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Dental Anxiety- a Prospective Study among Medical and Non-Medical Subjects

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Abstract: *The subject of anxiety related to dental treatments is recognized and long debated in medical literature. There are various motivations, starting with individual, age-related, social, economic or strictly medical reasons. Considering the medical and psychological importance of oral health that impact the whole organism health, there is an increasingly sustained, interdisciplinary concern, with the involvement of dentists, generalists, psychologists or psychiatrists. This situation is quantified at the individual and social level with reference to both the financial costs and the organic and psychological suffering determined by this medico-psycho-social problem. This is why the authors of this article proposed in the current study to determine if there is a difference in terms of anxiety towards dental treatments in subjects trained from a medical point of view versus people without medical instruction. The study used an online questionnaire and was carried out over a period of one month in the year 2023. The data were processed with the help of LibreOffice Calc and Microsoft Excel. The conclusions of the study revealed that poor oral health can serve as a precursor to anxiety and depression, creating a link between oral hygiene and mental well-being. Oral pain, embarrassment and the resulting self-consciousness can contribute to feelings of anxiety and depression, feelings that exist no matter if there were subjects trained in medical field or not, therefore individuals may have difficulty socializing, communicating, and maintaining a positive self-image.*

Keywords: *dental anxiety, dental problems, oral health, dental treatment.*

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1. Introduction

In the last years, in the field of dental medicine, there has been brought a series of major changes regarding the technical possibilities consisting of medical investigation equipment, treatment and new therapy methods. Beyond these major changes regarding the organization of this medical field, with the emergence of new subspecialties, the concern of specialists in dental medicine also knows another approach more and more closely related to the part of psychology. Therefore, it has been developed a strong relationship to the behavior of patients with dental diseases, with a specific reference to anxiety related to the dentist (Saatchi et al., 2015; Seligman et al., 2017).

There are more and more studies on the information implications and collaboration with patients concerning the examinations and interventions in the dental field (de Jongh et al., 2011; Wide & Hakeberg, 2021).

If it is accepted that the doctor-patient relationship represents a special type of social relationship, so we can say without fear of being wrong that the dentist-patient relationship far exceeds this limit and anxiety about dental treatments is one of the most important feelings in current dental practice (Appukuttan, 2022; Caltabiano et al., 2018; de Jongh et al., 2005). This is the reason why considering the medical and psychological importance of oral health on the entire body health, there is an increasingly sustained interdisciplinary concern which involves the dentists, generalists, psychologists, psychiatrists and pediatricians (Porrit et al., 2012; Klingberg & Broberg, 2007) in research, deciphering intrinsic mechanisms (Facco & Zanette, 2017) and finding solutions for dental anxiety (Newton et al., 2012).

The explanations are numerous and their point of origin is extremely wide, starting with those of an individual (Economou, 2003), social or economic level, gender, education level or age, general health status (Stenebrand et al., 2012; Muneer et al., 2022) or special periods in the individual's life (pregnancy, post-partum, adolescence) (Cohen et al., 1982; Grisolia et al., 2022).

What is certain, however, is the fact that pain, the primary symptom in medicine that determine the patient to be examined by a doctor, occupies a central place in the context of dental conditions, through the imperative of manifestation that creates the context of an emergency situation; in most situations there is no alternative other than presentation at the dental office (Armfield & Heaton, 2013; Tellez et al., 2014).

Thus, the addressability of dental offices is doubled in proportion in 10-20% of cases by fear or phobia of the dentist if we refer, at least, to the adult population (Gordon et al., 2013; White et al., 2017).

The problem of anxiety towards the dentist should not be viewed simplistically and unilaterally, as a strictly individual problem. Modern medicine, which is inevitably related to expenses and social costs of medical conditions, will have to take this side more and more into account. In this context, avoiding examination or presenting in late stages to the dentist due to anxiety (Richter et al., 2022) is quantified by both the suffering of the individual and by the existence of higher costs imposed by the health systems when there are severe dentition damage or by the occurrence of medical problems (Minja & Kokulengya Kahabuka, 2018) with general consequences determined by the existence of dental diseases (cancers at the level of the oral mucosa due to its prolonged aggression by dental debris, digestive problems determined by insufficient mastication, anemia or various nutritional deficiencies, psychiatric diseases by affecting the facial aesthetics of the individual or due to communication and socialization problems) (Locker, 2003).

2. Material and methods

The study was designed in order to obtain answers from two samples of respondents: a sample consisting of people without medical knowledge and a second sample including people with medical training. It was applied for a period of one month, in 2023, through online questionnaire. The questionnaire was developed by the authors and includes 26 questions. A first section of the questionnaire includes structural data (Items 1-6), the second section brings together questions related to addiction problems (Items 7-9), the third section includes data related to dental problems (Items 10- 14) , the fourth section (Items 15- 22) contains questions related to dental anxiety; a last section, the fifth one (Items 23- 26) brings together questions about the consequences generated by avoiding solving dental problems as a consequence of anxiety related to dental treatments.

The design of the study included making a comparison between the answers obtained from the two samples of respondents in order to find out how having some medical knowledge can influence dental fear/anxiety.

The patients were informed about the confidentiality of the data provided to them by expressing their agreement regarding participation by completing the questionnaire itself. The principles of studies on human subjects were respected.

