Problem-based learning in health education with a focus on the Unified Health System: a literature review

Abstract The present study aimed to analyze the Brazilian scientific production regarding the problem-based learning (PBL) methodology used as a tool for health education within the scope of the Unified Health System (SUS). This is a critical literature review, whose search strategy was based on the selection of bibliographic productions, carried out in March 2023, through the Virtual Health Library (BVS). The health sciences descriptors (DeCS) employed were "problem-based learning", "health education", and "Unified Health System*. Sixty articles were retrieved, and after applying the eligibility criteria, 19 studies remained, resulting in the formation of two thematic categories: a) active methodology PBL as a tool in teaching-learning in undergraduate studies, in the context of SUS, and b) contributions of the PBL methodology to health education of the population and/or health professionals within SUS. It is concluded that the scientific production addressing the PBL methodology used as a tool for health education within the scope of the Unified Health System is still scarce in Brazil. 

Descriptors: Problem-Based Learning, Health Education, Unified Health System.

Aprendizaje basado en problemas en educación para la salud con enfoque en el Sistema Único de Salud: una revisión de literatura

Resumen El presente estudio tuvo como objetivo analizar la producción científica brasileña sobre la metodología de aprendizaje basado en problemas (problem-based learning, PBL) utilizada como herramienta de educación en salud en el ámbito del Sistema Único de Salud (SUS). Se trata de una revisión crítica de la literatura, cuya estrategia de búsqueda fue a partir de la selección de producciones bibliográficas, realizada en marzo de 2023, a través de la Biblioteca Virtual en Salud (BVS). Los descriptores en ciencias de la salud (DeCS) utilizados fueron “aprendizaje basado en problemas”, “educación para la salud” y “Sistema Único de Salud”. Se recuperaron 60 artículos y luego de aplicar los criterios de elegibilidad quedaron 19 estudios, que culminaron con la formación de dos categorías temáticas: a) metodología activa PBL como herramienta de enseñanza-aprendizaje a nivel de pregrado, en el contexto del SUS y b) aportes de la metodología PBL a la educación en salud de la población y/o profesionales de la salud del SUS. Se concluye que la producción científica que aborda la metodología ABP utilizada como herramienta de educación en salud en el ámbito del Sistema Único de Salud es aún escasa en Brasil.


Aprendizagem baseada em problema na educação em saúde com enfoque no Sistema Único de Saúde: uma revisão de literatura

Resumo O presente estudo teve como objetivo analisar a produção científica brasileira acerca da metodologia de aprendizagem baseada em problema (problem-based learning, PBL) utilizada como ferramenta de educação em saúde no âmbito do Sistema Único de Saúde (SUS). Trata-se de uma revisão crítica de literatura, cuja estratégia de busca baseou-se na seleção de produções bibliográficas, realizada em março de 2023, por meio Biblioteca Virtual em Saúde (BVS). Os descritores em ciências da saúde (DeCS) empregados foram “aprendizagem baseada em problemas”, “educação em saúde” e “Sistema Único de Saúde”. Foram recuperados 60 artigos e após a aplicação dos critérios de...
elegibilidade, restaram 19 pesquisas, que culminaram na formação de duas categorias temáticas: a) metodologia ativa PBL como ferramenta no ensino-aprendizagem na graduação, no contexto do SUS e b) contribuições da metodologia PBL para a educação em saúde da população e\ou profissionais de saúde no âmbito do SUS. Conclui-se que a produção científica abordando a metodologia PBL utilizada como ferramenta de educação em saúde no âmbito do Sistema Único de Saúde ainda é escassa no Brasil.

**Descritores:** Aprendizagem Baseada em Problemas. Educação em Saúde. Sistema Único de Saúde.

**INTRODUCTION**

The process of health education has undergone a series of questioning and changes to meet the requirements of the National Curricular Guidelines (DCN), whose general competencies include health care, decision-making, communication, leadership, administration, and management, as well as lifelong learning. To develop them, the student must be able to collect, observe, and interpret data for diagnosis; develop logical reasoning and critical analysis in clinical practice; propose and execute appropriate treatment plans; promote and maintain health; communicate with patients, health professionals, and the community at large, within ethical and legal precepts; work in interdisciplinary teams and act as a health promotion agent; plan and manage collective health services\(^1\).

