

ORIGINAL ARTICLE

Vaccination of medical students and the role of medical schools in primary prevention*Vacinação dos estudantes de medicina e o papel das instituições de ensino superior na prevenção primária*

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ABSTRACT: Vaccination is an effective and safe prophylactic measure, able to prevent the spread of infectious etiological agents, being essential, especially to individuals who have habitual contact with hospital environments. So, the objective was to analyze the posture of Higher Education Institutions (HEIs) on the vaccination of medical students. For this, a search was carried out in the scientific literature for articles on the topic, in addition to a search on the Internet, through information on whether or not vaccination proof was required, at what time and which vaccines would be required of students, from HEIs of the state of Minas Gerais (MG) / Brazil. Most (34/39) HEIs require the full vaccine card while five (12.82%) require only Hepatitis B, Triple Viral and Yellow Fever vaccines. Twenty HEIs require vaccination cards at enrollment (51.3%), leaving 19/39, which require prior to starting the internship (48.7%), around the ninth period. Literature data revealed a large contingent of medical students in several states of the country, with incomplete vaccination cards. According to data from the retrieved articles, the students reported lack of knowledge about their own vaccination status, with risks of exposure due to direct contact with contaminated environments and people, contrary to HEI requirements. One reason is that hospitals do not check students' immunization status at the beginning of internships, so colleges neglect not to present the vaccine card. It is concluded that, despite the importance of vaccination is recognized, academics, HEIs and hospitals have not acted effectively, needing more attention to the topic, in order to avoid agent infections, which have an effective vaccine.

Keywords: Vaccination, Infectious diseases, Prevention and control, Pre-exposure prophylaxis, Health personnel, Occupational diseases.

RESUMO: A vacinação é uma medida profilática eficaz e segura, capaz de evitar a disseminação de agentes infecciosos, sendo essencial, principalmente, a indivíduos que possuem contato habitual com ambientes hospitalares. Objetivou-se analisar o conhecimento dos acadêmicos de medicina sobre imunização profilática, e o papel das Instituições de Ensino Superior (IES), que oferecem graduação em medicina, sobre vacinação dos acadêmicos. Para isso, foi realizada buscas por artigos sobre o tema e dados nos sites das secretárias acadêmicas de todas as IES do estado de Minas Gerais (MG)/Brasil por informações sobre exigência ou não da comprovação de vacinação, qual momento e quais vacinas seriam exigidas. A maioria (34/39) das IES exige o cartão de vacina completo, enquanto cinco (12,82%) exigem apenas as vacinas para Hepatite B, Tríplice Viral e Febre Amarela. Vinte IES exigem os cartões de vacina no ato da matrícula (51,3%), restando 19/39, que exigem antes de iniciar o estágio (48,7%), por volta do nono período. Dados de literatura revelaram um grande contingente de acadêmicos dos cursos de Medicina, em vários estados do país, com cartões de vacinação incompletos. De acordo com dados dos artigos recuperados, os discentes relataram desconhecimento sobre o próprio status vacinal, mesmo possuindo riscos de exposição devido o contato direto com ambientes e pessoas contaminadas, contrariando as exigências das IES. Uma razão, para tal fato, é que os hospitais não verificam o status de imunização dos alunos ao iniciarem os estágios, logo as faculdades negligenciam a não apresentação do cartão de vacina. Conclui-se, que apesar de reconhecida a importância da vacinação, acadêmicos, IES e hospitais não tem atuado de forma efetiva, necessitando maior atenção ao tema, para serem evitadas infecções por doenças imunopreveníveis.

Palavras-chave: Vacinação, Infectologia, Prevenção & controle, Profilaxia pré-exposição, Pessoal de saúde, Doenças ocupacionais.

