.0000.5237, y un análisis inferencial y comparativo con la literatura y datos de vacunas de una encuesta realizada en 2014 en esta institución, con las vacunas contra la hepatitis B, dT, varicela, influenza y VPH. **Resultados:** A pesar de un aumento de 2014 a 2019 entre los estudiantes, la mayor parte de las coberturas de vacunación aún no ha alcanzado las metas recomendadas por el PNI, lo que también se observa en los docentes en 2019. Es necesario mantener el incentivo a la vacunación, ya que la muestra es un grupo de alto riesgo para enfermedades infecciosas y contagiosas. **Conclusión:** Por lo tanto, se debe considerar la implementación de un plan de acción para la exigencia de cartilla de vacunación actualizada como requisito para la matrícula de los estudiantes de medicina, reforzando la relevancia de la vacunación en el tratamiento de enfermedades prevenibles por vacunación.

Palabras clave: Vacunación, Estudiantes de medicina, Docentes médicos.

INTRODUCTION

Adequate immunization is of paramount importance to control infections in the healthcare sector, since it guarantees a lower contagion and transmission risk of infectious disease, as well as the number of liable individuals and professionals. Therefore, vaccination and the knowledge of vaccination status, especially of health professionals, represent an important method of primary prevention and great importance for an effective immuno-protection, for health professionals and patients alike and the general population, which also allows the elaboration of better prevention policies in health (LIMA AA e PINTO ES, 2017).

Healthcare professionals are constantly exposed to various infectious agents, which points to the need of an adequate immunization, from the start of their academic lives. More than any other healthcare professional, the protection of students from the health subjects requires greater attention, due to their lack of experience to deal with tools and procedures, development of biosafety awareness and the anxiety to learn and perform new medical procedures (MANCUZO EV, et al., 2016). However, vaccination in this group is unsatisfactory in various regions of Brazil and there is a wide miscomprehension about the relevance of updated vaccinal situation (MIZUTA AH, et al., 2018).

The so called “anti-vaccine movement” is increasingly being disseminated in social media, with incorrect information and without any scientifical foundation, which dismantles the safety and efficacy of vaccines already scientifically tested and approved by leading to a lower vaccinal adhesion in the general population. Knowledge of the benefits from the vaccine and its importance to public health, since the beginning of the academic life, could minimize the effects of the spread of these anti-vaccine movement that threaten the control of these immuno-preventable diseases (MIZUTA AH, et al., 2018).

According to the national immunization program - Programa Nacional de Imunização (PNI), vaccines against hepatitis B, diphtheria and tetanus (dT), yellow fever and also the triple viral vaccine (measles, mumps and rubella), are all available, for adults from 20 to 59 years old at the Brazilian public healthcare systema - Sistema Único de Saúde (SUS). The Brazilian Society for Immunization - Sociedade Brasileira de Imunizações (SBIm) recommends that health professionals should present update immunization for these vaccines, and also against hepatitis A, influenza, varicella and meningococcal disease B and ACWY/C (SOCIEDADE BRASILEIRA DE IMUNIZAÇÕES, 2020).

Since the awareness of health students is primordial for better vaccination coverage both within and outside universities, we note the necessity of reinforcing the instruction about the subject and search for the knowledge around vaccination of this important risk group in various institutions, as the data in the literature about this topic is still scarce. Therefore, the objective of this study is to assess and analyze the vaccinal situation of both student and lecturers from a Medical School at a University in the south of Rio de Janeiro.

METHODS

We recruited 20 students from each semester of the 6-year medical undergraduate course, resulting in 240 students' volunteers. Additionally, 41 faculty members were recruited for this research. All participants signed a consent form prior to the participation, when they had opportunity to learn about all aspects of the research and ask any questions. The study participants were asked to fill a questionnaire with demographic information and vaccination status and knowledge.

Among the variables under study, the following were assessed: age, gender, occupation, semester of studies (for students only), whether they had their vaccination card and, if so, whether it was up-to-date, whether the knowledge of the topic made the participants get vaccinated more than others who hadn't yet been in touch with the subject, and, regarding the analysis of vaccination, the vaccines available from SUS were selected, which are: Bacillus Calmette–Guérin (BCG), hepatitis B, diphtheria and tetanus (dT), yellow fever, the triple viral vaccine (measles, mumps and rubella), influenza, Oral polio vaccine (OPV), human papillomavirus (HPV) and varicella.

Subsequently, an analysis stage from the data obtained in the previous process was necessary and, to this end, the Microsoft Excel spreadsheet editor was used, in which the data was computed, and the spreadsheets were generated. Thus, an inferential and comparative analysis to the literature was carried out, using the Scielo, Pubmed and Medline database to build the scientific basis of the research using the descriptors "vaccination" and "medical student". It is, therefore, an observational, cross-sectional and of quantitative approach research.