3. Results

Analysis of the data obtained by interpreting the answers obtained from the first sample of respondents (category without medical knowledge)

3.1. Answers to the sample of subjects without medical knowledge

- ***Section I (Items 1-6)***

The structure data reveals the following:

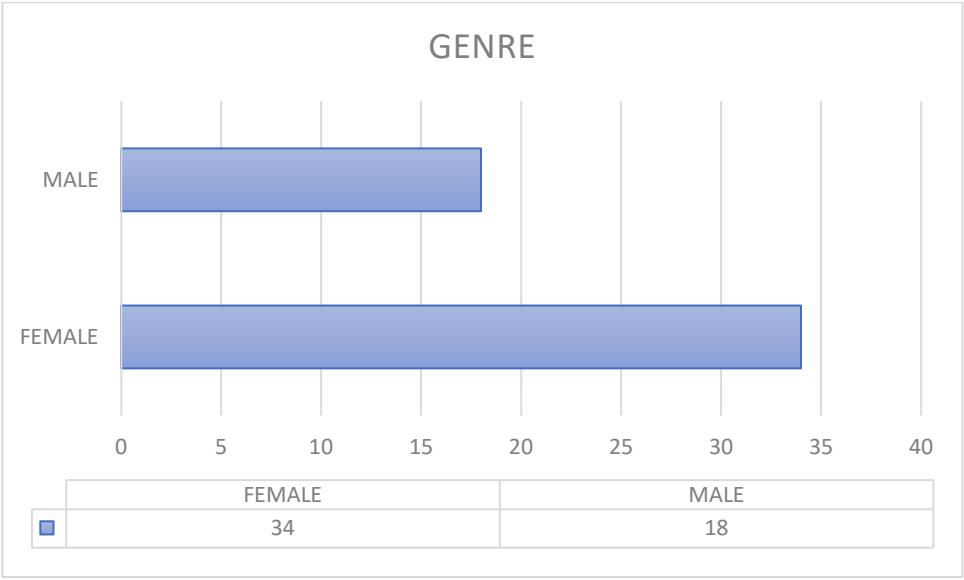


Fig 3.1.1. Gender distribution in the population sample without medical education
Source: Authors' personal data

Analyzing the sample of respondents (Fig. 3.1.1), we noticed that the proportion of female respondents is approximately twice as high as that of male respondents. Sex ratio F:M = 1.88:1

Regarding the origin of the respondents, a number of 42 come from the urban environment and only 10 from the rural environment. An explanation could be that the access to digital means and the concern of people from the rural environment for oral health is lower, but in certain situations the access to dental offices and the level of information about dental hygiene and the possibilities of therapy are less in the environment rural.

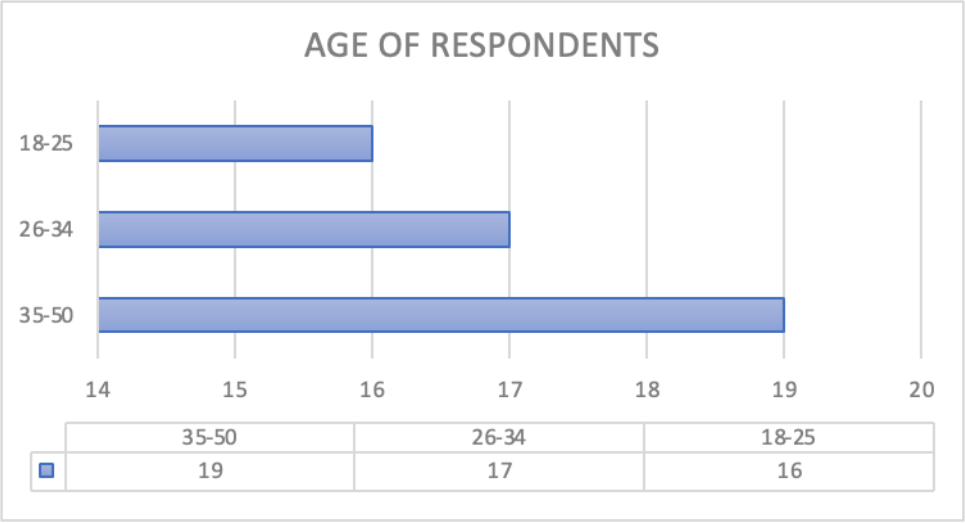


Fig. 3.1.2. Distribution of respondents by age groups
Source: Authors' personal data

Referring to the age of the respondents (Fig. 3.1.2) considering the levels on which the study was designed, it can be observed that most respondents belong to the sample of 35-50 years.

The structural data regarding the level of education of the respondents shows that the largest number is represented by people with higher education. If we sum up the people with higher, university and postgraduate education, their number is 3.33 times higher than that of those with high school education.

Among the respondents to the questionnaire, the largest number is represented by people with a job (29 respondents) and the smallest number of subjects (6 respondents) is represented by people with a lower socio-economic level (retired, self-employed, uninsured), the number of students being 17.

- ***Section II (Items 7- 9)***

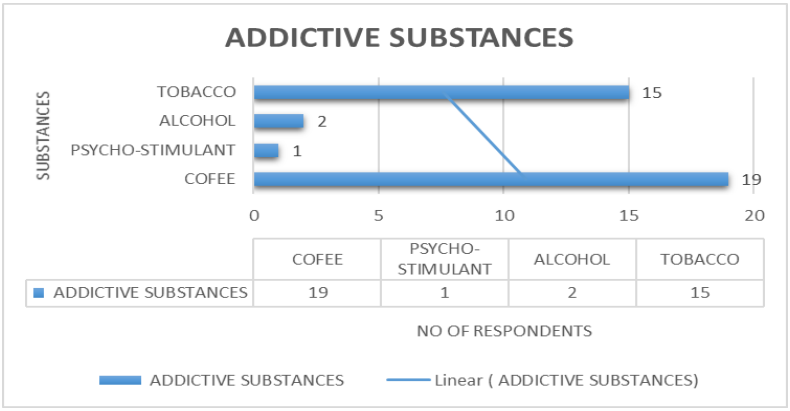


Fig. 3.1.3 The distribution of respondents according to the declared addictions
Source: Authors' personal data

Among the patients with addictions (Fig. 3.1.3), most of the respondents declared an addiction to coffee.

