

Is Patient Safety Being Effectively Taught In Medical School?



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ABSTRACT

Introduction: Patient Safety (PS) is defined as a set of measures taken to reduce as much as possible the risks of unnecessary damage to patient care. Therefore, the importance of introducing issues related to this theme in the process of training new professionals has been widely studied.

Objective: To deepen the literature on the insertion of the subject of PS in the curriculum and how it is being taught in medicine courses in Brazil and around the world.

Method: The study is a systematic literature review and was conducted following the PRISMA recommendations. A search was carried out in the main scientific databases associated with health (CochraneLibrary, Medline via PubMed, Regional Portal of the Virtual Health Library (VHL) and Scielo), using the descriptors "Patient Safety"; "Curriculum" and "Medical Schools". The inclusion criteria were primary articles from the last five years, in Portuguese, English and Spanish, presented in full text and that answered the guiding question. Those article that didn't contain primary data were excluded. After selection, articles were double-assessed by independent reviewers for risk of bias and quality of evidence using the QUADAS-2 tool provided by Cochrane.

Result: 173 articles were identified, of which 150 were excluded as per the Prisma protocol, leaving 23 articles that were analyzed in depth and synthesized descriptively. In general, the concern of medical schools in implementing a curriculum that attends to patient safety was demonstrated.

Conclusion: There are several barriers that hinder the implementation of the PS theme in the medical curriculum, such as the lack of standardization of curricula on the subject, reducing the effectiveness of teaching, to solve this issue, although several models are being developed to facilitate and ensure a standard of quality. However, more assertive teaching-learning methodologies are needed for better effectiveness of teaching Patient Safety in medical schools.

KEY WORDS: Patient Safety; Curriculum; Medical Schools.

INTRODUCTION

Patient Safety (SP) is defined by the World Health Organization (WHO) as a set of measures taken to reduce as much as possible the risks of unnecessary damage resulting from patient care¹ and has been shown to be fundamental with regard to quality of health care.

In 2004, WHO created the Word Alliance for Patient Safety with the aim of organizing the concepts on this topic and proposing measures to reduce adverse events. In this context, the Ministry of Health (MS) defined, in 2013, the National Patient Safety Program (PNSP) through MS/GM Ordinance No. 529, with the purpose of promoting the qualification of services in patient care in all health establishments in the national territory.

Given the importance of the subject, much has been discussed the introduction of themes related to PS in the process of training new professionals in the health area, with the aim that undergraduates develop skills to act in a way that minimizes the frequency of errors and adverse events².

In this panorama, the objective of this research was to show what the literature points out about the insertion of the subject of Patient Safety in the curriculum and how it is being taught in medicine courses in Brazil and around the world.

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METHOD

The study is a systematic literature review, which was conducted according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA. The guiding question was structured with the mnemonic PVO, where Schools of Medicine, Curriculum and SP being effectively taught correspond to each letter of the mnemonic, respectively. Therefore, we seek to answer the following question: Is SP being effectively taught in medical schools?

The research was carried out through searches in the PUBMED, COCHRANE, SCIELO and BVS databases. The keywords were previously consulted in the Health Sciences Descriptors (DeCS) and in the Medical Subject Headings (MeSh), with the following descriptors being chosen: “Patient Safety”; “Curriculum” and “Medical Schools”. The Boolean AND was used for the combination of the descriptors in English: (Patient Safety) AND (Curriculum) AND (Medical Schools).

The inclusion criteria adopted to select the articles were: Primary research articles, from the last five years, in Portuguese, Spanish, English, available in full and that answered the guiding question. The exclusion criteria were the articles that were duplicated and those that did not bring primary data, in order to follow the methodological rigor required by systematic reviews.

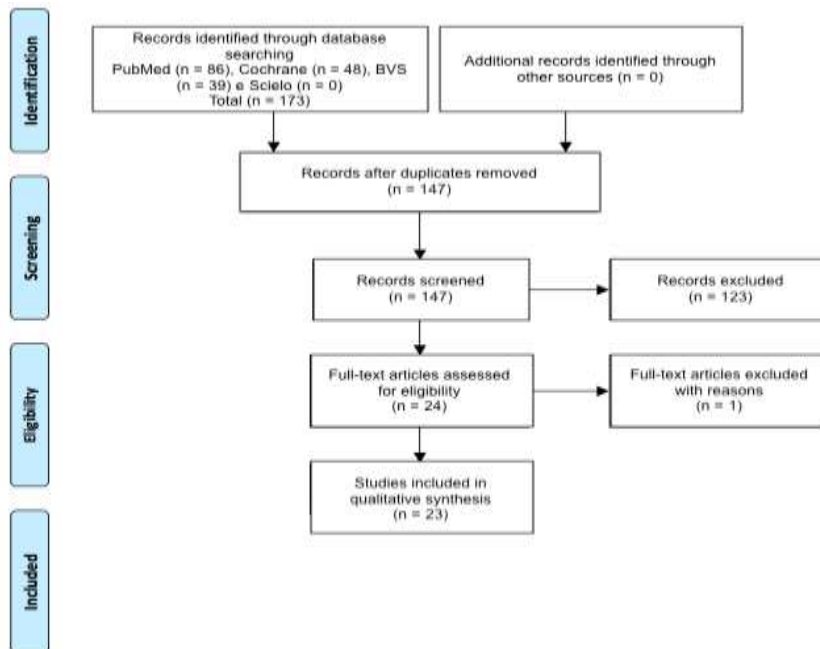
For selection, two researchers independently read the titles and abstracts of the articles found in the search and any differences were resolved by consensus, together with a third evaluator. After the initial selection and removal of duplicate articles, the entire sample was read independently and, in consensus, which articles would compose the final sample were determined. Thus, there were 23 articles that theoretically supported this review.

