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SCIENTIFIC ARTICLE

Knowledge of anaesthesiologists in Recife with respect to potential risks in the operating room—cross-sectional study

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Abstract

Objectives: the health care should be a safe act, free of adverse events. However, in daily practice an excessive exposure to factors that endanger the health of the professional is observed. The surgical center stands out as one of the sites where the professional involved is more vulnerable. This environment is the anaesthesiologist's workplace, and this professional must deal with its potential complicators. This study aimed to evaluate the knowledge of anaesthesiologists in Recife on various situations of risk in the workplace.

Method: a cross-sectional study in which structured questionnaires, completed voluntarily and anonymously by the anesthesiologist itself, were applied to assess the knowledge of the potential risks in the operating room. Data were analyzed using Epi Info version 7.

Results: a total of 162 anaesthesiologists responded to the questionnaire, 38.02% of these professionals registered at Cooperative of Anaesthesiologists of Pernambuco. Of these, 3.7% read the manual of the Committee on Hospital Infection Control (Comissão de Controle de Infecção Hospitalar) of their institution and 40.74% chose the correct option, "technical director", as responsible for ensuring proper working conditions. Of the total, 5.56% stated that the anaesthetics' pollution index in the operating theater was monitored. Only 1.85% of the sample was subjected to periodic screening for tuberculosis. By analyzing the hypothetical situation of contamination with a patient with hepatitis C, only 43.83% knew that there is no effective post-exposure prophylaxis.

Conclusion: educational campaigns should be implemented to improve the knowledge of health professionals and clarify institutions and professionals' rights and duties.

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Introduction

The health care should be a safe act, free of adverse events. However, what is observed in daily practice is an excessive exposure to factors that endanger the physical and mental integrity of the health professional.

Among the various scenarios to provide services to which the physician is exposed, the surgical center stands out as one of the most significant, in which the professional is more vulnerable to potential risks. This scenario is unique among workplaces, with continuous exposure to noise pollution, chemical fumes, ionizing radiation, infectious agents, and increased levels of psychological stress.¹

This environment is the anaesthesiologist's workplace, and this professional must deal with its potential complications and it is here that he lives most of his days.¹ Given this reality, it is of paramount importance that the professionals involved in this activity be aware of all the risks and their consequences, as well as the duty of the hospital to provide dignified and safe conditions for the exercise of the profession.

After reviewing the literature, we found studies that outline the profile of the anesthesiologists and evaluate their quality of life,^{2,3} in addition to research investigating the physical and psychological consequences of long-term exposure to the unhealthy environment of the operating room.¹ However, studies are lacking that inquire about the anaesthesiologist's knowledge of the risks surrounding the profession, despite the existence of extensive literature describing these aggravating factors. The aim of this study was to evaluate the knowledge of anaesthesiologists in Recife on the various hazard situations in their work environment.

Method

After approval by the Ethics Committee for Research on Humans of the Instituto de Medicina Integral Prof. Fernando Figueira (CEP/Imip), a descriptive cross-sectional study was conducted between October 2011 and May 2012, involving anaesthesiologists in Recife (PE) accredited at Anaesthetists' Cooperative of Pernambuco (Coopanest/PE).

For participation in this research, anaesthesiologists in activity in hospitals in Recife who signed an informed consent form were selected. Exclusion criteria were incompletely filled questionnaires and anaesthesiologists who do not participate routinely in clinical care with procedures in the operating room.

The methodology consisted of developing a questionnaire that included the potential risks in the operating room, with items about physical risks, infection and fire, and the use of electrocautery. The physician was informed about the purpose of this research and was asked to offer his/her collaboration. The questionnaire was then given to the participants at their workplaces. The participants received orientation on how to answer the questions; it was explained that only an assertion was correct. The authors of this study were available for any clarification needed about the questionnaire. The identity of the participants was preserved. The research followed the ethical principles adopted by Resolution 196/96 of the National Health Council (CNS) and was approved by CEP/IMIP under number 2459.

Table 1 General characteristics of the sample.

Variable	n	%
AST	20	12.3
Master	09	5.5
Doctorate	03	1.8
<i>Years of practice of anaesthesiology</i>		
0-5	46	28.4
5-10	11	6.7
10-15	29	17.9
>15	76	46.9

Table 2 Knowledge of the anesthesiologist with respect to physical hazards.

Questioning	Hits	
	n	%
Responsible for ensuring proper working conditions (technical director)	66	40.7
Work at institutions with anesthetic pollution index monitoring	09	5.5
Sector of higher concentration of anesthetic gases (post-anesthetic recovery room)	89	54.9
Consequences caused by excessive noise	155	95.6
Most common form of presentation of latex sensitivity (contact dermatitis by irritation)	101	62.3

The variables studied were physical risks (anesthetic gases, radiation, allergic reactions, noise pollution), infection (respiratory viruses, herpes viruses, hepatitis, acute immunodeficiency virus, tuberculosis, viruses in laser mist) variables and of fires and use of electrocautery (surgical specialties involved, oxidizing agents in the operating room).

