

*Original article*

## Assessing Dentistry Students' Knowledge of Clinical Dental Management for Autistic Patients: A Cross-Sectional Study at a Public University in Northeastern Brazil

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### SUMMARY

**Introduction/Aim.** Evaluating dental students' grasp on managing dental care for patients with autism spectrum disorder (ASD) is paramount for effective treatment. The aim of the paper was to assess the understanding of dental students at a public university in northeastern Brazil about managing dental care for patients with ASD.

**Methods.** In this cross-sectional study, two meticulously designed questionnaires were utilized, targeting students from the fifth to the tenth period. The first questionnaire explored sociodemographic details, while the second assessed knowledge about the subject. The second questionnaire was divided into two sections: the first focused on the definition, diagnosis, and related comorbidities of ASD, and the second examined its impact on oral health, dental management, and oral manifestations. Statistical analysis involved the Kruskal-Wallis and Mann-Whitney tests, maintaining a 5% significance level. The analysis was conducted using SPSS statistical software, version 20.

**Results.** Ninety-eight questionnaires were analyzed, revealing an average age of students of 22.68 years (SD ± 3.03). The majority were female (69.4%) and identified as white (46.9%). The majority of participants (53.1%) attended public high schools before enrolling in university, and the majority (60.2%) had no prior exposure to the topic. No significant differences were observed between the course periods in relation to general knowledge about dental management for autistic patients ( $p = 0.952$ ). Public high school students were more likely to correctly answer questions related to priority treatment routines ( $p = 0.014$ ), while those familiar with the topic before university had a higher likelihood of answering questions concerning pharmacological methods for managing patients with ASD ( $p = 0.039$ ).

**Conclusion.** This study revealed a satisfactory level of knowledge among dentistry students at a university center in northeastern Brazil regarding the management of patients with ASD.

**Keywords:** autistic spectrum disorder, dental care, dentistry

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## INTRODUCTION

Given the current global scenario, it has become evident that autism spectrum disorder (ASD) is no longer perceived as a rare condition exclusively limited to early childhood. Instead, it is recognized as a pervasive and extensively researched lifelong condition. According to data released by the World Health Organization (WHO) in 2017, autism affects 1 in every 160 children globally. However, as noted by the Pan American Health Organization (PAHO), this figure represents an average, considering the variation in prevalence observed across different studies (1). In Brazil, official epidemiological estimates for ASD have not been reported yet (2).

In the context of research conducted in this field, autism is now recognized as a spectrum encompassing a range from mild to severe forms. This spectrum includes diverse disorders such as Asperger's disorder, early infantile autism, infantile autism, Kanner's autism, high-functioning autism, atypical autism, pervasive developmental disorder not otherwise specified, and childhood disintegrative disorder (3).

ASD has a heterogeneous etiology, with numerous recognized genetic, environmental, and immunological factors, as well as epigenetic mechanisms (4). The diagnosis relies on analyzing an individual's behavior, along with psychosomatic tests and parental history, as there are currently no specific tests or biomarkers available for this condition (5).

In 2020, the United States Department of Health and Human Services highlighted oral health as a major public concern. Given the high prevalence of ASD, many dentists encounter individuals with this condition. Recognizing the impact of ASD severity on oral health is crucial. Multidisciplinary approaches are essential for improving care. Children with ASD often face challenges in maintaining oral hygiene, emphasizing the need for comprehensive dental support (6).

Maintaining oral health in individuals with ASD poses a significant challenge, especially in the dental office environment, which can be overwhelming due to unfamiliar surroundings and sensory stimuli, heightening anxiety. Often, sedative medication or general anesthesia becomes necessary for procedures due to the complexities of behavioral management in these patients (7).

Research highlights dentists' challenges in assisting children with ASD due to their lack of confidence in their educational preparation. Many professionals are hesitant to provide care to individuals with developmental disabilities. However, those who received comprehensive training involving special needs populations expressed greater confidence and suitability in their treatments (8). Our study addresses the crucial need for research in this area.

In this context, this article aims to evaluate the level of knowledge of dentistry students at a public university in the Northeast of Brazil regarding the management of patients with ASD.

## METHODS

This study is classified as an observational, cross-sectional, descriptive, and analytical research endeavor (9). Being a census study, the population under investigation consisted of students enrolled in the Dentistry course at State University of Paraíba, Campus VIII, located in the city of Araruna, PB. Notably, the correct abbreviation for the Municipal Human Development Index (MHDI) was utilized, correcting the previous error pointed out. Araruna, with approximately 14,029 inhabitants as of 2021 (according to the Brazilian Institute of Geography and Statistics - IBGE), last evaluated its Municipal Human Development Index (MHDI) in 2010, yielding a value of 0.704 (10).