The protocol of this systematic review was registered with Prospero, receiving the following registration number: CRD42020181806.

RESULTS

The search in the databases resulted in an amount of 173 articles. At first, duplicate references were excluded, resulting in a total of 147 articles. In a second selection phase, considering the title and abstract of the articles, 123 articles were removed. In order to determine the relevance of these articles in relation to the research question, there was a pre-selection, and 23 scientific articles were obtained, which were read in full and analyzed in depth, as described in Figure 1.

Figure 1. Flowchart of selection of articles for systematic review, according to the Cochrane Collaboration model

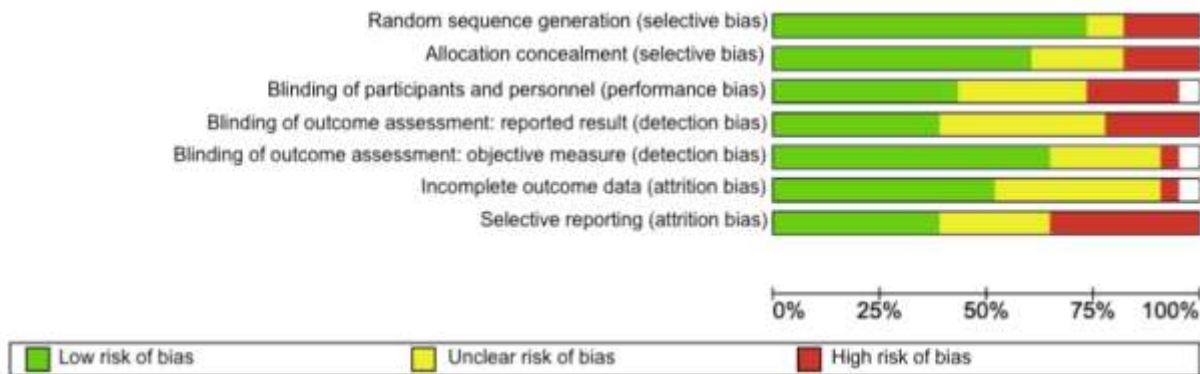


Methodological Quality Analysis

All studies included in the review were analyzed for the quality of the evidence presented. For this, the biases were evaluated using the QUADAS-2 tool, made available by Cochrane. Figure 2 contains the risk of bias of the articles selected for the review and shows that more than 50% of the studies had a low risk of selection bias, about 40% of the references had a low risk of performance bias, an average of 50% demonstrated a low risk of detection and attrition bias, while 30% of the reports indicated a high risk of bias. It was considered that all studies could make up the final sample for the search for evidence.