- ***Section III (Items 10- 14)***

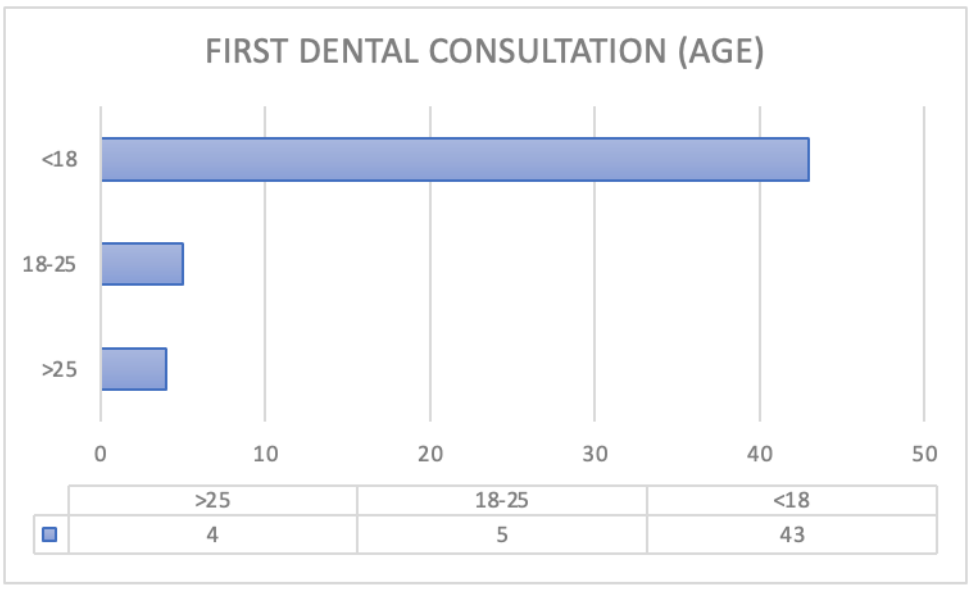


Fig. 3.1.4 Distribution of respondents according to the age of the first dental examination
Source: Authors' personal data

Regarding the age at which the first sample of respondents went to a dental examination for the first time by age group, the highest percentage of respondents is represented by the group of subjects younger than 18 years old (Fig. 3.1.4).

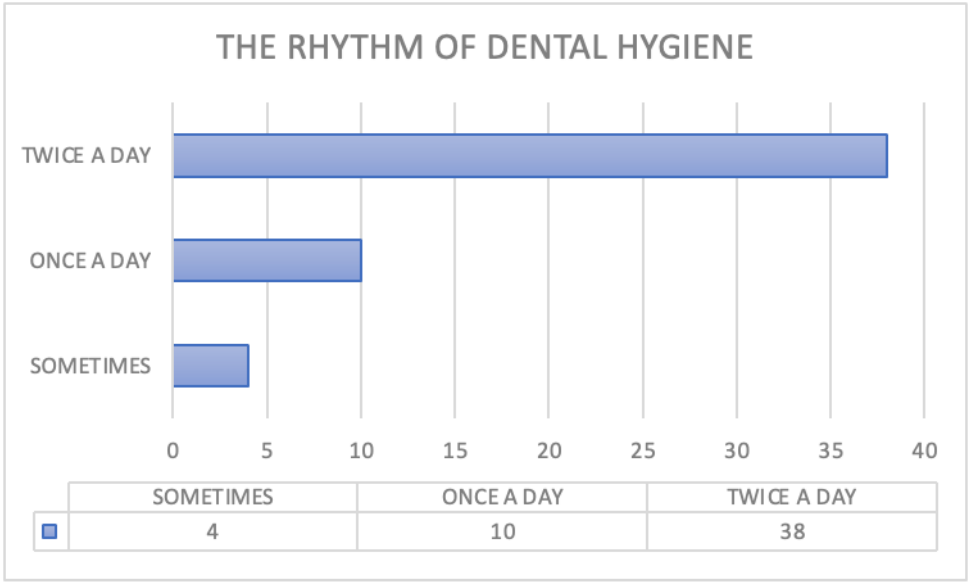


Fig. 3.1.5 Distribution of respondents according to the rhythm of dental hygiene
Source: Authors' personal data

The largest sample of respondents of the first questioned category states that they perform dental hygiene twice a day (2D) (Fig. 3.1.5).

Among the respondents who presented dental phobia: 8 patients do not go to the dentist because they do not have enough financial resources, 2 are treated at home and 7 think that they will be hurt because of fear.

- ***Section IV (Items 15- 22)***

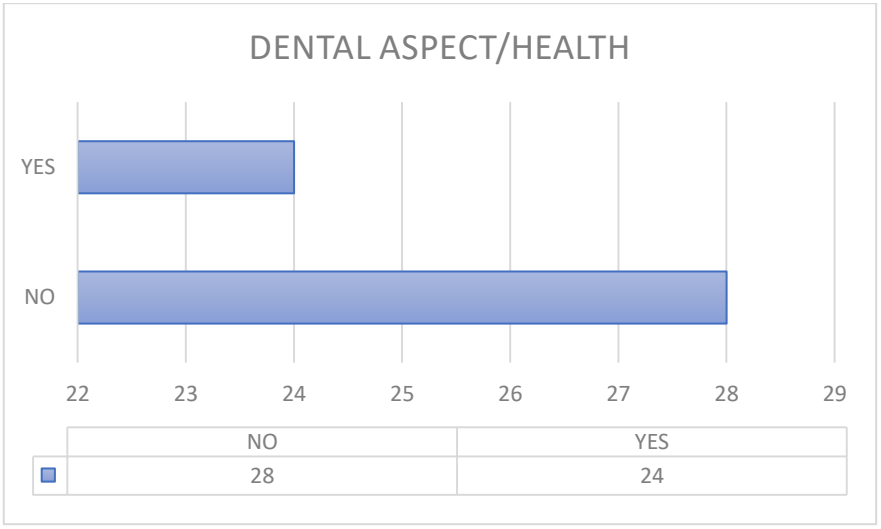


Fig. 3.1.6 Dental appearance/health
Source: Authors' personal data

To the question regarding a possible anxiety generated by the appearance of the teeth/oral health (Fig. 3.1.6), the largest number of respondents 28 (53.8%) opted for the negative answer option which can be translated by the lack of concern in this direction.