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INTRODUCTION

Academics and health professionals are at increased risk of contracting infectious diseases due to routine contact with infected individuals and environments. In many countries, mainly underdeveloped and developing countries, health professionals' working conditions and internship environments are characterized by understaffing, excessive workloads, stress, exposure to occupational risks, unsafe environments, occupational diseases and violence, which can result in damage to the health of the individual^{1,2}.

Primary prevention in occupational health is extremely important in reducing the incidence of a disease in the population, due to the establishment of barriers against agents in the environment. Vaccination being an important form of primary prevention^{2,3}.

Therefore, Higher Education Institutions (HEIs), which offer medical degrees and in other areas of health, have an essential role in encouraging immunization and infection control programs for medical students, so that, in this way, it is possible to ensure the reduction in the risk of acquisition to immunopreventable diseases. Data demonstrate a positive relationship between the infrastructure of hospital or health environments, mandatory prophylactic vaccination, and the reduction in the incidence rate of infectious diseases^{4,5,6}.

According to the World Health Organization (WHO), more than 1.4 million people in the world suffer from complications related to occupational health and even in the 70s, 4,468 occupational accidents were registered in hospitals in Brazil². Among occupational problems, infectious diseases, low back pain, allergic reactions, fatigue, in addition to injuries, contusions or sprains stand out. According to published data, the most prevalent infectious disease etiologic agents are the hepatitis B virus (HBV), hepatitis C (HCV) and human acquired immunodeficiency (HIV)^{7,8,9}.

In Brazil, from 1991 to 2011, there was a growth of more than 40% in the number of medical students and according to the National Curriculum Guidelines (DCNs), for courses in the health area, from the first semesters, the student must keep in touch with patients through practical learning, with classes in the hospital environment and in outpatient units⁴. Thus, students from the first semesters are exposed to a greater risk of immunopreventable diseases, and it is essential to adhere to safety measures, such as, for example, immunization through vaccines^{4,6,10}.

The National Immunization Program (PNI) in Brazil is the responsible for vaccinations, helping to control many endemic diseases. However, in recent years, a significant part of society has joined the anti-vaccine movement, compromising the safety of the whole society^{11,12,13}. Among some vaccines that have been neglected, we can mention Yellow Fever, Tuberculosis

and Measles^{14,15}, being the last cause of great concern due to the abrupt increase in the number of cases in the years 2018 and 2019 nationwide^{16,17}.

Thus, the aim of this study was to analyze the posture of the HEIs on the vaccination of medical students. If there is a requirement for proof of vaccination, which vaccines are required and when they are required, in addition to discussing, through a literature review, students' knowledge of prophylactic immunization and occupational health.

METHOD

Initially, a search was made on the website of the Federal Council of Medicine (FCM) for Higher Education Institutions (HEIs), which offer the Medicine course in the state of Minas Gerais, Brazil. Through the websites of all the HEIs, registered with the FCM, an active search was made for information regarding the requirement to present the vaccination card. Additionally, information was sought about the timing of this request and which vaccines would be required. Information on the geographic location of the institutions and the type of HEI was also collected.

Furthermore, a search was made for original articles that discuss vaccination among students and health professionals throughout the Brazilian territory, in the period from 2009 to 2019, in the databases Pubmed / Medline, Scopus and SciELO, with the descriptors elaborated according to the platform Mesh "vaccination" and "Immunization Programs". Articles published before 2009 and that were not related to the theme of vaccination in health professionals and students were excluded.

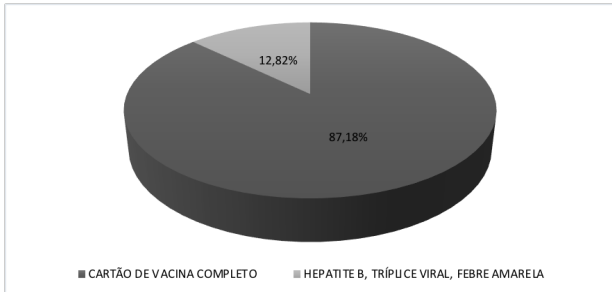
In the recovered articles, the students' knowledge about their own vaccine status and their science, about the dangers to which they are exposed, was analyzed. All qualitative data were described and calculations of percentage values were made from qualitative data. Data analysis was conducted in a descriptive statistical manner for the interpretative analysis of the results. Graphs and calculations were made using the Excel software.