For data analysis we used the software Epi Info version 7 program. The results were presented in the form of frequency distribution.

Results

Among the 426 accredited anaesthesiologists and those available in the hospital system, 162 agreed to participate, corresponding to 38% of those registered in their Cooperative. Of the respondents, 46.9% practice the specialty for over 15 years, 12.3% have a higher degree of anaesthesiology and 5.5% an MSc (Table 1).

As to the questioning about the responsibility for ensuring proper and decent working conditions for the anesthesiologist, only 40.7% chose the correct answer, "technical director" (Table 2).

Regarding anesthetic pollution index monitoring of the surgical center, only 5.5% of respondents said that this procedure is performed in their workplace. Of the total, 54.9% correctly indicated "post-anesthetic recovery room" as the sector with the highest concentration of inhaled anesthetics (Table 2).

Table 3 Knowledge of anesthesiologist as to the risk of infection.

Questioning	Hits	
	n	%
Had access to/read CCIH manual	06	40.7
Classification of the surgical center (critical area)	94	58
Sector responsible for monitoring the professional after percutaneous exposure (committee of local infection)	146	90.1
Profile of patients with a higher prevalence of infectious diseases (patients treated in trauma hospitals)	117	72.2
Periodic screening for <i>M. tuberculosis</i> infection	03	1.8
Tested seroprevalence to anti-HBs	95	58.6
Anesthesiologist previously vaccinated and responsive, after exposure to a patient with hepatitis B (prophylaxis is not required)	103	63.9
Professional unresponsive to complete hepatitis B vaccination program (repeat complete schedule)	101	62.3
Exposure to patient with hepatitis C (no prophylaxis available)	71	43.8
Biological fluids without risk of HIV transmission	130	80.2
Elective surgery in a patient with TB	72	44.4

With regard to the consequences caused by excessive noise, 95.6% answered satisfactorily and identified loss of attention and irritability, elevation of blood pressure and release of catecholamines as possible events. Contact dermatitis by irritation was identified correctly by 62.3% as the most common form of latex sensitivity presentation (Table 2).

As to the risks of infection, only 3.7% of anaesthesiologists have access/read their workplace manual of hospital infection control, 58% correctly classified the surgical center as a critical area and 90.1% would look for the local infection commission after percutaneous exposure. With respect to those patients with higher prevalence of infectious diseases, 72.2% of the anaesthesiologists chose correctly the option "patients treated at trauma hospitals" (Table 3). Only 1.8% of anaesthesiologists included in this study had periodic screening for infection with *Mycobacterium tuberculosis*, and 58.6% tested seroprevalence of anti-HBs after completion of the vaccination schedule for hepatitis B (Table 3).

In the hypothetical case of contact of a previously vaccinated and responsive anesthesiologist with HBsAg-positive patients, 63.9% of respondents chose correctly, answering that there is no need of post-exposure prophylaxis. In case of non-responsiveness to the complete hepatitis B vaccination program, 62.3% agreed to indicate a repetition of the full three-dose schedule. By analyzing the hypothetical situation of contamination with a hepatitis C carrier, only 43.8% knew that an effective post-exposure prophylaxis does not exist (Table 3).

Table 4 Use of electrocautery and fire prevention and hazards.

Questioning	Hits	
	n	%
Guidelines for fires in the operating room	08	4.9
Most important measure to prevent burns from electrocautery (correct application of receiving plate)	154	95
Surgical specialty with higher risk of combustion (head and neck)	90	55.5

As to the occupational transmission of human immunodeficiency virus, 80.2% of anaesthesiologists recognized that biological fluids pose no risk of infection. In the question about the right conduct in performing an elective surgery in a patient with tuberculosis, less than half the sample (44.4%) correctly chose to postpone the procedure until the patient was no longer infectious (Table 3). Regarding guidelines for fires in the operating room, only 4.9% said that they had received some kind of instruction in their workplaces (Table 4). Regarding the prevention of burns caused by electrocautery, the majority of respondents (95%) recognized "a correct application of the receiving plate" as the more relevant conduct. When asked about the surgical specialty most likely to promote oxidizing reactions, 55.5% chose correctly the "head and neck" (Table 4) option.

Discussion

The study on the potential risks in the operating room is part of the anesthesiologist training. Knowledge and prevention are the basic steps to reduce exposure and its possible consequences. Thus, every institution must have active educational programs on occupational hazards and develop appropriate techniques to prevent occupational exposure, since failure to comply with the standards of protection, or the submission to unsafe working conditions, can lead to drastic consequences in health and quality of life.

The main professional responsible for ensuring proper working conditions and the essential means to a good medical practice, in his/her work of supervision and coordination of all technical services of the health facility, is the technical director of the institution.⁴ It was observed in our research that less than half of the anaesthesiologists covered (40.7%) knew personally the professional responsible for this function – a factor that may hinder the resolution of unhealthy conditions in the workplace.