In addition to this, data from a previous unpublished research with the same variables collected in the year 2014 at the same institution was used to compare the evolution of the vaccination status and added to this research. The data collected in 2014 was related to the hepatitis B, dT, varicella, influenza, and HPV vaccines.

This work was approved by the local ethics committee (CAAE 08246918.1.0000.5237.281 and 32597014.1.0000.5237).

RESULTS

The volunteers were between the ages of 18 – 93, on average 28 years old. There were 164 female and 76 male students, whereas there were 23 male and 18 female participants among the faculty group. Women represent 64,77% of total participants in this research.

Regarding the vaccination card, most people presented it complete and updated (56,94%). However, more than 28,47% had the card, but they were incomplete. Besides, 6,41% of the participants said their card was updated although they did not have it. The percentages found between modules was similar.

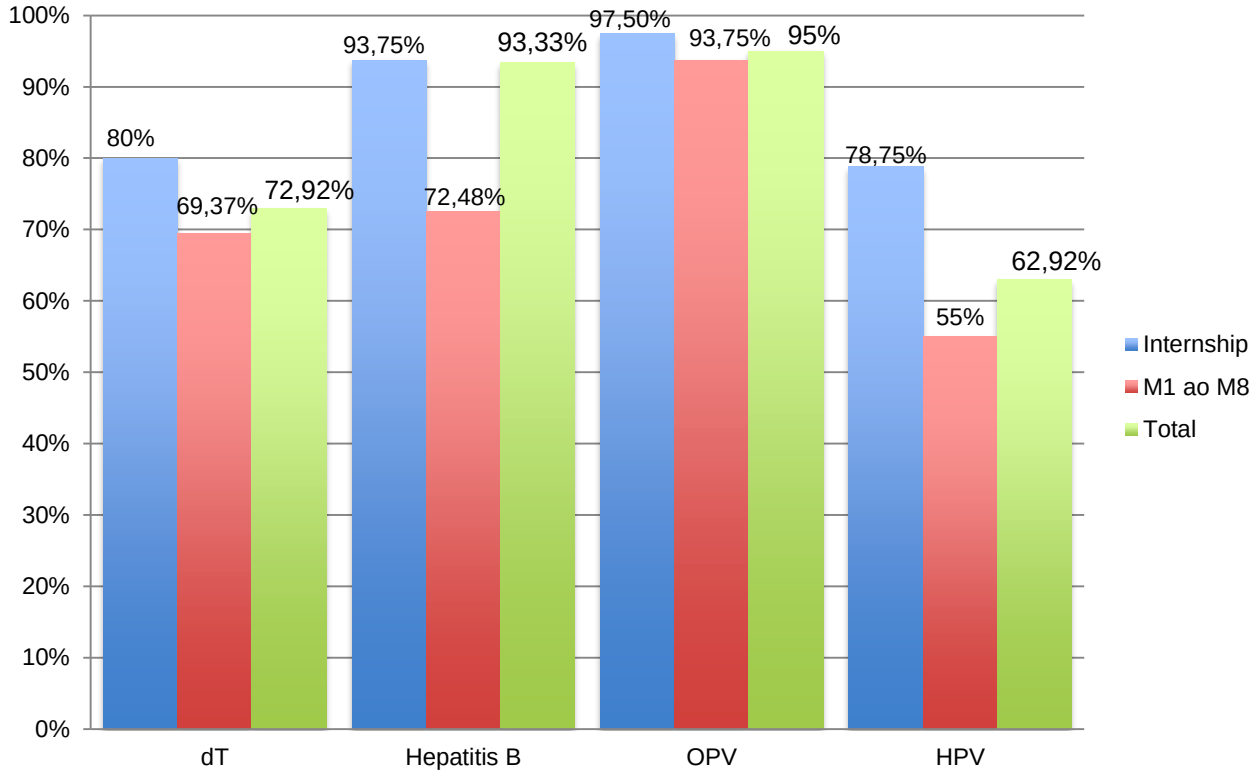
Taking into consideration the knowledge about the vaccine and its influence in the immunization of participants, it can be noticed that 54,62% of the students took the vaccine after learning more about the subject, whereas 45,38% did not take the vaccine.

After being questioned about having contracted any immuno-preventable disease, 25,62% of all participants said they had contracted one of the infections. Among these students, almost 15% do not have the vaccination card and 36,65% did not have the vaccines updated according to the vaccination schedule.