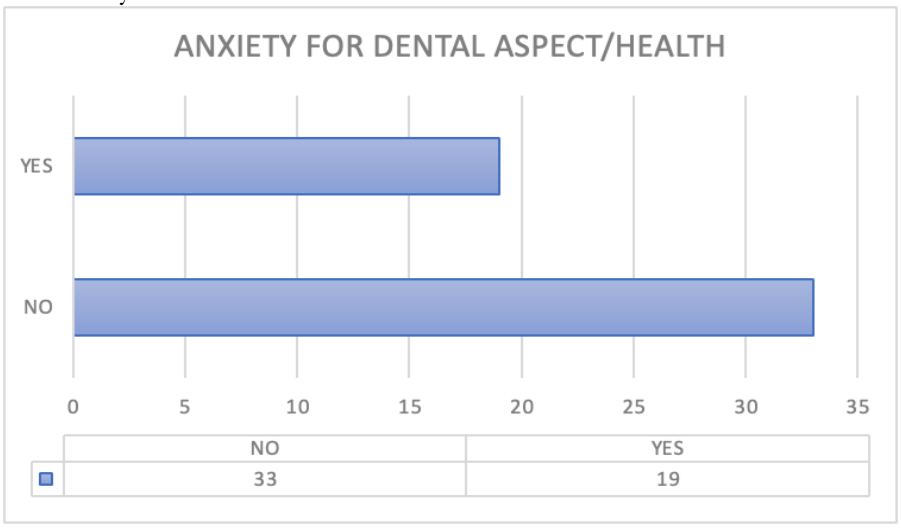


Fig. 3.1.7 Distribution of respondents according to the absence of dental anxiety regarding the physical appearance
Source: Authors' personal data

The answer to the question about anxiety related to dental appearance/oral health is negative in the largest proportion 33 respondents (63.5%), signifying the lack of concern related to this subject (Fig. 3.1.7).

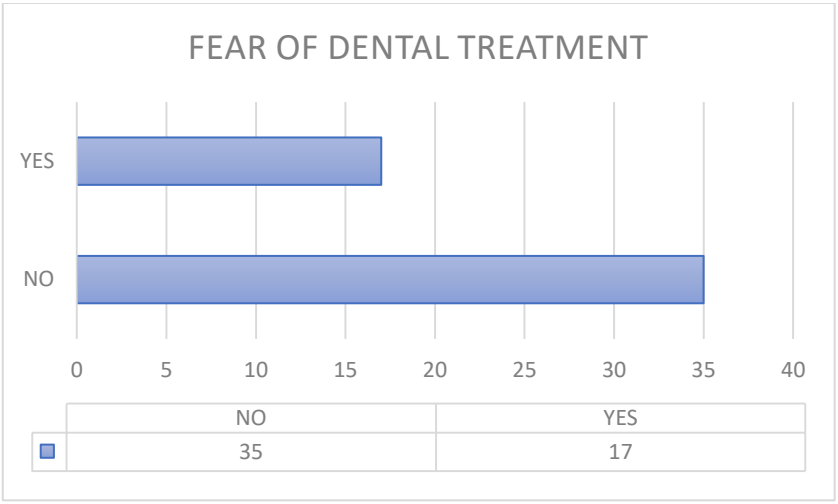


Fig. 3.1.8 Distribution of respondents regarding dental fear
Source: Authors' personal data

Figure 3.1.8 shows that a number of 35 respondents state that they do not have anxiety related to dental treatments.

- ***Section V (Items 23- 26)***

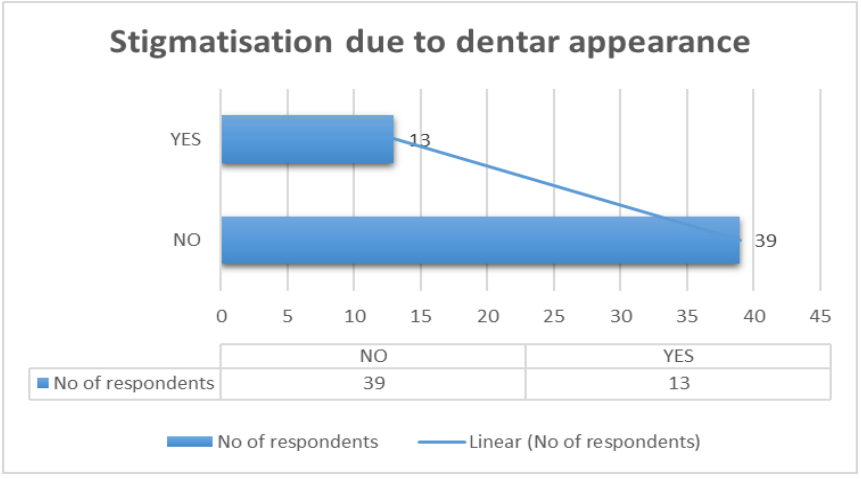


Fig. 3.1.9. The distribution of respondents regarding the stigma regarding the dental aspect
Source: Authors' personal data

From figure 3.1.9, representing the stigmatization due to an inappropriate dental appearance, the largest proportion of respondents, namely 39 (75%) state that they do not feel stigmatized. Those who are of the opinion that the dental appearance can represent a reason for being socially stigmatized are three times less, in number 13 (25%).

3.2. Answers to the sample of subjects who have medical knowledge

- ***Section I (Items 1-I6)***
  The structure data reveals the following:

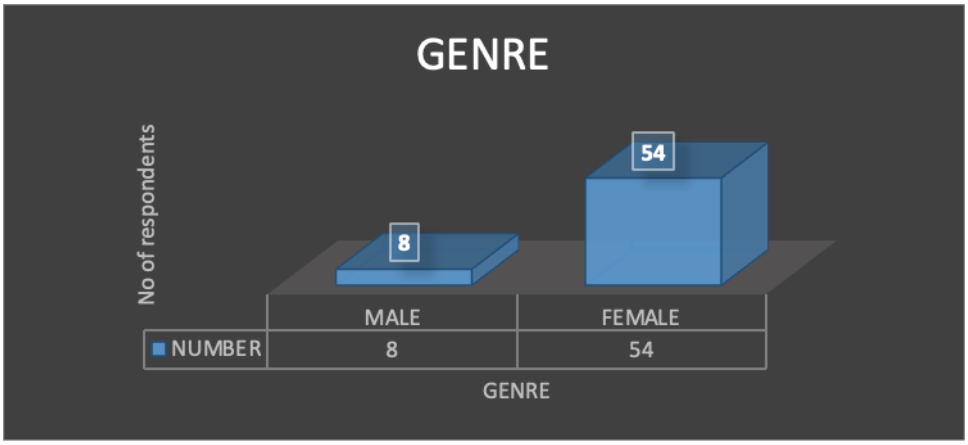


Fig. 3.2.1. Gender distribution in the population sample with medical studies
Source: Authors' personal data

The sample of medical staff respondents is composed in proportion of 87.1% women and 12.9% men (Fig. 3.2.1.).