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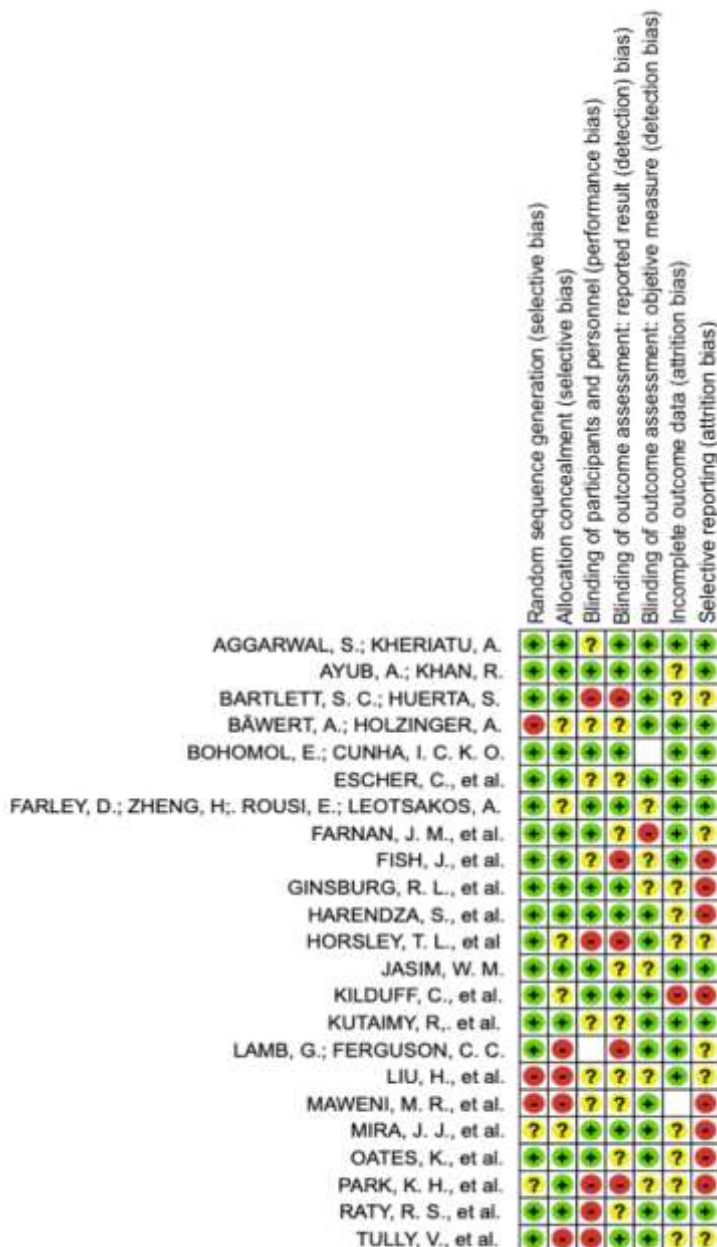
Figure 2 - Risk of bias in percentages



Source: The authors, 2021.

Figure 3, in turn, presents the summary of the risk of bias, according to the judgment criteria indicated by Quadas-2.

Figure 3 - Risk of bias summary.



Source: The authors, 2021.

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In the final sample, this review included 7 (30.4%) studies carried out in Europe, 4 (17.3%) carried out in Asia, 8 (34.7%) in North America, 1 (4.34%) in South America, 1 (4.34%) in Oceania and 2 (8.69%) carried out in different WHO regions. From a methodological point of view, there were 11 (43.4%) cross-sectional studies, 7 (30.4%) cohort studies, 1 (4.34%) qualitative descriptive exploratory research, 1 (4.34%) observational study pre - non-randomized and uncontrolled pro-descriptive, 1 (4.34%) double cohort study, 1 (4.34%) combined prospective/retrospective study and 1 (4.34%) descriptive study with documental strategy.

Table 1. Selected studies and their characteristics

First author	Date	Local	Type of studies	Methodological aspects
Harendza, S. et al. ³	2019	Germany	Cohort study	Application of a Group Assessment Test to medical students and their grades were compared to those of students from a flight school
Ayub, A. et al. ⁴	2018	Pakistan	Qualitative descriptive exploratory research	Focus groups were set up and a questionnaire was applied. All data were analyzed using the Atlas TI software and thematic narrative analysis was performed.
Liu, H. et al. ⁵	2018	China	Quantitative cross-sectional study	Study conducted in 4 Chinese medical universities, with students from the first to the fifth year who did not receive formal education on the subject, with the application of the Questionnaire of Attitudes towards Patient Safety II
Aggarwal, S. et al. ⁶	2018	USA	Quantitative cross-sectional study	The likelihood of medical students approaching and reporting inappropriate attitudes to peers, nurses and physicians was assessed
Ginsburg, R. et al. ⁷	2017	62 countries from the WHO regions	Two cross-sectional studies	Survey with technicians from the Ministries of Health and WHO country offices and, later, with people in a position to provide institution-level perspectives on the implementation of the SP curriculum.
Farnan, J. et al. ⁸	2016	USA	Cross-sectional descriptive study	Study conducted with medical students through the simulation of situations potentially harmful to patient safety. Satisfaction was assessed using the constructed response assessment and descriptive statistics were performed
Mira, J. J. et al. ⁹	2015	Spain	Cross-sectional descriptive study	Sample of medical and nursing students from 3 universities. Latin Patient Safety Student Information and a 5-question test were used. Using the chi-square and t-test, the qualitative and quantitative variables were analyzed, respectively
Jasim, W. M. ¹⁰	2019	Iraq	Cross-sectional study	Carried out in two medical schools, one considered traditional and the other innovative. Questionnaire created by the investigator was applied
Park, K. H. et al. ¹¹	2019	Republic of Korea	Cross-sectional study	The attitudes of third- and fourth-year medical students were evaluated using the Patient Safety Questionnaire
Fish, J. et al. ¹²	2015	USA	Cohort study	A total of 174 third-year medical students (86 in the pilot and 88 in online) who attended the internal medicine and family medicine services were evaluated
Bäwert, A. et al. ¹³	2019	Austria	Cross-sectional study	647 medical students watched videos of bladder catheter placement just before an objective structured clinical examination (OSCE). After viewing the videos, all students were surveyed through an online questionnaire with 15 questions about quality and acceptance
Kutaimy, R. et al. ¹⁴	2018	USA	Cross-sectional study	Application of a workshop on patient safety integrated into the anatomy course with pre- and post-test and also students' reports after the post-test