Chart 1 and **Chart 2** compare the percentage found between interns and previous modules students, during the year 2019, for the researched vaccines. A similar unpublished research was carried out at the same institution, in 2014, the data found is shown, comparatively to 2019, in **Chart 3**.

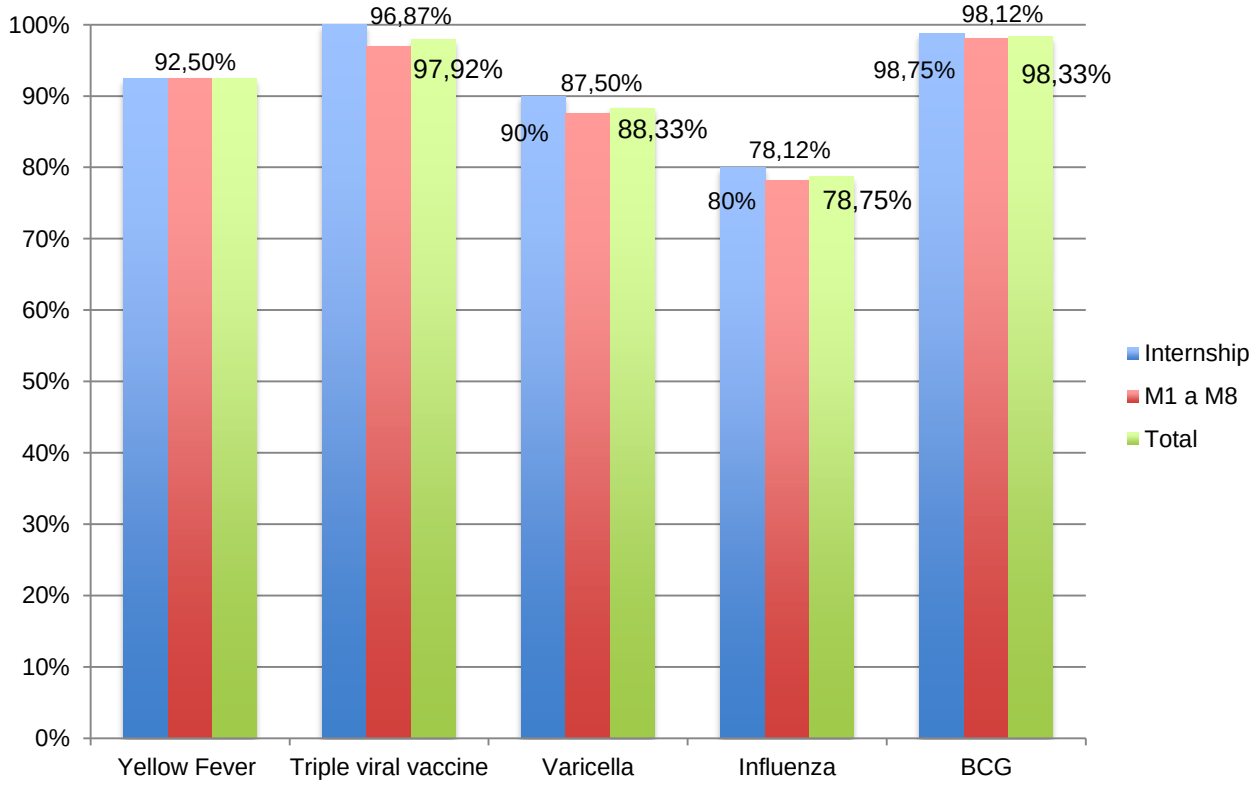
Regarding **Chart 4**, the data corresponding to the immunization of faculty members from the Medical Course in 2019 is listed.

Chart 1 - Immunization comparison against dT, hepatitis B, OPV and HPV in Medical students at the institution, between internship and modules from 1 to 8, in 2019.



