THE TEACHING OF CHEMISTRY AT THE INTERFACE BETWEEN EDUCATION AND HEALTH: CHEMISTRY AS A TOOL TO RAISE AWARENESS ABOUT THE RISKS OF SELF-MEDICATION

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ABSTRACT

This work sought, among the attributions of the PET-Chemistry of the Federal University of Campina Grande, to develop extension activities in two basic education institutions in Paraíba, mediating knowledge among high school students, through the lecture entitled: "The risks of self-medication: an alert for everyone's health". Thus, the general objective of this article is to reflect on the problem of self-medication in our society, highlighting the health risks that the irrational use of medications, without proper medical guidance, can cause. The expansion of this information contributes significantly to the education and awareness of young people and adolescents, thus strengthening the ability of these individuals to make more informed and safer decisions regarding the use of drugs.

Keywords: Contextualization, Chemical Education, Health.

INTRODUCTION

Seen as a challenging curricular component of basic education, the teaching of chemistry faces several problems related to its fragmented vision. One of the main factors is the complex language widely used in books, which can be characterized as content that is difficult to understand, implying methodologies that excessively estimate the memorization of formulas and rules, thus punctuating a reproduction of knowledge (Chassot, 2003). Thus, for the student, chemical knowledge ends up becoming boring and unnecessary, given the learning difficulties of a discipline disconnected from his reality. Tardif (2002) argues that knowledge is not restricted only to mental processes, supported by the student's cognitive activity, but also expresses itself as social knowledge, manifesting itself in the complexities of the student-teacher relationship.

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The recent school reforms in several countries around the world highlight a proposal that relates scientific knowledge to the exercise of citizenship, promoting the formation of a more critical subject capable of solving real problems experienced in their daily lives through knowledge. In this sense, the dialogue on pedagogical practice regarding the contextualized approach to teaching denotes reflectively the importance of new methods of conducting the teaching-learning process, evidencing the improvement of student performance (Carvalho et al., 2023).

In Brazil, the emphatic promotion of the construction and implementation of educational policies and guidelines that focus on the formation of the full development of the student, meeting the requirements of ethics, justice and citizenship, depositing the commitment of integral education in the school, has been increasingly expanding (Silva et al., 2023). CNE/CEB Resolution No. 3/2018 provides that:

> "highlights the contextualization, diversification and transdisciplinarity or other forms of interaction and articulation between different fields of specific knowledge, contemplating practical experiences and linking school education to the world of work and social practice and enabling the use of studies and the recognition of knowledge acquired in personal, social and work experiences (CNE/CEB Resolution No. 3/2018, Art. 7, § 2)."

This Resolution updates the National Curriculum Guidelines for Secondary Education, emphasizing the importance of the formation and global human development of students, highlighting that schools, in addition to the transmission of content, must also promote the development of competencies, skills, attitudes and values, aiming at the mobilization of this "knowledge" to solve complexities immersed in daily life, in the world of work and the full exercise of citizenship (Rodrigues et al., 2021). In this context, discussions emerge about new themes that do not constitute new disciplines within the curriculum but rather areas of knowledge that go beyond the disciplinary, interdisciplinary, and transdisciplinary fields, the so-called transversal themes (Araújo, 2014). In the BNCC, in its final version, these themes are now called Contemporary Themes:

> "Finally, it is up to the education systems and networks. As well as schools, in their respective spheres of autonomy and competence, incorporate into curricula and pedagogical proposals the approach to contemporary issues that affect human life on a local, regional, and global scale, preferably in a transversal and integrative way. (Brasil, 2017, p. 19)."

In their origin, in the PCN's, the transversal themes had a more flexible character, different from the BNCC (2017), in which these themes gained even more focus, becoming a mandatory national reference in the elaboration or adaptation of curricula and pedagogical proposals, expanded as transversal contemporary themes, evidencing their real importance

in the teaching-learning process (Brasil, 2017). Within this perspective, the use of cross-cutting themes in the teaching of chemistry, as a facilitating tool to assist in the contextualization and awareness of chemistry classes and problems existing in the daily lives of students, becomes even more relevant and fundamental (Fernandes; Lima, 2023). The topic of self-medication is one of the examples to be cited. The use of medicines without a legal medical prescription has been increasingly recurrent. This common practice can bring several risks to the health of those who make irrational use of these drugs, such as intoxication, clinical aggravations, and adverse reactions (Castro et al., 2007). For example, paracetamol is an easily accessible drug since it does not need a prescription and is, therefore, over-the-counter and considered a safe drug. However, improper use and use in large quantities can cause serious damage to health (Borges, 2018).