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Raty, R. S. C. et al. ¹⁵	2017	USA	Cohort study	Assessment of the impact of residents' participation in teaching patient safety to students of a SP course
Escher, C. et al. ¹⁶	2017	Sweden	Prospective cohort study	Medical students' attitudes towards SP, their motivation to participate in simulation-based team training were explored. Data collected by the Situational Motivation Scale and Attitudes towards Patient Safety Questionnaire (APSQ)
Horsley, T. L. et al. ¹⁷	2016	USA	Cohort study	Through the TeamSTEPPS program, simulations were carried out with teams of medical students in order to promote interprofessional education and collaboration among students, faculty and staff
Bartlett, S. C. et al. ¹⁸	2018	USA	Cross-sectional study	Application of a curriculum in 6 sessions focused on Quality Improvement and Patient Safety. The Quality Improvement Knowledge Application Tool was performed before the sessions and at the end. In addition, six projects were prepared
Maweni, M. R. et al. ¹⁹	2019	United Kingdom	Cross-sectional study	Application of a 20-item questionnaire to medical students and physicians in order to establish the most common clinical procedures and scenarios that students adopt in order to verify the level of confidence in each of the tasks. A simulation-based course was developed to address the knowledge and skills gaps identified by the questionnaire
Oates, K. et al. ²⁰	2018	Australia	Non-randomized and uncontrolled pre-post-descriptive observational study	A patient safety training package was applied. A test with the Patient Safety Attitudes Questionnaire3 (APSQ3) was used in four stages: before patient safety education, at the end of the first year when half of the training had been completed, at the end of the second year when the training had been completed and 12 months after training
Tully, V. et al. ²¹	2018	United Kingdom	Cohort study	First, the students of the latter were prepared with a tutorial and a course, then the mMERIT tool was applied so that medical students, in groups, reflect on errors that were reported, and finally they should write their reflections in a portfolio
Kilduff, C. L. S. et al. ²²	2018	United Kingdom	Double cohort study	An eight-item electronic questionnaire was distributed electronically to 32 medical schools
Farley, D. et al. ²³	2015	6 WHO regions	Combined prospective/retrospective study	Study to generate formative information about the work experience with the Curriculum Guide. Data collection in participating school through stakeholder interviews and student surveys at three different times: the start of the field test (baseline), right after each school starts teaching and right after each school finishes teaching
Ferguson, C. et al. ²⁴	2015	USA	Cohort study	Implementation of the QuIPS Academic Path (Quality Improvement and Patient Safety) in a medical school. Pathway assessment included surveys of student experiences after each main session and at the end of each year, reviewing students' unscored activities, and tracking completed academic projects
Bohomol, E. et al. ²⁵	2015	Brazil	Descriptive study with documental strategy	The theoretical framework adopted was the WHO Multi-Professional Patient Safety Curriculum Guide

Source: The authors, 2021.

When performing the in-depth readings of the selected articles, for greater understanding, categorization was used, called:

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effectiveness of teaching today, barriers to teaching Patient Safety, teaching strategies on Patient Safety and Patient Safety in different resumes.

CATEGORY 1: Effectiveness of teaching today

Ginsburg⁷ produced two cross-sectional surveys with 62 countries in the WHO regions. The first survey with representatives of the Ministries of Health and WHO representatives, and the second, with professionals who provided the institution's perspectives on the implementation of patient safety programs. The results showed that 69% of countries were considering whether to implement the patient safety program or actively planning its implementation, and 9% of countries reported that the program had already been implemented.

In the second survey, 43% of professionals were implementing a program based on the WHO guideline, 29% an adapted WHO program and 29% did not mention which program was being implemented. The study highlighted the need for greater attention to the implementation of the patient safety curriculum, considering that the barriers are not exclusive to a particular region and proposing a standardization for global implementation.

In a cross-sectional descriptive study, authors⁹ developed a survey of students from 3 universities in Spain and observed that it was possible to expect that 32% of medical students would acquire skills to talk to patients or to maintain frank communication, thanks to theoretical or practices. They also observed that 30-43% of the participants were able to identify the inherent health risks and knew what to do in case of an error, with 16-35% being more aware that some adverse events are unavoidable or a result of not updating of the protocols. Based on these results, they inferred those medical students receive incomplete information about how to avoid more frequent risks, what to do in adverse situations, and how to talk to colleagues and patients in case of error.