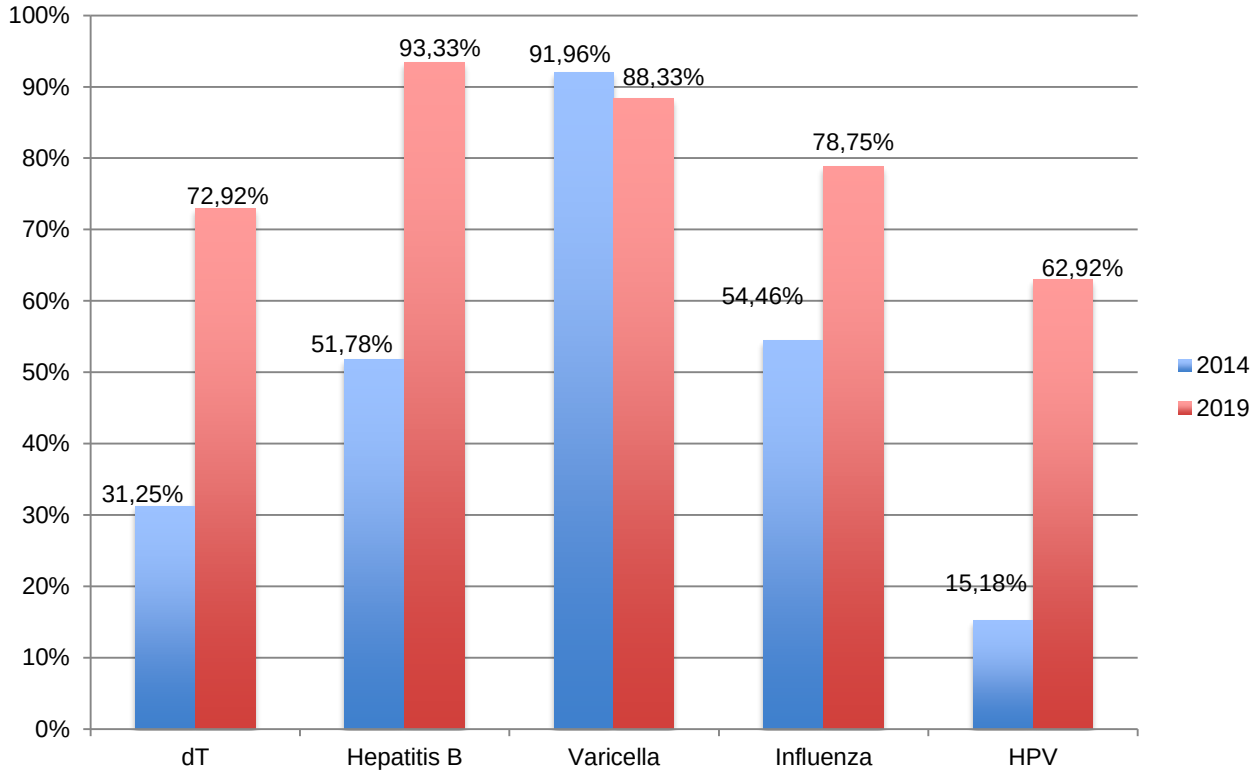
Source: Cabral AA, et al., 2021.

Chart 2 - Immunization comparison against yellow fever, triple viral vaccine, varicella, influenza and BCG in Medical students at the institution, between internship and modules from 1 to 8, in 2019.



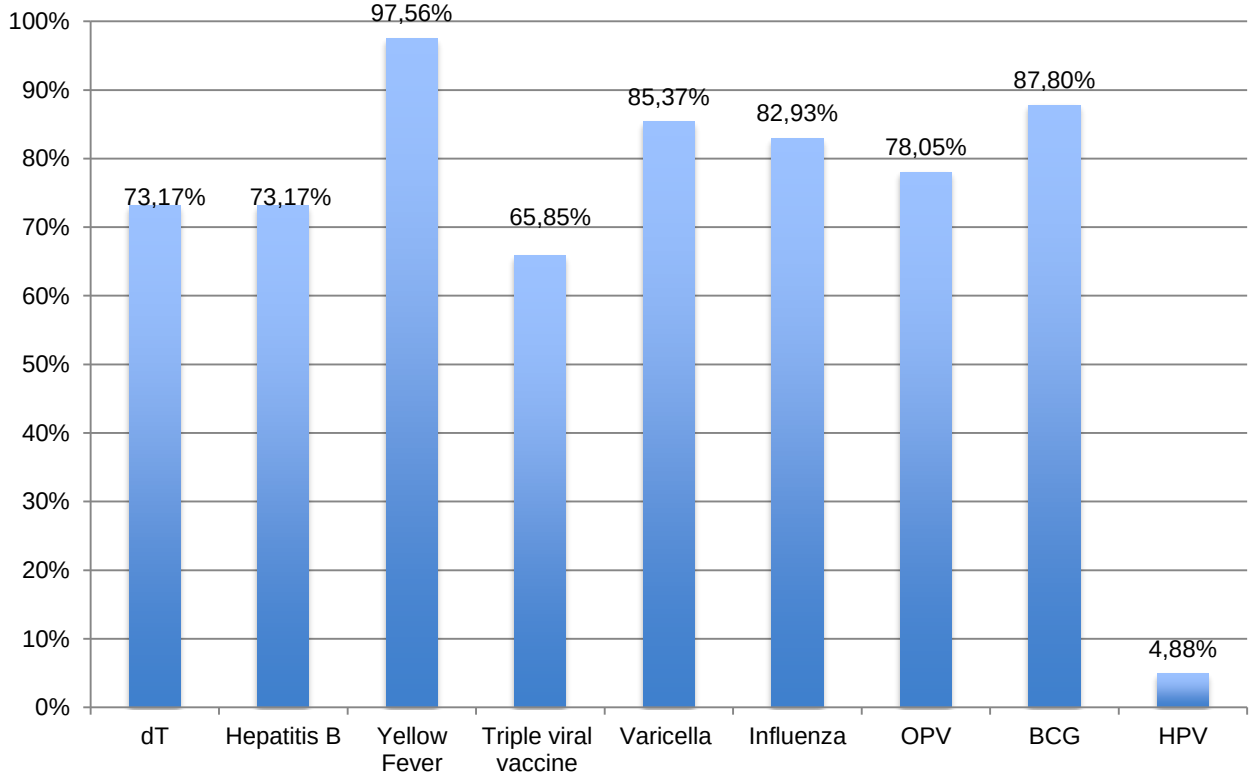
Source: Cabral AA, et al., 2021.