According to the survey carried out by the Institute of Science, Technology and Quality in partnership with Datafolha (2022), the number of people aged 16 and over who take medicines on their own went from 76% in 2014 to 89% in 2022. In addition, the survey revealed that the practice of self-medication is even higher among young people in the 16 to 34 age group, adding up to 95%. The survey also brought to light another important piece of information, the frequent use of the internet as a means of consulting symptoms and indications of medicines to buy. Given this scenario, the use of transversal themes in the teaching of chemistry becomes fundamental in the process that proposes a practice of a transformative and emancipatory character of the individual, developing the critical thinking of the student. In addition, the problematization and socialization of chemical phenomena are strengthened by dialogues related to the conceptual bases of chemistry, covering intrinsic competencies of the subjects (Nuñez; Ramalho, 2004; Pozo; Crespo, 2009; Roscoff et al., 2022).

This work sought, among the attributions of the Tutorial Education Program (PET-Chemistry) of the Federal University of Campina Grande (UFCG), to develop extension activities at the institutions ECI Orlando Venâncio dos Santos and ECIT José Rolderick de Oliveira, mediating knowledge among high school students, through the lecture entitled: "The risks of self-medication: an alert for everyone's health". Thus, the general objective of this article is to reflect on the problem of self-medication in our society, highlighting the health risks that the irrational use of medications, without proper medical guidance, can cause.

METHODOLOGY

The methodology of the present work consisted of the application of a lecture in partnership with institutions of the basic education network to expand and make the project visible. The schools contemplated were the José Rolderick de Oliveira Integral and Technical Citizen School, located in the municipality of Nova Floresta - PB and the Orlando Venâncio dos Santos Integral Citizen School, located in the municipality of Cuité - PB, both presenting High School, Technical and Youth and Adult (EJA) modalities.

The theme addressed in the lecture was "The risks of self-medication: an alert for everyone's health", contemplating countless young people and adolescents through essential chemical knowledge for their experience. The exposition of the content in question was carried out through the expository-dialogued model, lasting 2 hours/class, emphasizing the following topics: pharmacological presentation, the importance of medications, rational and irrational use, self-medication, and risks and chemistry present in medications.

This approach aimed to promote awareness of the problem in question through dialogues based on scientific knowledge. According to Vedove and Ferreira (2020), the dialogued expository method contributes to better efficiency in educational development, presenting itself as a crucial tool that strengthens the relationship between teacher and student, as well as the understanding of the theoretical and experimental basis.

In addition, didactic resources were used to disseminate additional information and intensify the learning process of the respective students. The didactic resource used consisted of educational folders, stimulating the adolescents' awareness of the pertinent risks of self-medication and the indiscriminate use of drugs, as illustrated in Figure 1.

Figure 1. Educational folder used in the lecture activity.

Source: Prepared by the authors, 2024.

Regarding the methodological approach used, a quali-quantitative research was carried out to analyze the numerical data and evaluate the students' perception of the topic

discussed in the lecture. The data were collected through an evaluative questionnaire containing a total of 10 questions to explore information about the use of medicines without a medical prescription, encouraging the analysis of the consequences of this problem through chemical concepts. The questionnaire was answered by forty-one young people of both genders, aged between 15 and 18 years. The data collected enabled an in-depth analysis of the students' perceptions and opinions, as well as an evaluation of the impact of the lecture.