RESULTS

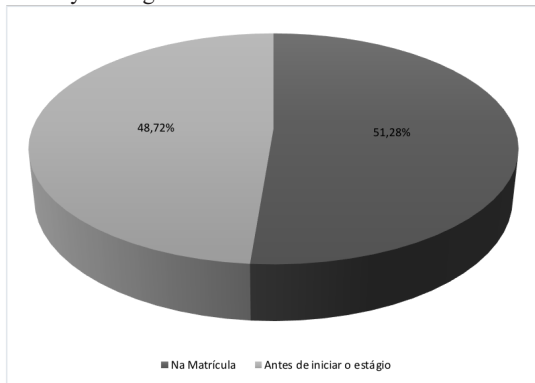
The state of Minas Gerais / Brazil is composed of 853 cities and a total of approximately 20.87 million inhabitants. In 2019, there were 39 HEIs with degrees in Medicine, of which 61.54% were private and 38.46% were public. The data reveal that most HEIs do not require a specific vaccine, but the complete vaccination card (87.18%) and only five institutions require specific vaccines (12.82%), as can be seen in Graph 1. Of the thirty and nine HEIs, twenty require vaccination cards upon registration (51.3%). With 19/39 remaining, HEIs that require before starting the internship (48.7%) as

can be seen in Graph 2. However, such data reported by the Institutions are contradictory as shown during the research, since there is an enormous amount of medical students with incomplete vaccination card.

Graph 1. Vaccines required by HEIs in the state of Minas Gerais, Brazil, to undergraduate medical students



Graph 2. Moment of the requirement, by the HEIs, of vaccination evidence by undergraduate medical students



According to data provided by the consulted colleges (private and public), the updated card must be presented before the first visit to the internship, preferably at the time of registration. However, this information is not found on the Universities' web pages, but is requested during the course by the academic secretariat of each education unit. If updates to the vaccination card are required, the student will be informed in advance of the need to carry out the required vaccination, as it is of extreme importance and responsibility of the student to be vaccinated, as the 39 colleges surveyed do not provide any means of immunization to students. .

In the literature review, 38 articles were found, of which 7 were selected to be part of the present review. After verification, independently by the researchers, agreement was reached on the selected articles. Figure 1 shows the flow diagram of the results of the review research.

The included articles searched for knowledge about the importance of occupational prophylactic vaccination and about the immunobiological status of medical students at different stages of the course, from the first period to students in the internship phase. Such studies were carried out in four Brazilian states: Minas Gerais, São Paulo, Rio de Janeiro and Santa Catarina. Chart 1 has data about the source, state where it was carried out, objectives and conclusions of the study, in addition to data on the courses, period of the course, sample size and vaccines studied.