Chart 3 - Immunization comparison against dT, hepatitis B, varicella, influenza and HPV in Medical students at the institution, in 2014 and 2019.



Source: Cabral AA, et al., 2021.

Chart 4 - Medical School faculty immunization in 2019 at the institution.



Source: Cabral AA, et al., 2021.

DISCUSSION

Taking into consideration that this research was carried out inside a Medical School, the fact that faculty and students did not present an up-to-date vaccination card suggests a risk not only to the participant's health but, also, to those patients and other individuals that live within the same environment, since health professionals represent an important group risk of contamination and transmission of immune-preventable diseases, especially, in an in-hospital environment (MANCUZO EV, et al., 2016). Those who claim to have up-to-date immunization, but do not have the vaccination card, also fit in the risk group, once it is not possible to confirm whether there really is an effective immunization to the diseases.

A study was carried out, in 2019, about the prevalence of adequate immunization of health professionals in the Brazilian state of Bahia, and it was observed that only 38,5% of the workers presented a complete vaccination card (ARAÚJO TM, et al., 2019). This fact, alongside the data found in our research, highlights that the incomplete immunization among health professionals still presents alarming rates, especially, due to the fact that they are responsible for the immunization and health care of the population.

In the latest document released by the Brazilian Ministry of Health (2018) about the vaccination coverage, it was requested that the vaccination goal for dT, hepatitis B and OPV should reach a 95% coverage. For HPV, it was estimated, at least, 80%. Among the vaccines in this study, hepatitis B and OPV were the ones that came the closest to the ideal number expected by the Brazilian Ministry of Health, reaching 93,33% and 93,75% respectively. It is worth noting that the campaigns for the oral vaccination of poliomyelitis began at the end of the 1960's and that the hepatitis B was released to the basic health units at the beginning of the 1990's, configuring themselves as the oldest vaccines and campaign targets and, therefore, may represent larger percentages in the research (MINISTÉRIO DA SAÚDE, 2015). Despite that, no vaccination has achieved the necessary cutoff for an appropriate immunization of these health professionals and students.

Among students, it was noticed that interns had higher coverage from all the vaccines studied, which suggests a higher protection for the individuals who are initiating more frequently the medical practices. It should also be noted that there was an immunization increase of the students in five years, which can be attributed to a larger awareness of the need of protection by the students, taking into account their little experience in medical practices. However, the reach of 95% set by the Brazilian Ministry of Health (2015), has not yet been met.

The Medical students show levels of exposure to biological material potentially contaminated similar to those of a hospital staff. Especially, regarding the medical interns, there is a higher risk of contamination, since they are in closer contact with patients, new procedures which they are in training, risk factors to contagious and infectious diseases and sharp cutting accidents, besides spending more time in in-hospital environments diseases (MIZUTA AH, et al., 2018).

A similar study carried out on students from the Universidade Federal de Minas Gerais, in 2014, showed that the immunization rate for hepatitis B reached 91% and, for tetanus, 86,1% (MIZUTA AH, et al., 2018). This study, similar to what ours has found, suggests that students are not properly protected from immuno-preventable diseases and can also expose patients in their care to such diseases. The fact that an up-to-date vaccination card is not mandatory by the higher education institutions in the health sector can contribute to the vulnerability of students to preventable risks (MIZUTA AH, et al., 2018; REIS PGTDA, et al., 2013).