In this context, educational trends point towards the use of active teaching methodologies, where the student becomes the center of the teaching-learning process, being the protagonist of their own training process. The teacher ceases to be a holder and transmitter of knowledge and becomes a facilitator or guide in the student's research, reflections, and decision-making. Thus, active methodologies teach the student to learn how to learn, through real or simulated experiences, also favoring health education\(^2\).

Therefore, to integrate theory and practice, service and education, the methodological proposals used in the training of health professionals must be reconsidered, making it imperative to adopt an expanded and integrated approach to curricula, prioritizing the development of competencies and encouraging the use of active learning methodologies, creating professionals with a broad vision of humanity\(^3\).

Outdated teaching methods can hinder the creativity and intelligence of young people. The efficiency of learning in universities and professional training is very low when traditional methods are used. Therefore, it is necessary to modernize education to keep up with the transformations occurring in the world. Among the active methodologies used in the health field, problem-based learning (PBL) has become one of the most employed\(^4\).

PBL is a pedagogical model that began in 1969, in medical education at McMaster University's medical school in Ontario, Canada. In the 1990s, it was included in medical courses worldwide and approved by the World Federation for Medical Education and the World Health Organization\(^5\).

It is an educational strategy in which a practical problem serves as the basis for learning relevant information; in it, students solve problems in small groups, supervised by a tutor. It consists of a self-directed teaching technique that stimulates the student's critical thinking, contributing to making them a problem solver. The basic source of learning in PBL is exposure to situations and problems similar to real experiences in future professional practice\(^6\).

In the PBL methodology, teaching is centered on the student, who is responsible for actively seeking knowledge, integrating content from various areas, unlike traditional teaching that divides knowledge into basic and specific disciplines. One of the objectives of this methodology is to develop in the student the ability to seek solutions to problems that will arise throughout their professional life\(^7\).

For several years, various debates about health education in higher education and the need to train professionals who are in line with the principles advocated by the Unified Health System (SUS) have been present in educational institutions and in the government sphere\(^8\). SUS, as the regulator of the training of professionals in the field, has provided actions and programs, through initiatives of the Ministry of Education and the Ministry of Health, to
reformulate the education of health professionals, with the aim of guiding their actions based on the ethical-political principles that support the current public health policies in Brazil. Thus, in recent years, undergraduate courses in the health field have undergone a series of curricular reforms, aiming to adjust the profile of training processes to the paradigm of comprehensiveness, promoting the integration of teaching and service, affirming their role as a field of formative practices, to strengthen the SUS service network, and allowing the learned content to be transmitted and incorporated by citizens, in a constant situation of empowering the population through health education.

The Ministry of Health defines health education as “an educational process of building health knowledge aimed at thematic appropriation by the population [...]. Set of sector practices that contribute to increasing people's autonomy in their care and in the debate with professionals and managers in order to achieve health care according to their needs”.

Thus, health services, especially primary health care (PHC), constitute privileged practice or learning scenarios at the intersection of the world of work with the world of education. Such processes are configured as strategies in higher education to improve the quality of health education and, indirectly, improve health care for the population.

Given the above and with the purpose of deepening the contents on the subject, the present study aims to analyze the national scientific production on the PBL methodology used as a tool for health education within the scope of SUS.

LITERATURE REVIEW

The study consists of a critical literature review, based on a strategic search for bibliographic productions conducted in March 2023, across all available databases in the Virtual Health Library (BVS). According to Resolution 466/12, ethical review by a Research Ethics Committee is waived, considering that the research did not involve human subjects.

The following guiding question was formulated: How does the problem-based learning active methodology contribute to the process of health education within the scope of SUS? The health sciences descriptors (DeCS) employed were "problem-based learning," "health education," and "Unified Health System," in the field "title, abstract, subject," published between the years 2008 and 2023.

Inclusion criteria were electronically available articles with full text in Portuguese, conducted in Brazil, and adopting the relevant theme, while excluding duplicate articles, editorials, letters to the editor, epidemiological bulletins, monographs, theses, as well as studies that did not address the relevant theme to achieve the review's objective.