A cross-sectional study⁵ in 4 Chinese universities with 2,498 first- to fifth-year medical students who did not receive formal patient safety education and applied the Patient Safety Attitudes Questionnaire 3 (APSQ3). In general, students responded in the affirmative to the following propositions: "Patient safety training received", "Patient involvement in error reduction", "I have a good understanding of patient safety issues as a result of my medical training graduation" and "patients have an important role in the prevention of medical errors", however some domains received fewer affirmative answers, they are: "professional incompetence as a cause of error", "disclosure responsibility", "medical errors are a sign of incompetence" and "it is not necessary to report errors, which do not result in adverse effects for the patient". The outcome of this study demonstrates that health institutions should focus more on issues related to the causes of medical errors and error reporting, with a view to the effectiveness of health care.

Harendza³ applied an assessment test to a group of medical students from the universities of Hamburg, Oldenburg and TU Munich and their grades were compared to students from a flight school at the German Aerospace Center in Hamburg. Medical students scored significantly higher than flight school students for adherence to procedures and communication, but lower scores for teamwork, resistance to stress, and awareness. Students in the 10th semester of medicine scored better than those in the last year. Low scores on awareness are of concern, as awareness is essential for patient safety and clinical reasoning. Furthermore, the difference between the two cohorts may suggest that medical students lose some awareness competence over the course of their graduation.

In a qualitative descriptive exploratory research⁴, focus groups were set up with medical professors and academics in the last year of the Islamic International Medical College, Rawalpindi, Pakistan and applied a questionnaire on Patient Safety. All participants considered that patient safety is an important issue, as well as all agreed that trust between doctor and patient must be strong. The need for a system and culture where students could report their errors was defended, and lack of communication was identified as one of the main causes of medical errors. Finally, they highlighted the need for reforms in the medical curriculum in relation to patient safety.

The quantitative cross-sectional study conducted⁶ with 159 medical students at the University of California, Irvine School of Medicine, assessed, through an electronic survey sent by e-mail to medical students, the likelihood of participants to address and report inappropriate behavior to peers, nurses and doctors. Students were more likely to approach a fellow medical student, followed by nurses, followed by physicians, to ask for behavior modification. Fear of retaliation and fear of being identified were the most common reasons for not reporting a problem. It is concluded that student behavior changes depending on the professional involved, and the combination of student patient safety education and an anonymous error reporting system could resolve some behavior discrepancies.

The cross-sectional survey¹⁰ carried out in two medical schools in Iraq, one considered traditional and the other innovative, shows that traditional education students point to the need for a reliable reporting system suitable for patient and student safety records. From the innovative school agree that medical errors should be noted by a specialized agency. In the distribution of the frequency

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of medical students according to their attitudes towards the main causes and importance of patient safety in medical education, it is seen that the attitude of medical students regarding the causes of medical errors was above the cutoff point. (2.1) and low in terms of its importance in medical education (1.8). In distributing medical students according to their perceptions of preventable measures of medical errors, both the traditional and innovative school's fourth stage agree on an effective strategy for dealing with these errors with care as a preventive measure, compared to the students from the third stage of the innovative school, who agree with medical errors being treated in a constructive way. Finally, in the frequency distribution of the study students according to their perceptions about the engagement of the formal patient safety curriculum in medical education, the third stage of both schools agrees with the involvement of the formal curriculum on patient safety. Patient in medical education, while the fourth stage of the traditional school disagrees with the need for this engagement.

More than a third felt that most harm to patients was unavoidable. More than 60% were satisfied and positively evaluated the patient safety training they received at the time of the survey. Most thought it's important for undergraduate medical students to receive formal instruction in patient safety. However, 41% believed that it could be learned through clinical experience after qualification, while only 31% indicated that it was effective to learn about patient safety issues before becoming qualified healthcare professionals. More than half of all respondents indicated confidence in reporting errors and accountability while working as a physician. However, more than half agreed that junior staff members should think carefully before initiating discussions about patient safety. More than 90% believed that human error was inevitable and that medical errors were not indicative of incompetence. About a third believed that most medical errors were the result of careless health professionals, while about two-thirds believed that medical errors could be avoided by paying more attention to work. Regarding situational awareness, 72% believed that remaining vigilant about potential risks could actually be detrimental to patient safety (while about two-thirds believe that medical errors can be avoided by paying more attention while on the job).