Students enrolled in the Dentistry course between the 5<sup>th</sup> and 10<sup>th</sup> period, aged 18 years or older, were included in the study. The research was conducted within a dentistry course spanning 10 periods. However, students from the 1<sup>st</sup> to the 4<sup>th</sup> period were excluded as they had not yet studied at least one subject relevant to the study topic. Participants who did not complete the questionnaire comprehensively or legibly were also excluded.

Data collection was carried out on the campus above by two duly trained researchers. First, a pilot study was carried out with 13 volunteers to adapt possible inconsistencies in the application of the methodology, and these data were discarded for statistical analysis. Two self-administered structured instruments were used with the participants.

The first questionnaire covered sociodemographic characteristics, including age, gender, ethnicity, type of high school attended (public or private), prior exposure to the research topic before university, involvement with the research subject during graduation, and the current academic semester during data collection. The second questionnaire assessed knowledge using the model proposed in previous research (11). It was divided into two

sections: the first section focused on ASD definition, diagnosis, and associated comorbidities, while the second section explored its impact on oral health, dental management, and oral manifestations (Table 1).

The criteria for evaluating knowledge levels were established following previous research in the field (12). Dentistry-related topics held greater significance. Questions 1 to 4 granted one point per correct answer, and questions 5 to 10 allotted two points each. The maximum achievable score was 16 points. Incorrect answers received zero points. Students' knowledge levels were categorized: below 6 points - significantly low knowledge, 6 to 10 points indicated moderate knowledge, and 11 points or more represented satisfactory knowledge.

**Table 1.** Topics addressed in the assessment of knowledge on the topic

1.	Definition of ASD
2.	Association of ASD with other comorbidities
3.	Diagnostic criteria for ASD
4.	ASD etiology
5.	Initial conduct for the dental care of a patient with ASD
6.	The priority routine for the treatment plan of patients with ASD
7.	Choice of techniques for the clinical management of patients with ASD
8.	Oral health of patients with ASD
9.	Oral hygiene practices for children with ASD
10.	Pharmacological means for managing patients with ASD

This research followed the ethical precepts of the Declaration of Helsinki and Resolution 466/2012. The research project was submitted to the Ethics and Research Committee of UEPB and approved under the number 5.618.390.

### Statistical analysis

Initially, we computed the absolute and relative frequencies of all variables to characterize the sample. Students' knowledge levels were determined by averaging correct responses from the administered questionnaire. To compare these means among course groups, the non-parametric Kruskal-Wallis test was applied due to non-normal data distribution. Additionally, the Mann-Whitney test assessed knowledge differences between study groups. Statistical analysis utilized SPSS version 20

with a 5% significance level.

### RESULTS

Ninety-eight questionnaires that met the eligibility criteria were evaluated. Students from the 5<sup>th</sup> to the 10<sup>th</sup> period were counted. The average age of students was 22.68 years, SD  $\pm$  3.03.

Most of the students who participated in the research were female (69.4%), self-identified as white (46.9%), and were predominantly in their seventh (24.5%) and eighth (24.5%) semesters. The majority of volunteers reported having attended a public high school (53.1%) and stated that they had no prior contact with the subject before their undergraduate studies (60.2%). Most claimed to have acquired knowledge on the subject during their undergraduate coursework (66.3%) (Table 2).

**Table 2.** Characteristics of sociodemographics of participants

<i>Variables</i>	<i>n</i>	<i>%</i>
<i>Sex</i>		
Male	30	30.6
Female	68	69.4
<i>Race</i>		
Yellow	2	2.0
White	46	46.9
Brown	45	45.9
Black	5	5.1
<i>Type of high school training</i>		
Public	52	53.1
Private	46	46.9
<i>Period</i>		
5 <sup>o</sup>	14	14.3
6 <sup>o</sup>	20	20.4
7 <sup>o</sup>	24	24.5
8 <sup>o</sup>	24	24.5
10 <sup>o</sup>	16	16.3
<i>Contact with content in training prior to higher education</i>		
Yes	39	39.8
No	59	60.2
<i>Contact with the topic during higher education</i>		
Yes	65	66.3
No	33	33.7

The average knowledge level of students in each semester was evaluated to ascertain potential differences in subject understanding between those working in the clinical school of the program, comparing students from foundational semesters with those in advanced ones. It was determined that, statistically, there were no significant differences. Consequently, across all semesters, the observed averages were above 11 points, and based on the overall scoring criteria of the program, the level of knowledge about the subject was deemed satisfactory (Table 3).