Regarding the vaccine against HPV, it is a more recent vaccine, launched in Brazil in 2014 and, therefore its adherence by students this year, was still extremely low (MINISTÉRIO DA SAÚDE, 2015). The improvement of adhesion in five years is due to the release, by the Brazilian Ministry of Health in 2017, of the vaccine to men and women up to the age of 26, since the vaccines were nearly approaching the expiration date due to the low success of the initial campaigns (MINISTÉRIO DA SAÚDE, 2018; CABRAL AA, et al., 2019). However, it did not get the necessary reach to eradicate the uterine cervix cancer, proposed to have a goal of 90% of immunization (MINISTÉRIO DA SAÚDE, 2018).

In relation to HPV, the national database presents as public domain only information about vaccination below the age of 14, in such a way that makes it hard to compare having the focus on healthcare students. It is also important to emphasize that, among faculty members, the HPV vaccine shows extremely low rate since it is a very recent vaccine and more suitable to children and teenagers between the ages of 9 and 14.

A study carried out with residents in a hospital in Recife has found vaccination coverage of 56,6% for three doses of hepatitis B (ACCIOLY LS, et al., 2018). In another study with students (healthcare area majors) in São Paulo, it was reported that 64,2% of the interviewed population were unaware about the number of infectious diseases that can be avoided with the vaccines available in the national immunization plan (MIZUTA AH, et al., 2018). This data only reiterates the urgent need for an incentive policy regarding the immunization of health professionals in the country.

Furthermore, the vaccination reach proposed, in relation to these vaccines for students, has not been met. Adult immunization is still seen as a worldwide challenge, as anti-vaccine movement, which includes people from the general population, healthcare professionals and health providers, uses the media share instantly a myriad of opinions and information which are not supported by science, pushed by the lack of knowledge about the materials such as immunobiologics and their benefit (BELTRÃO RPL, et al., 2020; CARDOSO VMVS, et al., 2021).

The triple viral vaccine has shown good vaccination reach among students, since the Brazilian immunization program's goal is to have a 95% coverage. This vaccine was created at the beginning of the 1970's, which can explain a lower rate of passive immunization found among faculty members, since vaccines against measles, mumps and rubella were administered separately before this period. Furthermore, we should consider that active immunization can have happened in this group, since these diseases were contracted by the population before the incorporation of the vaccines in the Brazilian immunization program (MINISTÉRIO DA SAÚDE, 2015).

Regarding varicella, in both 2014 and 2019 research results, there is good protection against Varicella Zoster-Virus (VZV), since more than 80% of people interviewed in both periods had already contracted the disease or had been vaccinated. This situation can guarantee a safer hospital environment, as the high transmissibility via aerosol of skin lesions can lead to the infectivity of VZV to 100% (HIROSE M, et al., 2016). Although death caused by varicella can be considered low, 6,7 per 100.00 infected, it is worth mentioning that this disease may have temporary or permanent sequelae, besides resulting in a higher cost of hospitalizations and hospital procedures (WHO, 2018).

Yellow fever has shown an increase in incidence in tropical countries, particularly, in South America, outside endemic areas historically know. In Brazil alone, were confirmed, serologically, around 2000 cases and more than 700 deaths between 2016 and 2018, this being the highest outbreak of yellow fever in Brazilian regions in the last decades (CHEN LH e WILSON ME, 2020; SOUZA TS, et al., 2019). In response to this scenario, massive vaccination campaigns were carried out in 4469 municipalities considered risk areas. However, the latest update from Brazilian national immunization program shows that the national vaccination coverage is around 55%, which is still not enough according to what was proposed by the Brazilian Ministry of Health (2018), with a target of 95%.

This reality can be an explanation for the significant increase of vaccination against yellow fever found in this research, in which there are no discrepancies between faculty and students, in both cases a coverage of over 90% has been identified. This scenario can also reflect a lack of awareness from the Brazilian population about the importance of ongoing vaccination and not just in specific situations, such as outbreaks and endemic diseases (BARBIERI CLA, 2017).

Since 1999, Brazil has, free of charge, provided by its universal healthcare system, the vaccination against the influenza virus, which covers only the population considered at risk, such as pregnant women, the elderly, those who have chronic illnesses and health professionals (MONTELES MS, et al., 2017). Since 2010, due to the pandemic cause by the H1N1 virus, a mass vaccination policy was established, in which around 89 million people have been immunized during that period (LUNA EJA, et al., 2014). Although the Brazilian Ministry of Health (2021), in its technical opinion of the campaign against the influenza virus, informs us that the objective is to reduce the health burden, including mortality, hospitalizations and complications caused by the influenza virus infections in the target population, free immunization does not include students in healthcare subjects (MINISTÉRIO DA SAÚDE, 2021).