The environmental pollution of surgery centers by anesthetic gases is another aggravating factor to the welfare of health professionals, with a high degree of relationship with the anesthesiologist. Even in rooms with proper ventilation and equipment cleaning, high concentrations of anesthetic gases were detected.¹ Only 5.5% of respondents stated that the degree of pollution by anesthetic gases in the operating room in which they work is monitored, and 54.9% correctly specified the post-anesthetic recovery room as the sector with the highest pollution.

The uncertainty about the true risks of this continued exposure often turns the professional into an insecure person, especially in the case of female anaesthesiologists in reproductive age, as there are no studies that definitively establish direct relations of this exposure with miscarriage and congenital abnormalities.¹ Measures should be taken to minimize the occupational exposure to chemical agents with known or probable toxic potential. It is crucial that these professionals continue fighting for better equipped surgical centers, with adequate ventilation and exhaust systems as well as with good quality maintenance schemes.

The noise levels in the operating room may also have adverse influence on the ability of the anesthesiologist to perform his/her tasks. Noise pollution should be quantified and their intensity and number of hours of exposure should be determined.¹ The complex psychomotor activities associated with anesthesia, such as monitoring and surveillance, are particularly sensitive to the adverse affects of noise pollution. With regard to the consequences caused by excessive noise, 95.6% answered satisfactorily and identified loss of attention, irritability, elevation of blood pressure and release of catecholamines as possible events.

The Committee on Hospital Infection Control was born with the mission of knowing the infection rates in hospitals, and its primary responsibility is the implementation of biosafety actions.⁵ Every health care organization offers a manual to instruct their professionals properly. Only 3.7% of respondents had access to or read the anaesthesiologists' manual of Committee on Hospital Infection Control (CCIH) in their institution. Considering that the anaesthesiologists deal intimately with potential aggravating factors in the surgical center, the implementation of educational projects is crucial to facilitate their access to this preventive tool.

The concept of critical area, into which the surgical center is encompassed, refers to the sector in which there is increased risk for development of care-associated infections, either by running processes involving critical articles or biological material, by the realization of invasive procedures or the presence of patients with increased susceptibility to infectious agents or carriers of microorganisms of epidemiological importance.⁶ Among the anaesthesiologists interviewed, 58% classified correctly the operating center as a critical area. With respect to the patients with higher prevalence of infectious diseases, 72.2% of respondents selected the correct option, "patients treated at trauma hospitals". Measures should be implemented to ensure that all anaesthesiologists be aware of the classification of their working area.

The exposure to potentially contaminated biological materials is a significant risk to the health professional. Studies conducted in this area reveal that accidents involving blood and other body fluids correspond to the most frequently reported exposures.⁷

Injuries from needles and sharps, in general, are considered extremely dangerous, for being potentially able to convey more than 20 different types of pathogens. The infectious agents commonly involved are human immunodeficiency virus (HIV) and hepatitis B and hepatitis C viruses.⁷ In the sample reviewed in this study, only 43.8% knew about the inexistence of an effective prophylaxis after exposure to hepatitis C virus. Educational actions should be encouraged

by hospital administrators, intending the full knowledge of the risks encouraged by the professionals involved.

The hepatitis B vaccine is highly effective. Thus, all health professionals should have access to this resource. Another key point is to test seroconversion to clarify the effectiveness of the method. In our survey, only 58.6% of respondents tested seroconversion. Based on this result, one should give greater emphasis to the intensification of campaigns aiming to repeat the vaccination schedule in those professionals who have not responded satisfactorily to the method.

High prevalences of tuberculosis infection and incidences of this disease among health professionals are reported, as well as higher prevalences and incidences in professionals performing activities that put them in contact with patients with suspected or diagnosed tuberculosis in the workplace.⁸ The Ministry of Health recommends the vaccination of healthcare professionals and of newly hired employees in these services, provided that they are tuberculin negative.⁹ In our study, only 1.8% of respondents underwent screening for *M. tuberculosis* infection. As that tuberculosis is an endemic disease in Brazil, the screening for tuberculosis should be extended to all health professionals.

The anesthesiologist plays a key role in the prevention of fires in the operating room, recognizes possible sources of ignition and administers oxygen rationally, especially in the case of open systems. The first step to fire prevention must be the constant reminder of the possibility of fire, which, despite being a rare event, is a potentially serious complication.¹⁰ Only a small portion of the sample (4.9%) reported receiving guidelines on the subject and 55.5% correctly identified the "head and neck" specialty as that of highest risk for this complication.

In face of the serious consequences caused by combustion in the operating room, workshops should be mounted to clarify aspects of its prevention, the surgical specialties most involved, and what steps must be followed in the event of its occurrence.

Conclusion

The risk to which anaesthesiologists are exposed is variable and ignored by the class itself. This may result in professional illness, with personal loss. It was observed in this study from some of the questions submitted that less than half of the sample answered correctly and a very small percentage of the evaluated professionals read the CCIH manual of their institution. These results reinforce the importance of educational campaigns in order to improve the knowledge and also to clarify the rights and duties of labor institutions.

Conflicts of interest

The authors declare no conflicts of interest.

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