RESULTS AND DISCUSSIONS

Self-medication is understood as the act of consuming medicines without a medical prescription or recommendation from a health professional. According to Carmo Júnior and Silva (2017), self-medication is a habit that is becoming increasingly common among people, especially adolescents. Adolescence can be characterized as a phase of life where the degree of vulnerability is considered high, and it is at this stage that individuals are more susceptible to influence, whether it is from their family circle or friendships. It is in this context that subjects start to make decisions on their own, such as the action of ingesting medicines without a medical prescription. Without understanding the risks of self-medication, many people resort to the inappropriate use of medications to alleviate health problems.

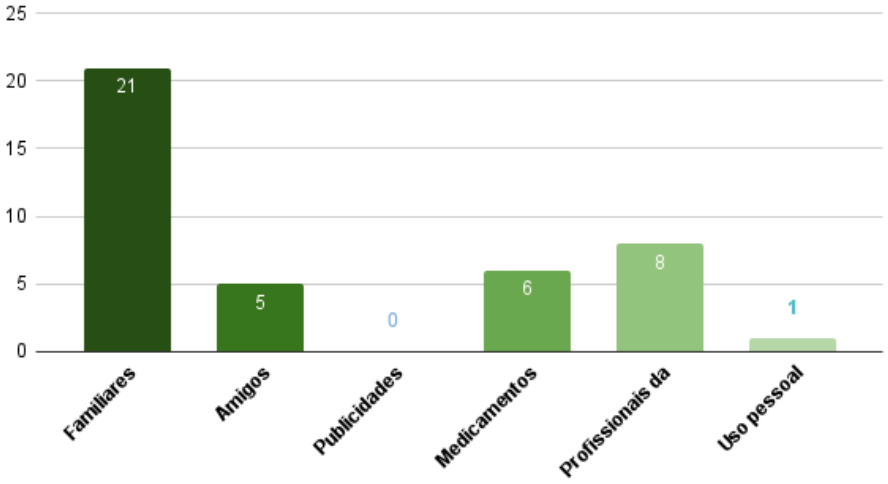
Given this problem, the lecture "The risks of self-medication: an alert for everyone's health", promoted by the Tutorial Education program (PET - Chemistry) of the Federal University of Campina Grande (UFCG), aimed to inform students about the dangers of self-medication. For this, a questionnaire with ten questions on the theme was elaborated and applied to the students to assess the critical thinking of each one about the problem of self-medication.

The initial question of the questionnaire was "Have you ever used over-the-counter medications?". After explaining the content in the lecture, this question made it possible to address the problem related to self-medication and assess whether the students had such a habit. The question offers two alternatives: yes and no. It was possible to notice that the answer 'yes' was chosen by the majority of the students present at the lecture, approximately 92.68% (38 students), while a portion of 7.32% opted for 'no'. From these results, it is concluded that most of the young people present are adept at self-medication.

The second question, "Self-medication was influenced by:" sought to identify the main influences that lead students to use medications without prescription or medical guidance. Alternatives included family, friends, relatives, and health care professionals who can help during a medical problem, as well as medications available at home for personal use. Based

on these answers, it was possible to analyze the students' motivations about the theme (Figure 2).

Figure 2. Influence on self-medication.

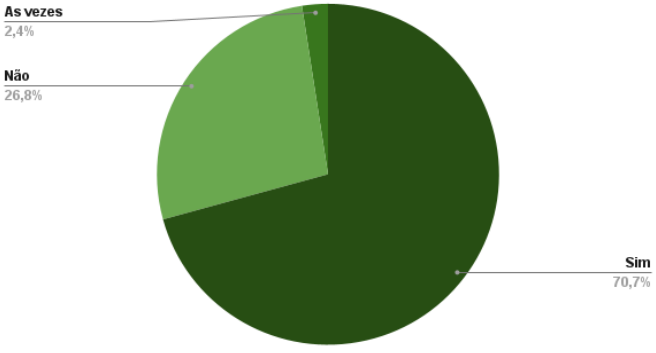


Source: Survey data, 2024.

In Figure 2, it can be seen that among the options, it is possible to verify that self-medication under the influence of family members is the most recurrent practice, with 21 answers obtained in the data analysis. Health professionals are pointed out as the second largest influence, with 8 responses, while the use of medications available at home comes soon after, with 6 responses. While only one student mentioned personal use as a reason for self-medication, five students pointed out the influence of friends. No one responded to the possibility of being influenced by advertisements.