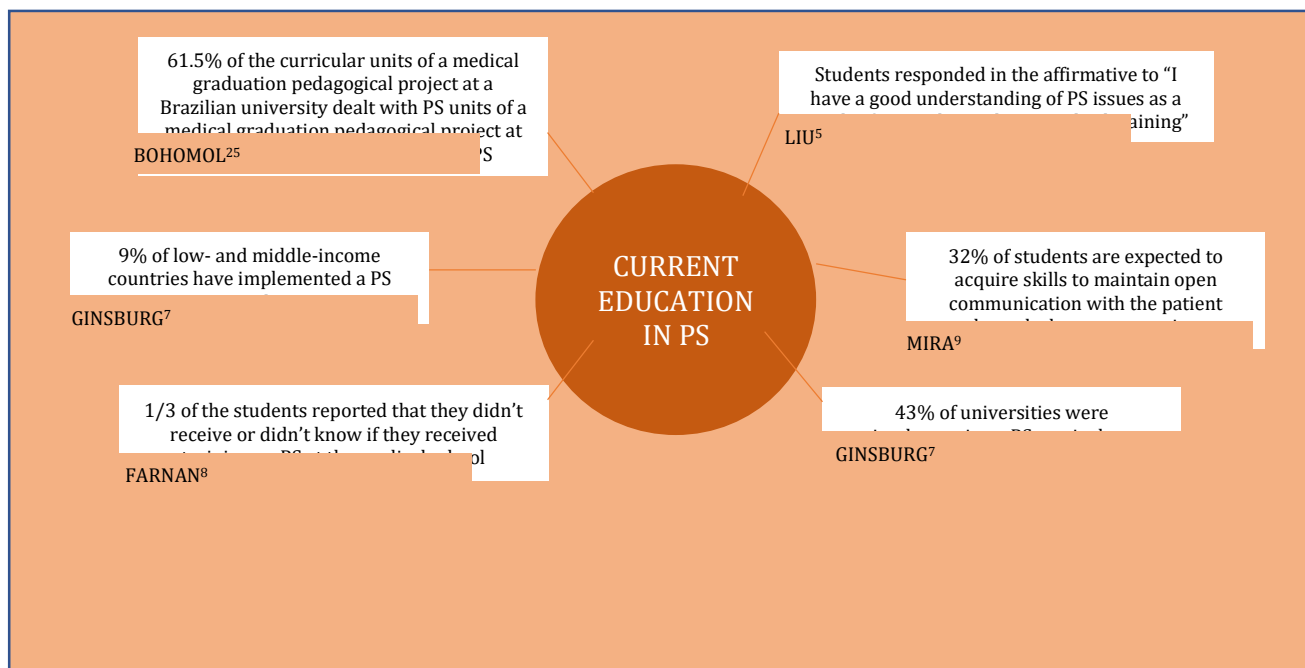
Another study¹¹ investigated Korean medical students' attitudes about patient safety to determine which perspectives required greater focus in terms of educational development. Attitudes towards patient safety were assessed using the Attitude Patient Safety Questionnaire (APSQ) which was distributed to 580 students at four medical schools in the Republic of Korea. A total of 300 questionnaires were returned for final analysis. More than a third of participants believed that most harm to patients was inevitable. Although none of the respondents received formal patient safety instructions, more than half were confident in reporting errors, regardless of who made them. About two-thirds of all respondents believe that patient safety issues can only be learned through clinical experience after qualification. In addition, only 31.3% believed it was effective to learn about patient safety before qualifying, and many students misinterpreted several items (eg, professional incompetence as a cause of errors, responsibility for disclosure, the importance of patient safety in curriculum and situational awareness). Thus, it was concluded that patient safety education should be designed to place greater emphasis on the proper attitude.

Authors¹² evaluated, in a qualitative study, 174 third-year medical students (86 in the pilot and 88 in online) who had attended the services of internal medicine and family medicine at the University of Texas Southwestern Medical School. The course was highly effective and confident both in participating in the project and in teaching the principles of Patient Safety. All participants completed the Quality Improvement Knowledge Assessment Tool (QIKAT) at the beginning and completion of the study period. The pilot group had statistically significant higher scores on specific objective statements ($p < 0.01$) and tended towards significance in identifying processes and stakeholders ($p = 0.07$). Research indicates that students in the face-to-face pilot program reported that the course is more effective and more satisfying than students in the online program. Pilot students also reported greater self-efficacy for future participation in QI projects than the online group. Although the study did not demonstrate a difference in overall effectiveness by objective measures, it does indicate that combining didactics with an applied simulation design improved some Patient Safety skills.

Figure 2 shows excerpts from some of the articles in the Current Teaching in Patient Safety section, which allow for a perspective of current teaching in SP. In summary, universities still lack a curriculum aimed at SP and the number of students who did not receive formal education in SP is large.

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Figure 2. Current teaching in Patient Safety



Source: The authors, 2021.

CATEGORY 2: Barriers to teaching patient safety

Ginsburg⁷ found as barriers to the implementation and exercise of patient safety, the belief that the curriculum on this topic was externally imposed, the lack of government commitment to the patient safety curriculum and the lack of enthusiasm on the part of educational institutions.