As a result of the search, 60 scientific works were obtained. The reading of abstracts led to the exclusion of 3 texts not available in full; 7 available in English and 1 in Spanish; 7 monographs and 1 thesis. The remaining documents were read in full, and 22 of them did not fit the thematic approach, leaving 19 articles used for the study (Figure 1).

Table 1 contains the relevant aspects for characterizing the studies: author, year of publication, journal, title, objectives, institution, and state of origin of the study. Most of the articles found were published in 2019 and 2017. The journals were Revista da ABENO (26.3%); Interface (15.8%); Revista Brasileira de Educação Médica (15.8%); Revista Baiana de Saúde Pública (10.5%); Revista Ciência Plural (10.5%); Saúde em Redes (5.2%); Revista Brasileira de Educação Física (5.2%); Trabalho, Educação e Saúde (5.2%); and Arquivos em Odontologia (5.2%). Regarding the region where the research was conducted, 42.1% were in the Southeast of Brazil, with the majority conducted in the state of São Paulo (36.8%); 31.6% in the Northeast, and 26.3% in the South of the country. It is possible to observe that 6 out of 19 studies were published in dental journals; 5 in the area of Education and Health; 3 in medical journals; 2 in public health journals, and 1 in the field of Physical Education.
From the analysis of the texts, two categories emerged: a) PBL active methodology as a tool in undergraduate teaching and learning, within the context of SUS, and b) contributions of the PBL active methodology to health education of the population and/or health professionals within SUS.

Active PBL Methodology as a Tool in Undergraduate Teaching and Learning within the Context of SUS

Traditional health education, still in use today, stems from recommendations made by Flexner in 1910, which were widely disseminated and resulted in a sort of 'model' to be adopted by educational institutions. Since then, health education has adopted a teaching organized into disciplines, centered on the teacher, with practical activities predominantly in hospital settings, characterized by unidirectionality in the teacher-student relationship and the fragmentation of individuals' bodies and health. This 'model' is responsible for training professionals who master various types of technologies but are less skilled in dealing with the subjective, social, and cultural dimensions of individuals, and is increasingly distant from the current model of organization of public health services in our country.

Over time, there arose a need for change in health professions education, and since the 1950s, Case Western Reserve University established Problem-Based Learning (PBL). Since then, various universities, mainly in North America, have adopted similar strategies. In the 1960s, McMaster University in Canada reformed its curriculum based on PBL and became one of its main showcases to the world. In Brazil, some medical schools have adopted PBL in their curricula.

In Brazil, aiming to meet a national need, some health professional training institutions have been implementing courses in this modality and proposing curricular changes and changes in teaching/learning methods.
Table 1. Data from articles selected after applying the inclusion and exclusion criteria.