To understand whether or not students are in the habit of seeking information about the medications they consume, both about benefits and risks, the question was asked, "Did you seek additional information or clarification about the medication before opting for self-medication?". The answer options were "yes", "no," and "sometimes" (Figure 3).

Figure 3. Search for additional information or clarification about the medication before opting for self-medication.

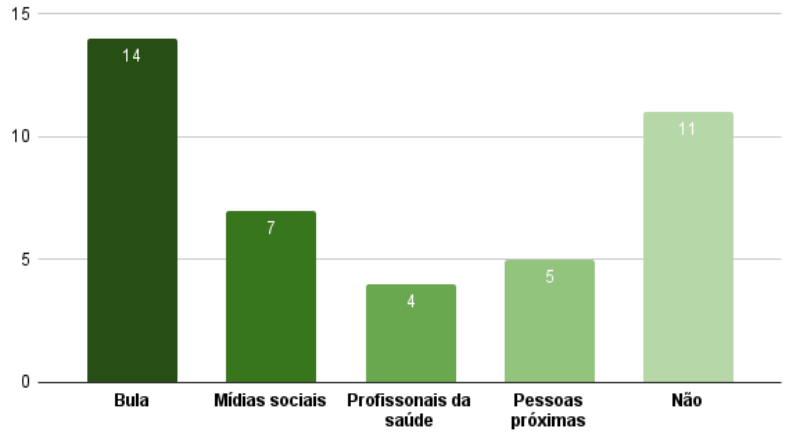


Source: Survey data, 2024.

Most of the members, which corresponds to 70.7%, as shown in Figure 3, have the habit of seeking information about the medications used. On the other hand, 26.8% of young people reported that they do not seek clarification, and 2.4% stressed that they sometimes find it necessary.

To better understand where the young people sought information about the medications, the question was asked: 'Where did you look for this information, if you answered yes to the previous question? If you answered no, proceed to the next question!'. The students had the following answer options: Package Insert, Social Media, Health Professionals, Close People and Not (Figure 4).

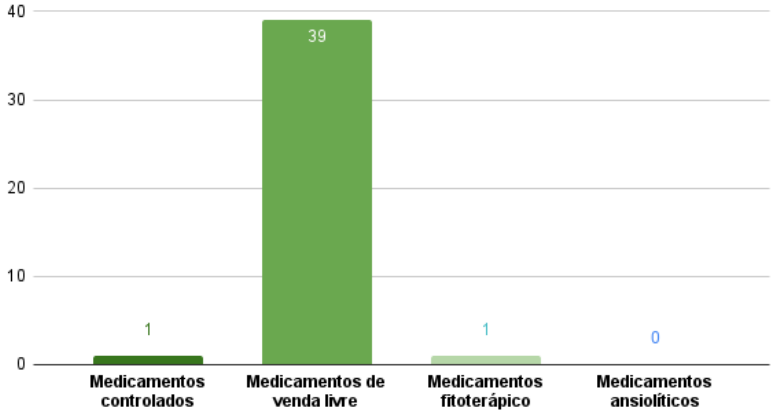
Figure 4. Place of search for information about medicines.



Source: Survey data, 2024.

In Figure 4, it can be seen that 14 students used the package insert to seek information about the medication before using it. On the other hand, 11 students did not seek information on any of the available alternatives. Seven students sought information on social networks, five consulted people close to them, and only four turned to health professionals for guidance on medications. Based on the results of the previous question, which showed that most students are not in the habit of seeking information about medicines from health professionals, the question was asked: 'What were the types of medicines consumed without a medical prescription?' The objective was to identify the most used drugs without proper guidance. The options were controlled drugs, over-the-counter drugs, herbal medicines, and anxiolytics (Figure 5).

Figure 5. Types of medicines consumed without a medical prescription.