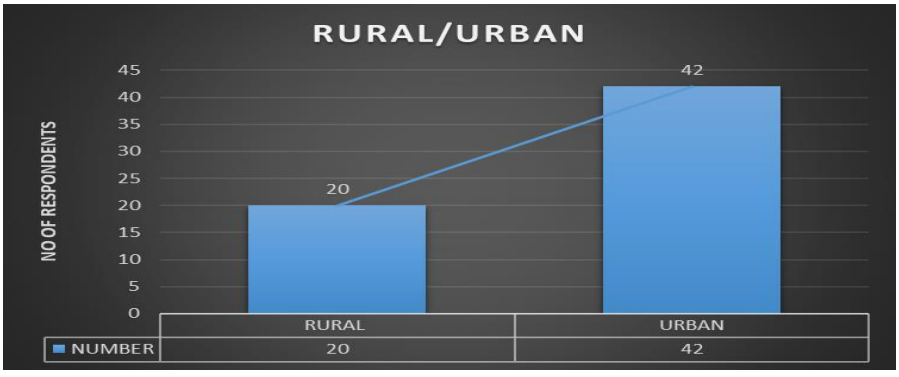


Fig. 3.2.2. The distribution of respondents according to the environment of origin
Source: Authors' personal data

With reference to the area of origin, 42 (67.7%) respondents are from the urban area and only 20 (32.3%) from the rural area (Fig. 3.2.2).

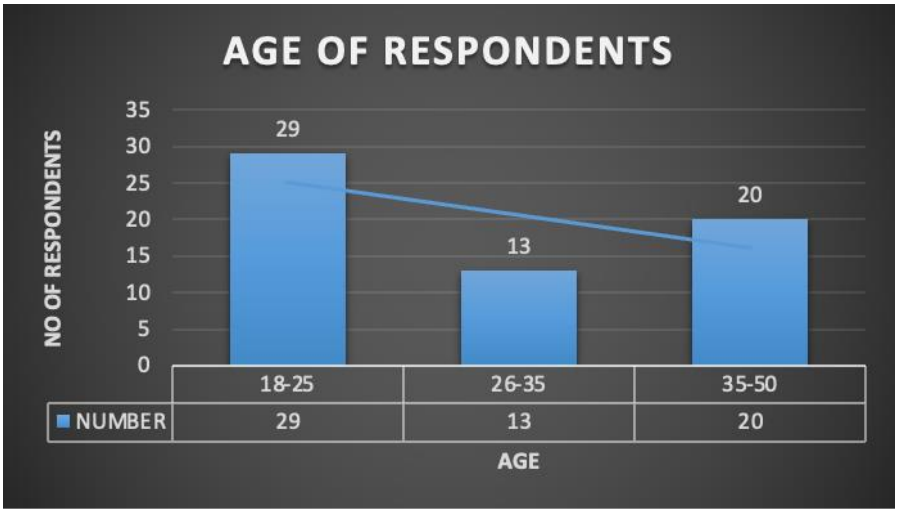


Fig. 3.2.3. Distribution of respondents by age groups
Source: Authors' personal data

In figure 3.2.3. the age of the subjects who answered the questionnaire can be observed. At the level of the samples established by the design of the study, we observe the fact that the largest weight is represented by the segment 18-25 years old in a proportion of 2.23:1:1.45.

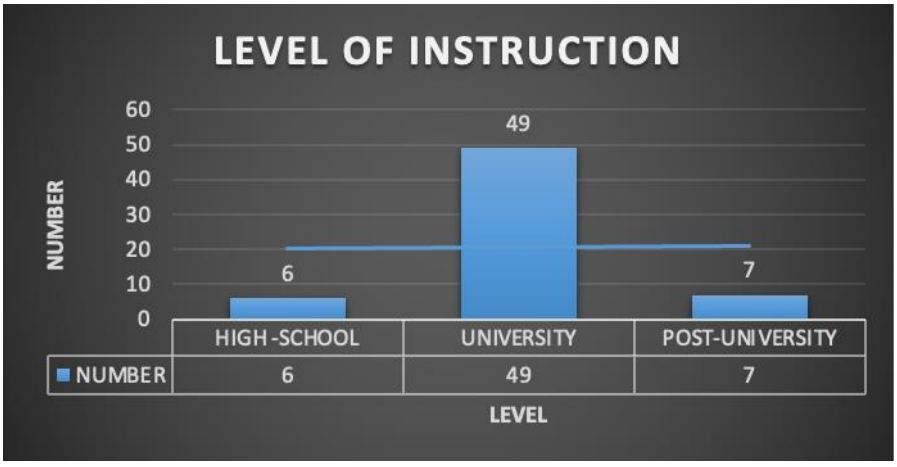


Fig 3.2.4 The distribution of respondents according to the level of education
Source: Authors' personal data

As can be seen, most respondents 49 (79%) have university education (Fig 3.2.4.).