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Journal</th>
<th>Title</th>
<th>Objectives</th>
<th>Institution, State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pereira et al., 2021</td>
<td>Saúde em Redes</td>
<td>Analysis of the teaching-learning process from the perspective of undergraduate preceptors in primary health care</td>
<td>To understand the teaching-learning process experienced by professionals who act as preceptors for undergraduate students in the context of primary health care</td>
<td>Hospital Israelita Albert Einstein, São Paulo UNAERP, São Paulo</td>
</tr>
<tr>
<td>Romão et al., 2020</td>
<td>Revista Brasileira de Educação Médica</td>
<td>Application of clinical PBL in primary care in medical courses</td>
<td>To assess students' perception of a clinical PBL model implemented in primary care internships in the medical course at UNAERP</td>
<td>UFPB, Paraíba</td>
</tr>
<tr>
<td>Maroja et al., 2020</td>
<td>Interface</td>
<td>Challenges of problematizing training for health professionals in a multiprofessional residency program</td>
<td>To discuss some of the difficulties and potentialities of problem-based pedagogy in a multiprofessional health residency program</td>
<td></td>
</tr>
<tr>
<td>Oliveira et al., 2019</td>
<td>Revista Brasileira de Educação Física</td>
<td>Constructivist spiral in physical education courses: teaching about the Unified Health System</td>
<td>To describe a curricular experience based on the constructivist spiral framework in a physical education course within the context of the unified health system</td>
<td>UFRGS, Rio Grande do Sul</td>
</tr>
<tr>
<td>Noro et al., 2019</td>
<td>Revista Ciência Plural</td>
<td>How to structure an integrated curriculum in dentistry courses</td>
<td>To develop a proposal for an integrated curriculum, mediated by active learning methodologies and process evaluation of learning</td>
<td>UFRN, Rio Grande do Norte</td>
</tr>
<tr>
<td>Oliveira et al., 2019</td>
<td>Interface</td>
<td>The teacher in active methodologies and the nuances between teaching and learning: challenges and possibilities</td>
<td>To address the training and teaching practice of SUS health professionals, based on socio-interactionist theories and active teaching-learning methodologies</td>
<td>Max Planck University Center, São Paulo</td>
</tr>
<tr>
<td>Borges et al., 2018</td>
<td>Revista da Abeno</td>
<td>Health education in the adolescent segment from the perspective of teaching-learning methodologies</td>
<td>To interact, debate, and promote health and self-care, with emphasis on oral health, according to the reality of the adolescent group within the context of the Unified Health System</td>
<td>UFU, Minas Gerais</td>
</tr>
<tr>
<td>Adler et al., 2018</td>
<td>Interface</td>
<td>Medical school and Unified Health System: creation of the medicine course at the University of São Carlos, SP, Brazil, from the perspective of teachers and students</td>
<td>To present research with teachers and undergraduate students from the first medicine class at UFSCar</td>
<td>UFSCar, São Paulo</td>
</tr>
<tr>
<td>Saraiva et al., 2018</td>
<td>Revista da Abeno</td>
<td>Interprofessional discipline in health: evaluation of dentistry students</td>
<td>To present the evaluation of dentistry students on the Health Care discipline, through the analysis of their evaluative portfolios' narratives</td>
<td>UEM, Paraná</td>
</tr>
<tr>
<td>Taroco et al., 2017</td>
<td>Revista Brasileira de Educação Médica</td>
<td>Competency-oriented curriculum for understanding comprehensiveness</td>
<td>To evaluate how the curriculum of a college contributes to students' understanding of comprehensiveness in nursing and medicine courses according to DCN</td>
<td>FAMEMA, São Paulo</td>
</tr>
<tr>
<td>Rocha et al., 2017</td>
<td>Revista da Abeno</td>
<td>Learning perceptions about interprofessional discipline in Dentistry</td>
<td>To evaluate the results of the Health Care discipline in the Dentistry course, from the students' perspective</td>
<td>UEM, Paraná</td>
</tr>
<tr>
<td>Melo et al., 2017</td>
<td>Revista Ciência Plural</td>
<td>An experience of integrating education, service, and community for undergraduate medical students in primary care in Maceió-Alagoas</td>
<td>To present the relevance of the aforementioned discipline in medical education as a mandatory element of the curricular structure</td>
<td>UNIT, Alagoas</td>
</tr>
<tr>
<td>Carvalho et al., 2016</td>
<td>Revista da Abeno</td>
<td>Acceptance of the use of methodologies in SUS internships by undergraduate and postgraduate dentistry students</td>
<td>To evaluate the acceptance of the use of active teaching-learning methodologies in SUS internships</td>
<td>UEM, Paraná</td>
</tr>
</tbody>
</table>

Continues
Active methodologies place the student as the main responsible for their education, ensuring them autonomy of thought and attitude, with the main objective of making the student capable of acting in their profession, as they are faced with real situations and guided to solve health problems presented, based on scientific evidence.

Therefore, the need for pedagogical models that enable the active construction of knowledge, which should extend throughout the professional life, becomes clear. The integration of teaching-service-community and the use of active teaching-learning methodologies are pointed out as strategies for training professionals oriented towards the world of work and the needs of the population, aiming at significant learning.

In their study, Carvalho et al. (2016) observed that the majority of undergraduate students were not familiar with this type of methodology. This is due to the teaching methodology employed in the vast majority of Brazilian elementary and high schools, which is traditional. However, the interviewees expressed satisfaction with the teaching method, which demystifies the idea of the difficulty of acceptance of new methodologies by students, valuing the opportunity to share their experiences and knowledge, and feeling more motivated in a class where their opinions are heard.