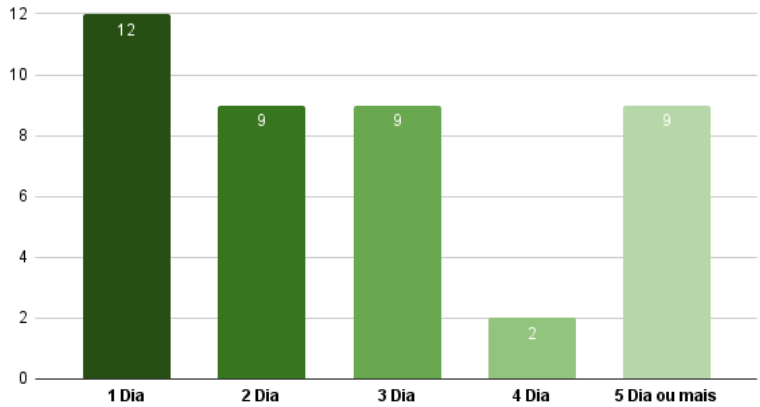


Source: Survey data, 2024.

The results presented in Figure 5 show that the majority of students, 95.12%, resorted to over-the-counter medications. Only 2.44% used controlled medicines, and another 2.44% opted for herbal medicines. None of the participants reported the use of anxiolytics without a prescription. According to Braz et al. (2019), the problem of freely accessible medicines, especially in the context of self-medication, raises significant public health concerns. While these medications, such as pain relievers and antacids, are affordable and can relieve mild symptoms, their improper use can result in serious consequences.

According to the medical literature, there is no universal specific time for the use of medications in general. However, in the case of antibiotics, the duration of treatment usually varies from 5 to 6 days, and daily use mustn't be interrupted. Considering these guidelines, the question "What was the time of use of the medication?" aimed to identify the duration of consumption of medications used by students without the proper medical prescription. To answer this question, the students had the following options available: 1 day, 2 days, 3 days, 4 days, and 5 days or more (Figure 6).

Figure 6. Time of use of the medication.

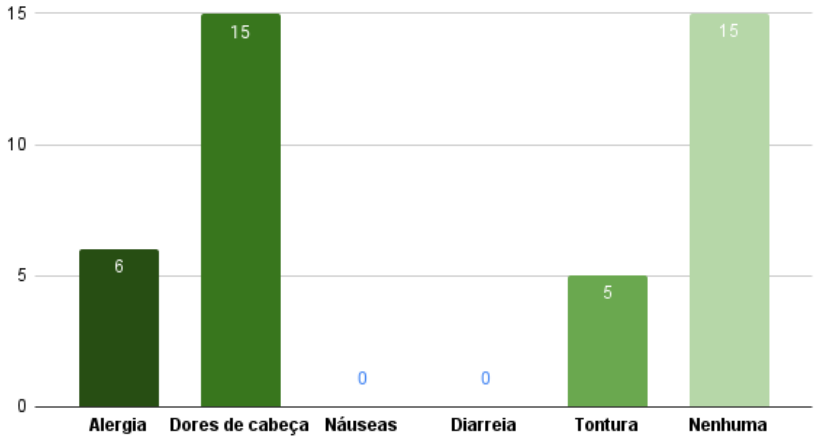


Source: Survey data, 2024.

After analyzing the data presented in Figure 6, we observed that 29.27% reported using the drug for only 1 day. The options of use for 2 days and 3 days were chosen by 21.95% each, while 21.95% of the students used the medications for 5 days or more; that is, 4.88% of the total used the medications for 4 days. These data indicate a significant variability in the duration of medication use among students, which raises important questions about the practice of self-medication.

Every medicine has side effects, and when ingested incorrectly, it can cause side effects and, when ingested incorrectly, it can cause more harm than good to the body (Pfizer, 2021). Among the main problems, the relief of symptoms that mask the correct diagnosis of the disease, allergic reactions, dependence, and resistance to the drug stand out. Considering the consumption of over-the-counter medications, the following question was asked: 'What are the side effects presented after the use of over-the-counter medications?' to identify whether the inappropriate use was generating any health problems. The response options were allergies, headaches, nausea, diarrhea, dizziness, and none (Figure 7).

Figure 7. Side effects presented after the use of over-the-counter medications.



Source: Survey data, 2024.