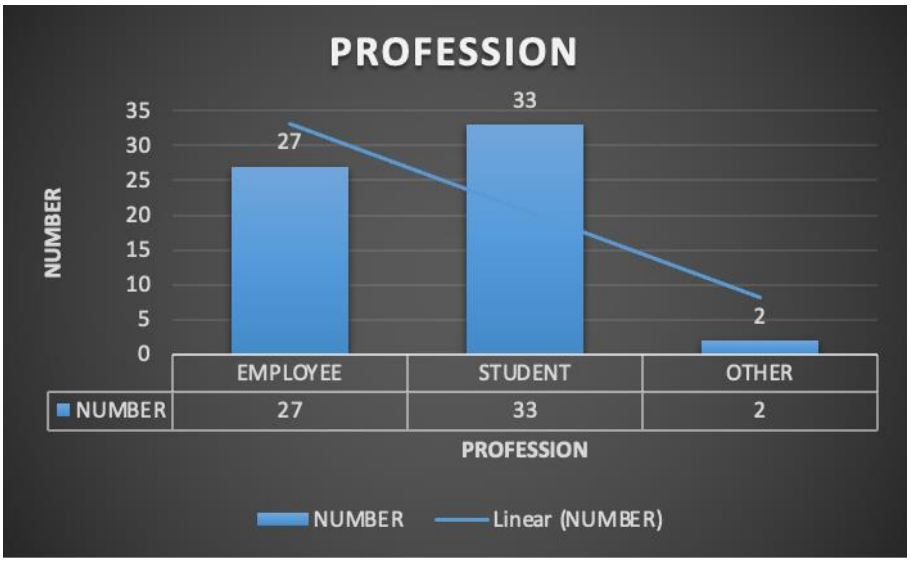


Fig. 3.2.5. Standard of living
Source: Authors' personal data

Analysis of figure 3.2.5. regarding the profession highlights the fact that the largest number of respondents is represented by employed persons in the medical system. The other respondents are students in the medical field or workers belonging to other categories of care in the medical field.

- ***Section II (Items 7 – 9)***

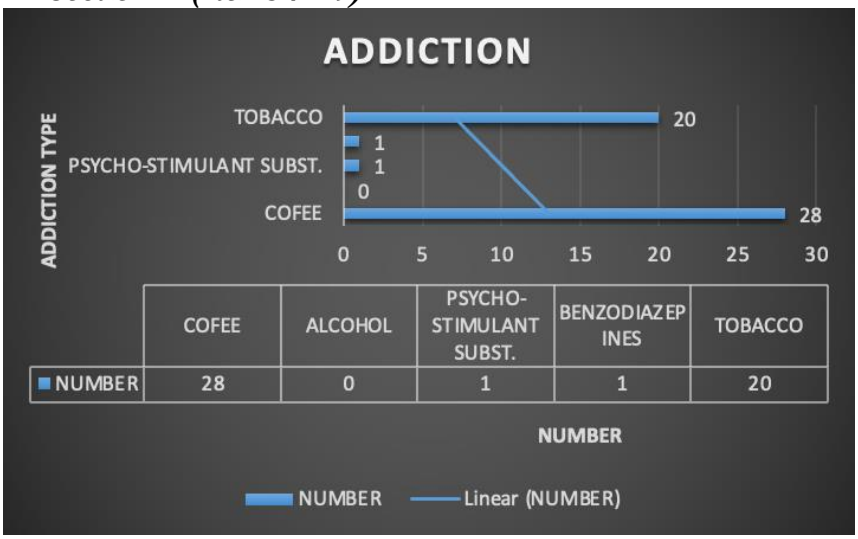


Fig. 3.2.6. The distribution of respondents according to the declared addictions
Source: Authors' personal data

From figure 3.2.6. it turns out that people from the medical field are addicted to coffee and tobacco consumption, no one is addicted to alcohol, and the consumption of benzodiazepines and psychostimulants is practiced by 2 people.

- ***Section III (Items 10- 14)***

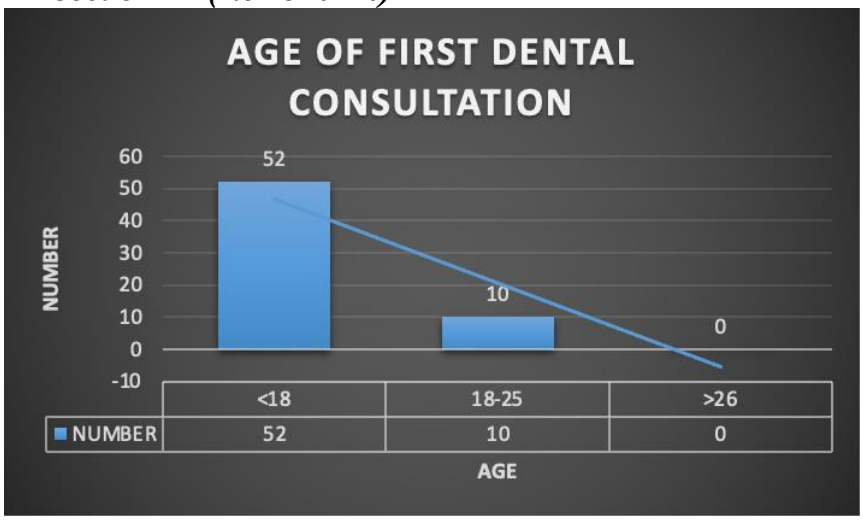


Fig. 3.2.7. Distribution of respondents according to the age of the first dental examination
Source: Authors' personal data

Most respondents went to their first dental examination before the age of 18. It is important to underline the fact that all respondents went to their first dental examination before the age of 26 (Fig 3.2.7.).

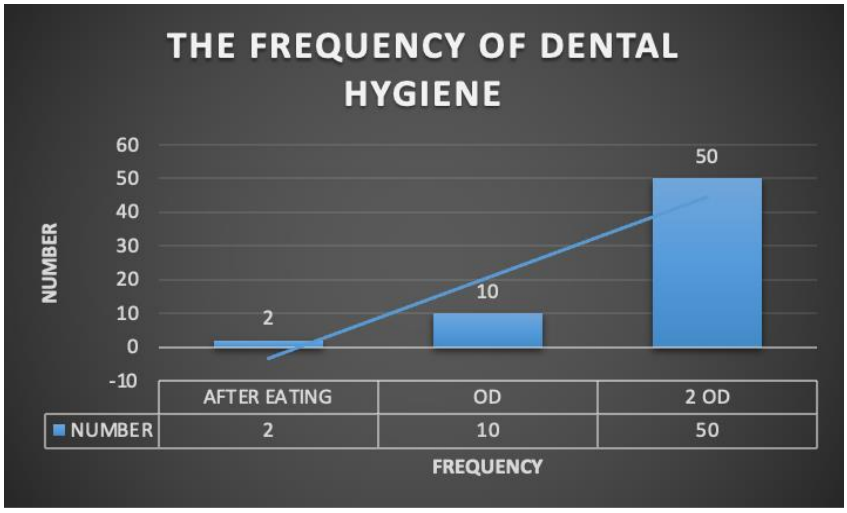


Fig. 3.2.8. Distribution of respondents according to the rythm of dental hygiene
Source: Authors' personal data

With reference to the frequency of dental hygiene (Fig. 3.2.8.), most respondents 50 (80.6%) say that they do this twice a day. It should be noted that 10% of the respondents perform dental hygiene after each meal, but with the amendment that this action lasts only a few seconds.