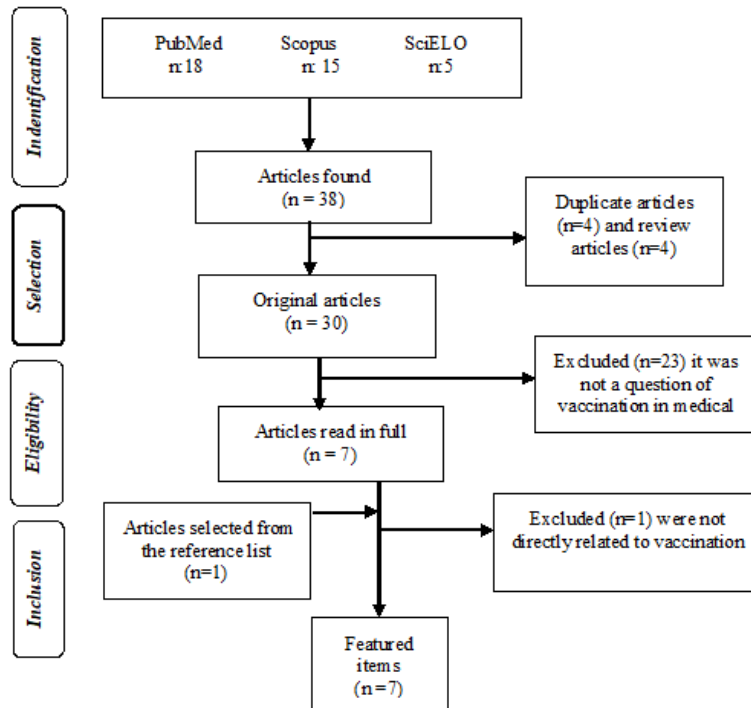


Figure 1. Flow diagram of the results of the systematic review research, based on items of preferential reports for Systematic Reviews and Meta-Analysis: The PRISMA Statement.

Chart 1. Data from the articles selected and included in this study, regarding the knowledge of medical students about the importance of occupational prophylactic vaccination and about their own immunobiological status

Source	State	Courses	Course semester	Objectives	N°	Studied Vaccines	Conclusions
Oliveira et al. ¹⁸	MG	Nursing, Pharmacy and Medicine	1 st	Describe the vaccination status	-	Adult double; Viral duo; Triple viral; Yellow fever; Hepatitis B	Students are not adequately vaccinated, exposing themselves to vaccine-preventable diseases when providing services. Adequate vaccination coverage for their graduates is required.
Arent et al. ¹⁹	SC	Medicine	Prior to boarding school	Describe the vaccination status	277	Hepatitis A; Hepatitis B; Influenza; Measles; Mumps; Rubella; Pneumococcus; Tetanus, Diphtheria; Varicella; Tuberculosis	Part of the students did not know how to inform about their vaccination status and did not know the importance of this measure. Only 1.1% had received all vaccinations recommended to the health professional.
Chehuen Neto et al. ²⁰	MG	Medicine	10th	Assess the vaccination situation and the perception of biological risk.	133	BCG; Hepatitis B; Triple Viral; VOP - polio; DTP; DT; Yellow fever	Non-conformities were identified in the immunization of students in relation to hepatitis B and tetanus, exposing them, and patients, to risks. The significant rate of exposure to biological risk and the unsatisfactory use of PPE deserve to be the target of initiatives aimed at preventing accidents and measures for an effective immunization.
Mizuta et al. ²¹	SP	Medicine	1st to 4th	Identify the perception of the importance of vaccines and the risks of refusal	92	Influenza	Medical students and doctors do not get vaccinated properly, have doubts about the vaccination schedule, vaccine safety and vaccine refusal. Training is an important strategy for maintaining vaccine coverage and addressing vaccine refusal in an ethical manner.
Souza et al. ²²	RJ	Medicine	All semesters	Determine, acceptance of the A / H1N1 vaccine	858	A/H1N1	Among medical students, cases of non-acceptance of the pandemic influenza A / H1N1 vaccine were determined during the 2010 mass immunization campaign.
Mancuzo et al. ²³	MG	Medicine	5th ao 6th	Check the vaccination situation and exposure to biological risk.	423	BCG; Hepatitis B; Triple Viral; VOP - polio; DTP; DT; Yellow fever; H1N1 influenza	Insufficient vaccination coverage was observed in the studied population. On the other hand, we verified important exposure to the hepatitis B virus and HIV, as well as to procedures with biological risk and accidents with human fluids. It is necessary to review the teaching of skills and competences in relation to biosafety.
Nardelli ²⁴	MG	Biomedicine, Physical Education, Nursing, Phisioterapy, Medicine e Nutrition	At enrollment	Identify the vaccination status	124	Hepatitis B; Yellow fever; Triple Viral	Part of the students in health courses was not adequately vaccinated. The presentation of the vaccination card, a vaccination campaign for students entering at the time of enrollment, is a strategy for access to vaccines and prevention of vaccine-preventable diseases.