Based on the analysis of the data available in Figure 7, we observed that 36.59% reported headaches, 36.59% did not have any side effects, 14.63% had allergic reactions, 12.20% experienced dizziness, and none of the students reported nausea or diarrhea.

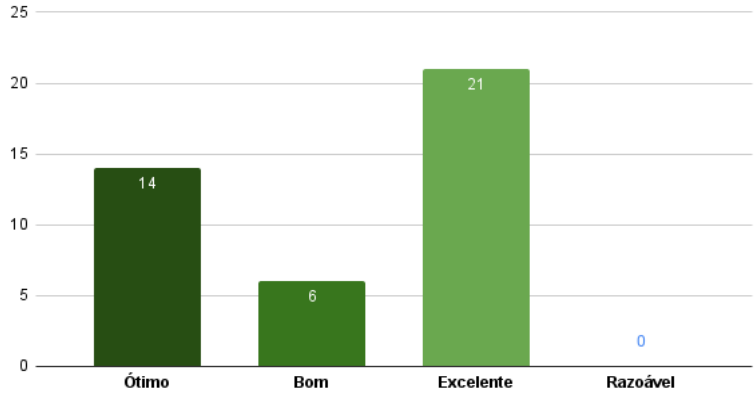
According to Casemiro et al. (2014, p. 834), "The school is an important space for the encounter between health and education, enabling various health promotion initiatives, including the theme of the rational use of medicines within these initiatives". Due to the high number of students who have self-medication as a common habit, the question 'Is there any educational action against self-medication in your school?' was formulated to investigate whether the school already carried out activities for this purpose. The students were able to

answer with the options 'yes' or 'no'. According to the data from the interviews, 56.1% of the students reported that the school did not carry out any educational activity on self-medication, while 43.9% stated that they had already participated in some action with this focus. These results suggest the need to intensify awareness-raising initiatives in schools, ensuring that more students receive adequate guidance on the risks of self-medication.

In the previous question, most students answered that there were no activities on self-medication at school. To assess whether, after the lecture on the risks of self-medication, the students understood the seriousness of this practice, the question was asked: 'For you, did the lecture held today help you understand how the risks of self-medication work?'. This question was intended to check if the students paid attention during the lecture. The answer options were yes and no. According to the results, 100% of the students stated that they understood the risks that self-medication can offer, without any student indicating otherwise.

To conclude the questionnaire and assess the students' degree of satisfaction with the lecture, the following question was asked: "What is your degree of satisfaction with the lecture?". The students were able to choose between the following options: excellent, good, excellent, and reasonable (Figure 8).

Figure 8. Degree of satisfaction with the lecture.



Source: Survey data, 2024.

According to the data presented in the Figure above, 51.2% of the students considered the lecture excellent, 34.1% evaluated it as excellent, and 14.6% as good. The "Reasonable" option was not chosen by any student. Therefore, it is evident that most of the participants who answered the questionnaire evaluated the lecture extremely positively, with 85.4% of the students rating it as excellent or excellent. These results highlight the effectiveness of the project and its relevance for raising awareness about self-medication and for health education in the school community.

As mentioned in the results above, the lecture promoted by the Tutorial Education Program (PET-Chemistry), Cuité campus, Paraíba, was essential for the development of new chemical concepts, as well as awareness about the risks of self-medication.

CONCLUSION

It is concluded that the lecture was successful, with high satisfaction indicators, according to the data collected, evidencing its relevance for young people and adolescents. In addition, the present study was of great importance in addressing the factors associated with self-medication, contributing to the improvement of the knowledge present in the students' daily lives. Given the above, the teaching of chemistry is highlighted as a fundamental tool to relate the theory and factors present in everyday life. Through this link between theory and everyday life, it was possible to understand the chemical composition of medicines and, consequently, to associate it with the risks involved in their inappropriate use. In addition, such actions proved to be effective in the awareness process, especially about the indiscriminate use of medications. In this sense, the expansion of this information contributes significantly to the education and awareness of young people and adolescents, thus strengthening the ability of these individuals to make more informed and safer decisions regarding the use of drugs.

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