The Mann-Whitney test was employed to examine the relationship between the type of schooling (public or private), prior exposure to dental knowledge, and the accuracy of responses concerning ASD patients. A significant difference was observed between attendees of public schools and their responses to question 6, indicating a higher frequency

of errors. In contrast, students who were acquainted with the subject prior to university exhibited greater accuracy in question 10 (Table 4).

**Table 3.** The general knowledge about dental management of autistic patients and according to course periods

<i>Period</i>	<i>Mean</i>	<i>SD</i>	<i>p-value</i>	<i>df</i>
Fifth	11.93	2.0	0.952	4
Sixth	11.90	1.8		
Seventh	11.58	1.93		
Eighth	12.04	1.92		
Tenth	11.31	3.11		
Total	11.77	2.13		

Abbreviations: SD, Standard Deviation. df, Degrees of Freedom

**Table 4.** Hypothesis test for the association between knowledge of dental management and independent variables

Independent variables	Question 6					Question 10				
	n	Mean	Test**	p-value	95%CI	n	Mean	Test**	p-value	95%CI
<b>Type of school</b>			2,500	0.014*	[0.035-0.301]			...	...	...
Public	52	1,21				...	...			
Private	46	1,04				...	...			
<b>Previous theme access</b>			...	...	...			-2,091	0.039*	[-0.405-0.011]
Yes	...	...				39	1,49			
No	...	...				59	1,69			

\*statistical significance

\*\* Mann-Whitney test

The correlation between students' scores in clinical dental management knowledge for ASD patients and the following variables did not demonstrate significant associations: gender ( $p = 0.536$ ), type of high school education ( $p = 0.945$ ), prior exposure to the topic before higher education ( $p = 0.277$ ), and exposure to the topic during higher education ( $p = 0.769$ ).

## DISCUSSION

The purpose of managing patients with ASD is to optimize the patient's performance, promote the maintenance of their health safely, nurture constant care, and focus on family support, in an empathetic and effective way. For a treatment plan to be successful, it is important to have interdisciplinary work and that each professional recognizes their role and performs it satisfactorily and creatively (5, 13). Thus, dentistry professionals must have a scientific basis to conduct practical, efficient, and comfortable consultations for this population.

There is limited research on behavior management techniques and dentists' knowledge levels in treating individuals with ASD (14). A profound understanding of behavioral principles is crucial for dentists aiming to modify behaviors. Previous studies have suggested that dentists who feel adequately prepared during their university education are more likely to deliver effective care to these patients, aligning with the findings of this research (15).

From the analysis of the data obtained in this study, it was possible to verify that the majority of the volunteer students in this research never had any kind of contact with the subject before graduation, which makes it even more difficult to awaken in-

terest in researching and studying the content care for this type of patient if not required or encouraged by the educational institution. In addition, more specific aspects of the subject during graduation are more difficult for students to grasp.

On the other hand, most of the students in this research claim to have had contact with the subject during graduation, divergent data from a study similar to the one carried out by Sá et al. (16), which assesses the level of knowledge about ASD in medicine and psychology students. The results of the study showed that 42.31% of final-year medical students said they had never read an article or book about ASD. This data becomes important when signaling the need to include the theme of autism in medical courses, since, in the professional routine, contact with autistic patients, regardless of age, is increasingly commonplace and, in view of this, the professional must be able to deal with the situations imposed during the service.

The average performance of each period was examined so that differences could be assessed between the level of knowledge on the subject by students who work clinically in more basic periods compared to those who are in more advanced periods, with the exception of the 9<sup>th</sup> period of the course due to the absence of the class at the educational institution. There was a greater emphasis on the eighth period, however, statistically, there were no significant and relevant differences, considering that all periods were characterized by good level of knowledge, according to the score of this research, considering that all classes reached an average above 11 points.

The performance results of dental students in this research indicate that they had a good degree of information about the dental management of pa-

tients with ASD, even in more basic periods, such as the 5<sup>th</sup> and 6<sup>th</sup> period, which is the main objective of this search. However, the results of similar studies carried out by Muller in (17) and by Sá et al. (16) indicated deficient knowledge of Medicine and Psychology students, respectively, regardless of whether they were attending the first or last year of the course, revealing a limitation in training. No similar studies were found in Dentistry courses, emphasizing the originality of this research.

One question that can be guided is the fact that there were no significant differences in the general level of knowledge between the classes. This data reveals that most students had a satisfactory performance on the subject regardless of the period they were in, which shows us that from the initial clinical periods, students were instructed to understand the subject, either through classes, research, scientific events, or even encouragement by the institution's professors so that they were prepared to attend all patient audiences, considering that the vast majority claim the fact of having had contact with the subject during graduation.