However, the students are subjected to the same risk situations, being as susceptible as any other health professional. Nevertheless, in the present study, we could notice that students have shown similar vaccine

coverage to those of faculty, 78,75 and 82,93% respectively. However, this reality has not been seen in a similar study carried out at a private Medical course in a town in São Paulo, where a much lower than expected coverage was found, having 48% and 70,3% of students and faculty, respectively (MIZUTA AH, et al., 2018). Furthermore, with the current saturation of the healthcare services due to an increase in demand with Coronavirus Disease (COVID-19), influenza vaccination is a strategy with increasing importance to prevent its severe forms and, therefore, reducing the burden on the healthcare system (MINISTÉRIO DA SAÚDE, 2021).

The results of this research point to possible consequences of inadequate vaccinal coverage, which can lead to impacts not only in individual immunity, but also in the increase of infectious diseases. The unsatisfactory adherence to these vaccines in this and other studies require acknowledgment of the seriousness and reasons for this situation, to make adequate interventions possible, which would be able to change the way this scenario is going. This is of paramount importance in situations like the present COVID-19 pandemic that is afflicting the world. One recent worldwide study found that a COVID-19 vaccine acceptance may be as high as nearly 90% of positive responses in China and as low as less than 55% of positive responses in Russia (LAZARUS JV, et al., 2020). In Brazil, one study found that more than 17% of the interviewed individuals in Maranhão reported hesitancy to be vaccinated against COVID-19, which may lead to infection and poor control of the pandemic (OLIVEIRA BLCA, et al., 2021).

Considering that this study focuses on health sector professionals and, especially, students, we must reinforce the importance of immunization to fight preventable diseases, so that the vaccine adherence can increase, until it reaches more satisfactory rates. Besides that, it was noted that there is no integral awareness of the importance of an ongoing immuno-prevention, since the vaccination rates that came closest to the objective set by the Brazilian immunization program were due to outbreaks and epidemics, as it happened with the influenza virus in 2010 and the yellow fever in 2018 (SOUZA TS, et al., 2019; MONTELES MS et al., 2017).

Despite being conducted in a population with a high level of access to technical information on vaccines, the vaccinal situation of both student and lecturers from a Medical School was lower than the goal set by the Brazilian Ministry of Health, with many participants having incomplete vaccination cards in multiple vaccines, despite an observed higher vaccination when compared to 2014. Being a population that is in close contact with communicable diseases, as susceptible as any other health professional, this data shows that it is imperative that institutions take steps to improve vaccination rates and prevent the spread of diseases in this high-risk population.

CONCLUSION

This study is limited by its small sample size, as well as the single site where the data was collected. However, it can provide an estimate for further studies in the area, focusing on other populations and vaccination intention, such as the current pandemic and possible future outbreaks. This research highlights the importance of continuous conscientization as well as to provide additional guidance to promote vaccination, even in a population with high level of education and access to technical information. Also, it contributes to the epidemiological data regarding the immunization of an important risk group. The implementation of measures such as: requiring the up-to-date vaccination card for enrollment and the improvement of teaching and acquiring of health and safety abilities can be some proposals to improve the vaccinal coverage at the institution studied and others universities around the country which still do not include this condition.

FUNDING

This work has received funding from the Centro Universitário de Volta Redonda (UniFOA), under registry number 233863. There was no direct participation by the Institution mentioned in the study design; in the collection, analysis, and interpretation of data; in writing the manuscript; nor in the final decision to send the article for publication.