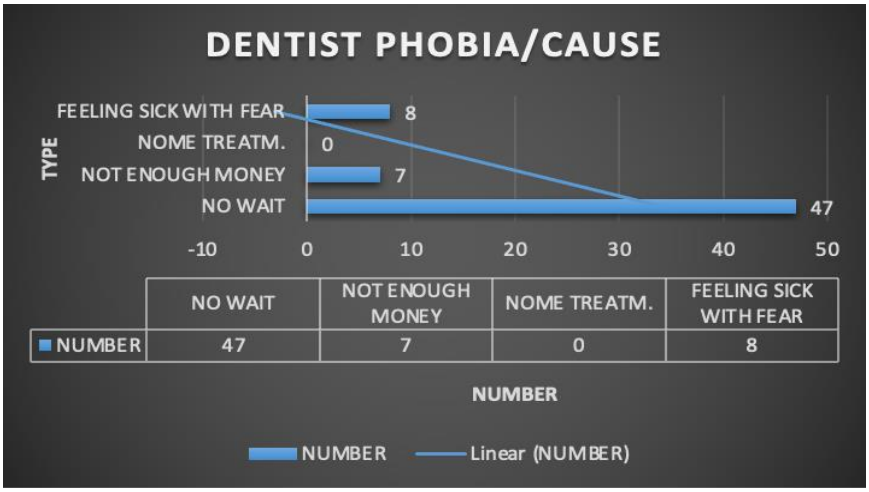


Fig. 3.2.9. The reasons why dental phobia occurs in patients
Source: Authors' personal data

Among the reasons that lead the respondents to avoid going to dental examinations or deciding to get an examination, we mention the fear/phobia/anxiety itself in a relatively small proportion of 12.9%. The largest proportion of respondents choose to get a dental examination, namely 47, respectively, 75.8%. A proportion close to the respondent cannot benefit of a dental examination, due to the lack of financial means (Fig. 3.2.9.).

- ***Section IV (Items 15-22)***

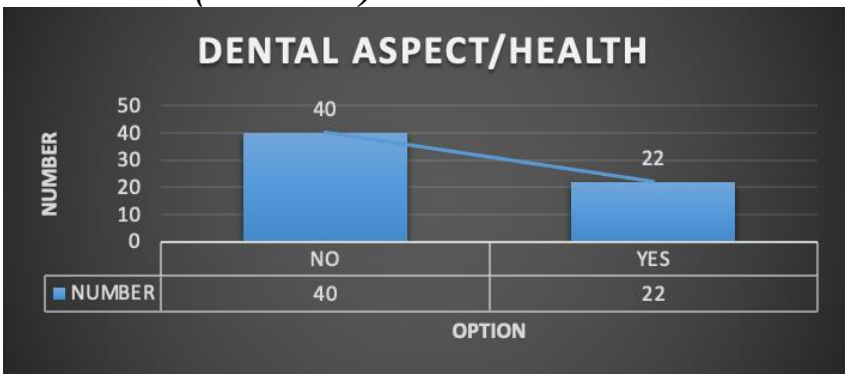


Fig. 3.2.10 Dental appearance/health
Source: Authors' personal data

The analysis of figure 3.2.10 regarding anxiety of dental appearance or oral health reveals the fact that most respondents do not experience this feeling - 40 (64.5%). The ratio between respondents who present anxiety and those who do not present this feeling is 1.81:1 in favor of those who do not experience anxiety.

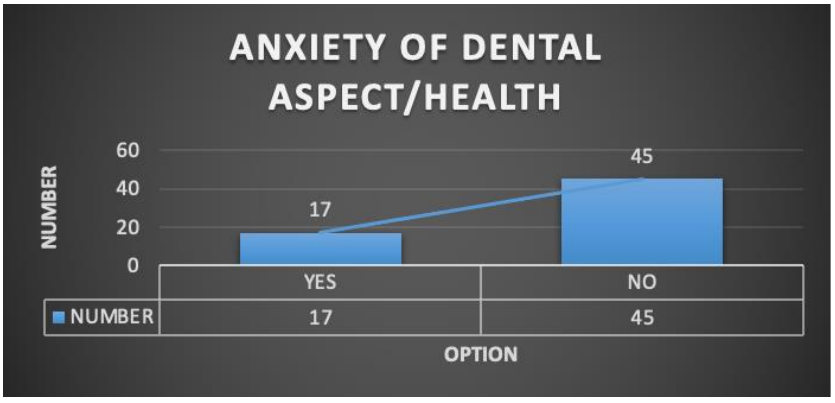


Fig. 3.2.11 The distribution of respondents according to the absence of dental anxiety regarding the physical appearance
Source: Authors' personal data

Regarding the anxiety related to dental appearance/oral health, in the sample of respondents with a level of medical knowledge, 72.6% do not experience anxiety (Fig. 3.2.11).

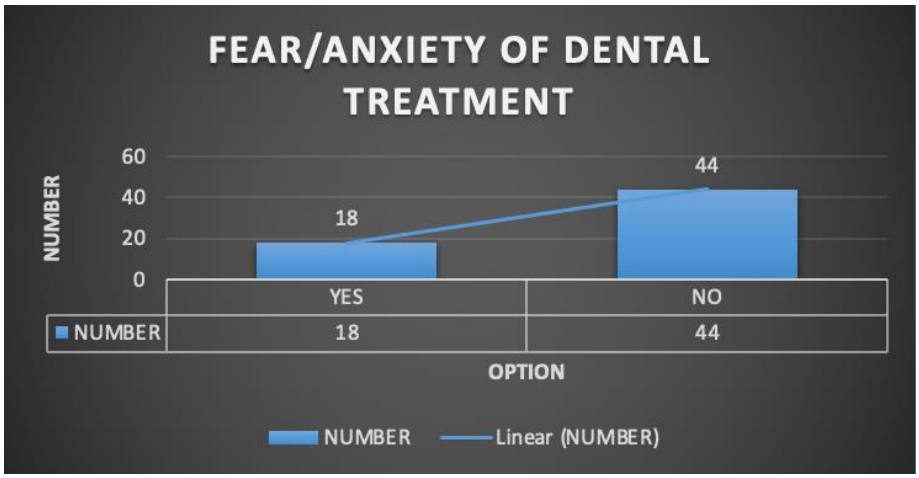


Fig. 3.2.12 Distribution of respondents regarding dental fear
Source: Authors' personal data

The fear/anxiety of dental treatments is present in figure 3.2.12 and it was declared by a number of 18 respondents (29%), while a number of 44 respondents (71%) do not face this feeling.