In a descriptive study²⁵ that used the Multi-Professional Patient Safety Curriculum Guide, they identified that 61.5% of the curricular units of a university's medical graduation pedagogical project dealt with issues related to patient safety. Themes such as "infection prevention and control" were found in 47.5% of the curricular units and "interaction with patients and caregivers" in 32.5%. However, no content related to "learning from mistakes to avoid damage" was found. Fragmented teaching was identified as a point of difficulty, which greatly values clinical skills such as diagnosis and treatment of the disease after treatment, surgical procedures and follow-up.

While Mira⁹ states that medical students receive incomplete information about how to avoid more frequent risks, what to do in adverse situations and how to talk to colleagues and patients in case of error, and thus, these factors make it difficult to learn patient safety. Another study⁴ points out that, for the implementation of the patient safety curriculum, a system and culture where students could report their errors in a comfortable way is necessary. Just as Aggarwal⁶ reports that fear of retaliation and fear of being identified were the most common reasons for students not reporting a problem.

A study¹⁰ pointed out the need for greater pedagogical engagement in the formal patient safety curriculum in medical education so that the teaching-learning process becomes effective.

CATEGORY 3: Patient Safety Teaching Strategies

The use of teaching tools such as videos, workshops and simulation scenarios has been shown to be an effective way to teach patient safety in the curriculum of medical schools.

Researchers⁸ created a case scenario with important patient information and security threats in a simulated manner at the University of Chicago with third-year medical students. The simulation time was timed and students were asked to list as many possible securities risks. One-third of participants reported that they did not receive or did not know if they received patient safety training at the medical school. Some safety risks were identified by most students, such as the risk of falling, but others were rarely identified, such as the absence of prophylaxis for deep vein thrombosis. The simulation was a viable and effective way to present students with content focused on safety, in addition to identifying the students' difficulty in recognizing common hospitalization risks.

Several authors¹³ conducted a cross-sectional study with 647 medical students in Austria. In this study, short explanatory videos were exposed to students just before an objective structured clinical examination (OSCE). After the simulation, all participants

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answered an online questionnaire, and all students reported being better able to perform procedures and remember hygiene techniques. Thus, the study points out that the clear transmission of medical skills seems to be important for the performance of students regarding patient safety, thus, it is observed that the use of videos is effective as an educational tool.

Kutaimy et al.¹⁴ proposed, through a study with 308 first-year medicine students at Wayne State University, the application of a workshop on patient safety integrated into the anatomy course with a high-impact event that consisted of the discovery of a sponge retained during the dissection of a cadaver in anatomy class, used to introduce medical error, as well as an educational session with an interprofessional team and, finally, a patient's story told by a close family member about the personal impact was presented of medical errors. They used pre- and post-test and also collected reports from students after the test. The mean score for attitudes towards patient safety had significant improvement post-test. Other items also improved, but without significance. As for the post-test comments, the students recognized that there was a medical error presented in the workshop and that it could cause serious consequences and decrease the patient's confidence in the procedure, many were surprised that medical errors still occurred and reported emotional discomfort when faced with the mistake. The integration of an existing ongoing workshop improved knowledge and general attitudes about patient safety.

In a cohort study¹⁵ conducted with 748 medical students using the Institute for Healthcare Improvement's patient safety curriculum as a framework, they brought resident participation in patient safety education to undergraduates as an educational tool in a safety course of the patient. The overall quality of the course, clarity of objectives, and the value of small group discussions increased after resident placement. The overall value of the course also increased after providing small group facilitation training to residents. Students valued interaction with residents, who in turn gained experience in facilitating and leading small groups.

Escher et al.¹⁶ explored medical students' attitudes towards patient safety and their motivation to participate in simulation-based team training through a prospective cohort study of 56 medical students. Intrinsic motivation and identified regulation improved and motivation and external regulation decreased after training. Students who scored the highest on the attitudes toward patient safety test were more motivated.

In a cohort study¹⁷, they used the evidence-based program, TeamSTEPPS, which incorporates strategies in a healthcare environment to improve the quality and safety of care, to carry out simulations. After the simulations, students were brought together in reinforced learning sessions. Then, the students were submitted to a second simulation and a debriefing at the end. TeamSTEPPS allowed students to focus on establishing and improving team performance. In addition, the simulation provided a safe learning environment to bring students together and put what they learned into practice.

CATEGORY 4: Patient safety in different curricula

Bartlett et al.¹⁸ proposed an experiential curriculum to offer medical student's knowledge about patient safety. To measure the students' knowledge on the topic, the Quality Improvement Knowledge Application Tool (QuiPS) was applied and the students' scores rose from 5.61 to 7.75 after applying the experimental curriculum. Teaching sessions were offered and each student received a syllabus and a copy of the Fundamentals of Improving Health Care, at the end of the program, students were interviewed for feedback. 80.9% of participants reported that their practice would change due to the experience of going through the experimental curriculum, and 96.5% reported that they planned to participate in the project again in the future. In addition, 96.5% of students considered the experience to be good or very good.