REFERENCES

1. ACCIOLY LS, et al. Estado de imunização contra a hepatite B em médicos residentes de um hospital do Recife. Revista Anais da Faculdade de Medicina de Olinda, 2018; 2(2): 22-27.
2. ARAÚJO TM, et al. Vacinação e fatores associados entre trabalhadores da saúde. Cad. Saúde Pública, 2019; 35(4).
3. BARBIERI CLA, et al. A (não) vacinação infantil entre a cultura e a lei: os significados atribuídos por casais de camadas médias de São Paulo, Brasil. Cadernos de Saúde Pública, 2017; 33(2).
4. BELTRÃO RPL, et al. Perigo do movimento antivacina: análise epidemio-literária do movimento antivacinação no Brasil. Revista Eletrônica Acervo Saúde, 2020; 12(6): e3088.
5. CABRAL AA, et al. Análise quantitativa da imunização contra o HPV no âmbito do Sistema Único de Saúde em um município Sul Fluminense. Brazilian Journal of Surgery and Clinical Research, 2019; 27(3): 42-46.
6. CARDOSO VMVS, et al. Vacinas e movimentos antivacinação: origens e consequências. Revista Eletrônica Acervo Científico, 2021; 21: e6460.
7. CHEN LH, WILSON ME. Yellow fever control: current epidemiology and vaccination strategies. Tropical Diseases, Travel Medicine and Vaccines, 2020; 6(1).
8. HIROSE M, et al. The impact of varicella vaccination on varicella-related hospitalization rates: global data review. Revista Paulista de Pediatria, 2016; 34(3).
9. LAZARUS, J.V. et al. A global survey of potential acceptance of a COVID-19 vaccine. Nature Medicine, 2021; 27: 225–228.
10. LIMA AA, PINTO ES. O contexto histórico da implantação do Programa Nacional de Imunização (PNI) e sua importância para o Sistema Único de Saúde (SUS). Scire Salutis, 2017; 7: 53-62.
11. LUNA EJA, et al. Efetividade da estratégia contra influenza: uma revisão sistemática. Epidemiologia e Serviços de Saúde, 2014; 23(3): 559-576.
12. MANCUZO EV, et al. Situação vacinal e exposição a risco biológico dos estudantes de medicina da UFMG. Revista médica de Minas Gerais, 2016; 26(0): 0.
13. Ministério da Saúde. Calendário Nacional de Vacinação. Brasília: Ministério da Saúde; Brasil, 2018. Disponível em: http://portalms.saude.gov.br/acoes-e-programas/vacinacao/calendario-nacional-de-vacinacao. Acessado em: 15 de novembro de 2019.
14. MINISTÉRIO DA SAÚDE. 23ª Campanha nacional de vacinação contra a influenza: informe técnico. Brasília: Secretaria de Vigilância em Saúde – Departamento de Vigilância das Doenças Transmissíveis – Coordenação-geral do Programa Nacional de Imunizações; Brasil, 2021. Disponível em: https://sbim.org.br/images/files/notas-tecnicas/informe-tecnico-campanha-vacinacao-influenza-2021.pdf. Acessado em: 28 de julho de 2021.
15. MINISTÉRIO DA SAÚDE. Coberturas vacinais no Brasil – período: 2010 – 2014. Brasília: Secretaria de Vigilância em Saúde – Programa Nacional de Imunizações; Brasil, 2015. Disponível em: https://portalarquivos2.saude.gov.br/images/pdf/2017/agosto/17/AACOBERTURAS-VACINAIS-NO-BRASIL---2010-2014.pdf. Acessado em: 28 de julho de 2021.
16. MINISTÉRIO DA SAÚDE. Informe técnico da ampliação da oferta das vacinas papilomavírus humano 6,11,16 e 18 (recombinante) – vacina HPV quadrivalente e meningocócica C (conjugada). Brasília: Secretaria de Vigilância em Saúde – Departamento de Vigilância das Doenças Transmissíveis – Coordenação-Geral do Programa Nacional de Imunizações; Brasil, 2018. Disponível em: http://portalarquivos2.saude.gov.br/images/pdf/2018/marco/14/Informe-T--cnico-HPV-MENINGITE.pdf. Acessado em: 10 de dezembro de 2019.
17. MIZUTA AH, et al. Percepções acerca da importância das vacinas e da recusa vacinal numa escola de medicina. Revista Paulista de Pediatria, 2018; 37(1): 34-40.
18. MONTELES MS, et al. Fatores de não adesão dos idosos à vacina contra influenza: uma revisão bibliográfica. Revista Uningá Review, 2017; 30(3).
19. OLIVEIRA BLCA, et al. Prevalence and factors associated with covid-19 vaccine hesitancy in Maranhão, Brazil. Revista de Saúde Pública, 2021; 55(12): 1-12.
20. REIS PGTDA, et al. Perfil epidemiológico de acidentes com material biológico entre estudantes de medicina em um pronto-socorro cirúrgico. Revista do Colégio Brasileiro de Cirurgiões, 2013; 40(4): 287-292.
21. SOCIEDADE BRASILEIRA DE IMUNIZAÇÕES. Calendários de vacinação SBIm Ocupacional. São Paulo: Ministério da Saúde; Brasil, 2020. Disponível em: https://sbim.org.br/images/calendarios/calend-sbim-ocupacional.pdf. Acessado em: 28 de julho de 2021.
22. SOUZA TS, et al. Ocorrência de febre amarela no Brasil: uma revisão integrativa da literatura (2014-2018). Revista Eletrônica Acervo Saúde, 2019; (28): 896.
23. WORLD HEALTH ORGANIZATION (WHO). Surveillance standards for vaccine-preventable diseases. Word Health Organization; 2018. Disponível em: https://www.who.int/immunization/monitoring_surveillance/burden/vpd/WHO_SurveillanceVaccinePreventable_22_Varicella_R1.pdf?ua=1. Acessado em: 15 de fevereiro de 2020.