The studies revealed worrying data about knowledge of vaccination status and the importance of vaccination among medical students. A survey of students, in the pre-internship phase, revealed that they did not know how to inform about their vaccination status and had little knowledge about the importance of vaccines¹⁹, proving that there is no punishment / restriction of access to those students who are not vaccinated and there are no

recommendations on how to proceed in relation to students with delayed vaccination by Higher Education Institutions.

Similar studies showed a failure in the immunization of medical students in relation to Hepatitis B and tetanus, exposing them - and patients - to unnecessary risks²⁰, in addition to showing that students have doubts about the vaccination schedule, the safety of vaccines, in addition to of vaccine refusal²¹. Comparatively, in some cases,

it has been described that adolescents have a higher vaccination rate than medical students in general, a fact that was justified by the great workload of the course and the exhaustive routine of academics²².

A study on vaccination status and exposure to biological risk in students in the health field revealed insufficient vaccination coverage in the population studied, with significant exposure to the Hepatitis and SIDA virus, as well as procedures with biological risk and accidents with human fluids. makes it necessary to review teaching in relation to biosafety⁶.

DISCUSSION

Although HEIs require proof of vaccination, data from the literature reveal that a large contingent of medical school students in various states in the country are unaware of their current vaccination status. This fact evidences a gap in the primary prevention programs by the Universities, since academics in the health field and, mainly in the medical field, are exposed, from the first periods of the course, to possibly contaminated environments, without even a punishment or academic restriction to the students. unvaccinated students. A possible explanation is the fact that the hospital environments themselves do not require the complete immunization of students in the health care course when starting their internships, so the colleges neglect to present the full vaccination card or mandatory vaccines upon registration, in a mandatory manner. , to students.

Studies carried out by the University of Southern Santa Catarina have expressed great concern regarding the recommended vaccination for medical students against the following diseases: Hepatitis A and B, Influenza, Measles, Mumps, Rubella, Pneumococci, Tetanus, Diphtheria, Chickenpox and Tuberculosis³. There was a low vaccination coverage of vaccine-preventable diseases in Brazil in some health professionals and among these diseases are tuberculosis (81%) and, next, hepatitis B

(64%) and tetanus (60%)^{7,11}. In the case of Hepatitis B and tetanus, in the work environment, the risk of infection is associated with an accident with sharps and non-use of essential equipment for protection¹¹.

There are several factors that contribute to adherence to vaccination that are related both to the individual and to the organizational structure offered by the various institutions. Institutions should charge for the vaccination card, but the State is still the biggest supporter of mass vaccination practices today, constituting a fundamental strategy, facilitating access to vaccines and the prevention of vaccine-preventable diseases. This fact corroborates with another study that concluded that the risk of contracting infections due to vaccine-preventable diseases among students in the health area is significant, given the incompleteness of vaccination schemes. It is necessary to provide a constant incentive to the entire population and especially to those individuals exposed to occupational risks, in order to guarantee an effective vaccination coverage and to minimize risks of transmission of preventable infectious diseases^{23,24}.

FINAL CONSIDERATIONS

When comparing the collected data with data from the literature, it can be concluded that, despite being an established practice, it is assumed that the HEIs have not acted effectively in the prevention and control of infectious diseases, ignoring the students' non-adherence to immunization and, consequently, the low vaccination coverage in the academic field.

The awareness of health professionals and medical students about occupational health and the importance of the complete vaccination scheme is necessary, which will result in the reduction of the transmission of various diseases, since they have constant contact with contaminated individuals and places, being potential disseminators of infectious diseases.

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