Another relevant result of this work was obtained through a hypothesis test carried out to verify the association between knowledge of dental management and independent variables. It was proven that volunteers who completed high school in a public school had a large percentage of errors in question number 6, which addresses how the routine for the treatment plan of patients with ASD should be elaborated. According to the author Bomman-goudar (5), patients with ASD have a predilection for monotonous and repetitive routines, as well as an aversion to change. Thus, a routine should be established, preferring to maintain the same days, times, and team for each appointment.

It was confirmed that students who had prior exposure to the subject before graduation achieved a higher rate of correct answers in question number 10, which pertains to pharmacological methods used

in cases where conventional behavioral management techniques fail. Although the question's content is specific and covered during the undergraduate course, it is evident that students with prior exposure to the subject are better equipped to comprehend the scenario and understand the appropriate pharmacological interventions based on individual patient cases.

This study presents significant findings about students' knowledge at the specific educational institution under investigation. However, there are limitations. The sample size, limited to a single university center, restricts generalizability and external validity. Additionally, being a cross-sectional study, it cannot establish cause-and-effect relationships among the volunteer population (18). Nonetheless, the study's theme and originality are noteworthy.

In this context, there is a clear need for further studies with larger, more representative samples of dentistry students from diverse institutions and regions. These studies are essential for acquiring a comprehensive dataset that elucidates the nuances of dental students' knowledge on behavioral management in ASD patients. Specifically, there is a demand for research focusing on identifying major barriers and unexplored gaps in this area.

## CONCLUSION

This research revealed a satisfactory level of knowledge among dentistry students in a northeastern university center regarding the management of ASD patients. Although certain gaps persist in specific areas within this field, the institution significantly contributes to information dissemination. It plays a crucial role in training these professionals, boasting an effective teaching system. Students have basic and precise understanding of managing this special patient demographic.

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# Procena znanja studenata stomatologije o kliničkom pristupu stomatologa pacijentima sa autizmom: studija preseka urađena na državnom univerzitetu u severoistočnom Brazilu

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## SAŽETAK

**Uvod/Cilj.** Procena znanja studenata stomatologije o pristupu stomatologa lečenju pacijenata sa poremećajem iz spektra autizma (engl. *autism spectrum disorder* – ASD) od najveće je važnosti za efikasan tretman. Cilj ovog rada bila je procena znanja koje studenti stomatologije sa državnog univerziteta u severoistočnom Brazilu imaju o pristupu stomatologa pacijentima sa poremećajem iz spektra autizma.

**Metode.** U ovoj studiji preseka korišćena su dva detaljno osmišljena upitnika usmerena na studente koji pohađaju nastavu od petog do desetog semestra. U prvom upitniku istraženi su sociodemografski podaci, dok je drugim upitnikom procenjivano znanje o temi istraživanja. Drugi upitnik bio je podeljen na dva dela: prvi deo fokusirao se na definiciju, dijagnozu i komorbiditete povezane sa ASD-om, a drugi je ispitivao uticaj ovih poremećaja na oralno zdravlje, stomatološki tretman, te oralne manifestacije. Za statističku analizu korišćeni su testovi Kruskal–Wallis i Mann–Whitney, a nivo značajnosti određen je na 5%. Analiza je urađena pomoću SPSS statističkog softvera, verzija 20.

**Rezultati.** Analizirano je 98 upitnika koji su prikazali prosečnu starost studenata od 22,68 godina (SD ± 3,03). Većina ispitanika bila je ženskog pola (69,4%) i bele rase (46,9%). Većina je pohađala državnu srednju školu (53,1%) pre upisa na fakultet i nije bila prethodno upoznata sa temom (60,2%). Nisu primećene značajne razlike između delova kursa kada je reč o opštem znanju o stomatološkom lečenju pacijenata sa autizmom ( $p = 0,952$ ). Postojala je veća verovatnoća da bivši učenici državne srednje škole korektno odgovore na pitanja koja su se odnosila na prioritete rutine lečenja ( $p = 0,014$ ); kod ispitanika koji su pre fakulteta bili upoznati sa temom postojala je veća verovatnoća da tačno odgovore na pitanja u vezi sa farmakološkim metodama lečenja pacijenata sa ASD-om ( $p = 0,039$ ).

**Zaključak.** Studija je pokazala da je znanje o stomatološkom lečenju pacijenata sa ASD-om koje studenti stomatologije u univerzitetskom centru u severoistočnom Brazilu poseduju na zadovoljavajućem nivou.

**Ključne reči:** poremećaji iz spektra autizma, stomatološka nega, stomatologija