The problem-based methodology is also discussed by other authors who researched ethics teaching in undergraduate health courses. They affirm that some experiences and indications towards the integration of ethics in undergraduate education are in the use of active methodologies, such as problem-based learning or problematization, as instruments for knowledge construction in health courses.

Cirino and Toralles-Pereira (2004) already brought problematization as a methodology capable of leading students to have contact with the information addressed in class, encouraging research on the subject, giving autonomy to study, making choices, and making decisions.
It is believed that further study and dissemination of these methodologies can contribute to overcoming difficulties and improving the quality of education practiced in our country. Thus, continuous training of educators based on the DCN, aiming to form a critical and reflective professional who can act with the necessary profile for the needs of health services and the population, is important.

The PBL methodology presents itself as an alternative in the field of health education. It is considered a working tool for teachers, who, by using it, promote cognitive abilities in students. These contribute to the development of integrated clinical reasoning, with a profile directed towards lifelong learning and cognitive skills to diagnose and solve problems grounded in constant teaching-learning processes.

However, Bassir et al. (2014) emphasize that in Dentistry, more studies on PBL are still needed, as there is a limited number of publications, and a large part of these are from the medical field or based on medical literature. And this becomes a problem because the necessary competencies and the focus of education for training medical and dental students are different. So extrapolating results found in medical education studies to Dentistry may be limited.

Contributions of Active PBL Methodology to Health Education of the Population and/or Health Professionals within SUS

Consequently, health education in higher education has been the subject of many debates over the past two decades, especially after the institutionalization of the Law of Guidelines and Bases of National Education (LDB) in 1996, where the need for transformations regarding the critical reflection of health professionals is discussed in order to meet the current needs of SUS. In this line of action, the objective is to train competent professionals and citizens aware of their rights and duties, as well as to enable them to transform a given situation according to the reality in which they find themselves. Additionally, institutions of higher health education must seek to implement teaching strategies and faculty capable of inciting the aforementioned processes.

SUS is a healthcare network that fosters the training of individuals and the construction of knowledge; the National Curriculum Guidelines for health courses emphasize teaching focused on the reality and health needs of the population.

In this context, permanent health education (EPS), introduced in Brazil as an ethical-political-pedagogical proposal, aims to transform and qualify health care, training processes, health education practices, as well as encouraging the organization of actions and services from an intersectoral perspective also in the ESF scenario.

In the mold of APS, ESF focuses on health promotion in communities, ensuring everyone the right to access, equitable, and comprehensive, health services, in accordance with the principles of SUS. Additionally, it aims to establish a new paradigm in health care, with innovative guidelines on how to produce health actions and services, with a perspective of change and conversion from the existing mechanistic and biomedical care model.

According to Falkenberg et al. (2014), it is possible to perceive, looking at the current scenario, that there is a need to complement the current model of assistentialist care, focused on disease, excessively specialized, and still predominantly hospital-based, with a comprehensive model that prioritizes health promotion and prevention of ailments, and that uses health education in a participatory and dialogical manner. However, changes in the professional training process and reflection on their practices can assist in this paradigm shift. Therefore, the use of participatory and dialogical teaching-learning methodologies, such as those used in popular health education actions, inserted in continuing education curricula and in permanent health education actions, aiming at a more adequate professional health education to individual and collective health needs, from the perspective of equity and comprehensiveness, becomes important.

CONCLUSION

The problem-based learning (PBL) teaching methodology presents itself as an alternative in the field of health education. It is considered a tool whose application, both in undergraduate education and in training programs for
Problem-based learning in health education with a focus on the SUS  Lavres HAR et al.

SUS workers, as well as in empowering the population with health knowledge, shows benefits through the transformation of the context of these social actors. Nevertheless, although it is considered an important active methodology in the teaching-learning process, given the results found in this study, it is concluded that scientific production addressing PBL methodology used as a tool for health education within SUS is still scarce in Brazil. Therefore, it is hoped that the present study will stimulate further research on the subject addressed here.

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