Following the methodology of a cross-sectional study¹⁹, a questionnaire was applied to 436 medical students and physicians from the United Kingdom and the Republic of Ireland to determine the most common elective experiences and establish which procedures and clinical scenarios medical students commonly adopt and manage during the faculty, with the objective of verifying the level of confidence of students in each of these tasks. Based on the knowledge and skills gaps identified with such a questionnaire, a course was developed and administered to two groups of medical students at St George's University London and King's College London medical schools. It has been found that a significant proportion of medical students feel pressured to perform skills that are beyond their level of competence during college, putting patient and student safety at risk. The simulation course was successful in significantly improving key technical and non-technical skills, which would be useful for students during the medical period.

In their study²⁰, researchers applied a patient safety training package to the first and second year of the medical curriculum at four different schools in Australia. This module was taught in the form of seminars, tutorials, role plays, video clips and questions and answers. A test with Attitudes Towards Patient Safety Questionnaire 3 (APSQ3) was used and showed persistent effects in raising scores of a patient safety intervention on the attitudes of medical students in four different schools, showing the potential of an intervention scalable education provided by a centralized body, rather than each school developing its own.

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In a cohort study²¹ of 824 medical students, they were prepared with an Incident Management Review tutorial and online course and were evaluated by the Mayo Evaluation of Reflection on Improvement tool (mMERIT). In the four years of study, 33% of the reports submitted were rated highly satisfactory.

The double cohort study²² carried out using an electronic questionnaire interviewed 1,459 medical students from 32 medical schools in the United Kingdom. Of the interviewees, 38.8% reported having received education on patient safety verification in surgery, of which only 21.8% had received formal education in a university course. Knowledge of perioperative patient safety systems and the ability to participate in safety protocols are important skills that should be formally taught in graduation. The results of this study show that safety checklist training in graduate surgery in the UK does not meet the minimum standards set by the WHO.

The combined prospective/retrospective study²³ generated information about the experience of working with the Multi-professional Patient Safety Curriculum Guide developed by WHO, which was tested in 12 participating medical schools from different WHO regions. Using stakeholder interviews and student surveys, data were collected at three times: at the start of the field test, right after each school started teaching the topic, and right after each school finished the course. Students' perceptions and attitudes toward patient safety improved substantially during the field test, and their knowledge of the topics they were taught doubled, from 10.7% to 20.8% correct answers in the student survey. In addition, the study reinforces the need to reinforce the content of the Curriculum Guide by WHO and to encourage the use of the Guide globally by organizations for teaching patient safety.

In a cohort study²⁴, they implemented in a US medical school, the Quality Improvement and Patient Safety (QuIPS) Scholarly Pathway—a faculty-mentored, which consists of a five-path academic program (physician scientist, urban and community health, health global, clinical educator and general practitioner) that should be chosen by the participants after a series of presentations made, with each modality lasting two years, with a third year being optional, and characterized by a set of skills defined by theoretical classes and experimental activities. Although until the publication of the article, no students had completed the program, preliminary data from student assessments showed that student knowledge increased significantly after the first year of the curriculum. Student reaction to QuIPS was favorable. A new curriculum, with the QuIPS strategy, provides an important opportunity to develop and test new assessment tools for curriculum in systems-based practices and practices-based learning and improvement.

CONCLUSION

The present systematic review found results that show the pedagogical concern of medical schools in implementing a curriculum that deepens the themes related to patient safety, however several barriers, not only in implementation, but also in methodology were found in different institutions.

According to the categories identified, the first evidence refers to the (in)effectiveness of teaching, given the lack of standardization of the theme in the curricula in different medical schools, although several models and methods are being implemented in order to ensure a standard of quality in implementing patient safety education. Furthermore, the fragmentation of teaching is visible, although students seek to reflect on errors and harm to patients.

Another piece of evidence that the studies pointed out refers to the strategies used to teach patient safety, particularly identifying simulation, instructional videos and workshops on the subject as methodologies that favor learning and retention.

Despite the initiative of medical schools to offer a curriculum that trains qualified professionals to offer excellent health care to the patient, it is suggested that the subject has greater visibility in academic circles, with the possibility of being a theme worked in a longitudinal manner, with successive approach to different syllabus contents, enabling deep and real reflections on the professional praxis in patient safety.

It is understood that the student, professors and managers of higher education institutions, when faced with the world problem regarding the quality of care, the widely publicized numbers on adverse events and deaths, may, during training, develop the culture of patient safety systematically, with effective teaching strategies for the development of skills in this specific area.

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