- ***Section V (Items 23- 26)***

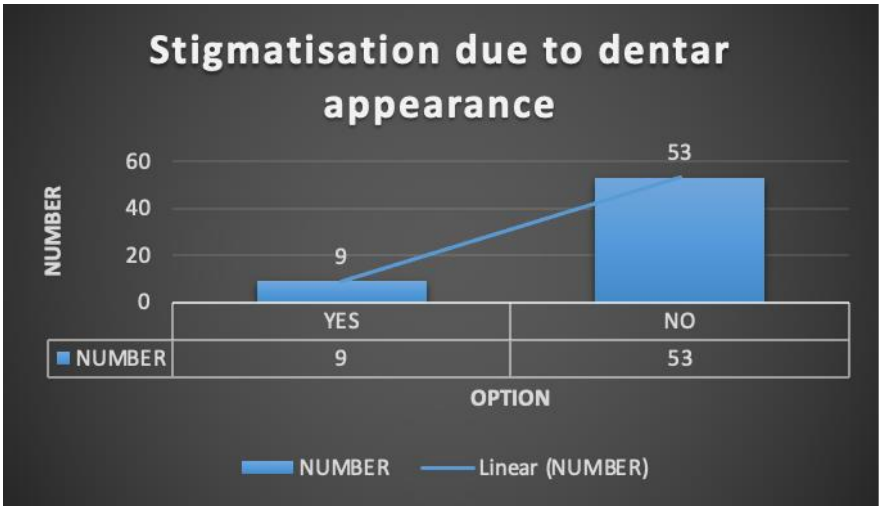


Fig 3.2.13 The distribution of respondents regarding the stigma regarding the dental aspect
Source: Authors' personal data

Figure 3.2.13, with reference to the social stigmatization due to the dental aspect, analyzes the answers and shows the fact that a number of 53 patients, respectively, 85.5% were not stigmatized, while a number of 9 patients representing 14.55 faced this situation.

4. Discussions

In order to obtain relevant results between the two categories of respondents, we performed a comparative analysis using the answers provided by the subjects to the same items as analysis material.

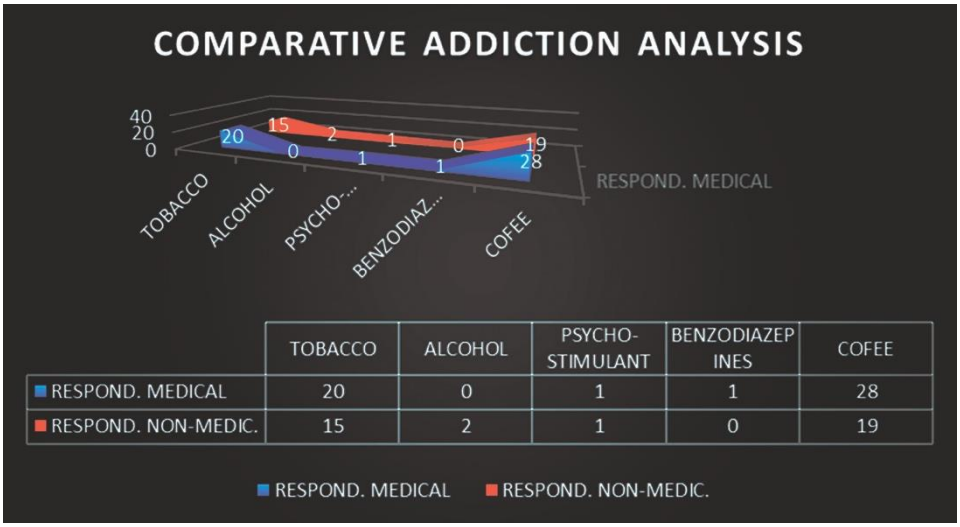
With regard to the structural data, we observed that in both samples the largest proportion of respondents is represented by females 34 and 54 respectively in the sample of those with medical knowledge.

Regarding the area of origin, in both samples of respondents, most of them come from the urban environment, in number of 42 in both samples.

Referring to the age of the participants in the study, we observed that while among the respondents who have medical knowledge, there is a larger number in the 18-25 years segment, namely 29, whilst in the other sample, the largest proportion of respondents is found in the 35-50 years segment with 19 subjects.

In both samples, the majority of respondents have university studies (30, respectively 49 subjects.

Considering the profession, an almost equal number of respondents for both samples are employees, 27 and respectively 29. However, we note that in the second sample the number of student respondents is twice as high (33), compared to 17 respondents from the first sample.



	TOBACCO	ALCOHOL	PSYCHO-STIMULANT	BENZODIAZEPINES	COFEE
RESPOND. MEDICAL	20	0	1	1	28
RESPOND. NON-MEDIC.	15	2	1	0	19

Fig. 4.1 Comparative analysis of respondents from the medical field vs non-medical ones regarding addictions
Source: Authors' personal data

Analysis Fig 4.1. regarding the addictions of the two samples demonstrates the fact that the addiction to coffee and tobacco is higher in the case of personnel who have medical knowledge, which is probably related to the level of stress and the work schedule. We notice that in the first sample, where the superior addictive representation refers to the consumption of alcohol, is superior and that of psychostimulants, equal. Among the medical staff, the higher consumption of benzodiazepines can be determined by the sleep disorders determined by the permanent schedule modified in this socio-professional category by the existence of night shifts.

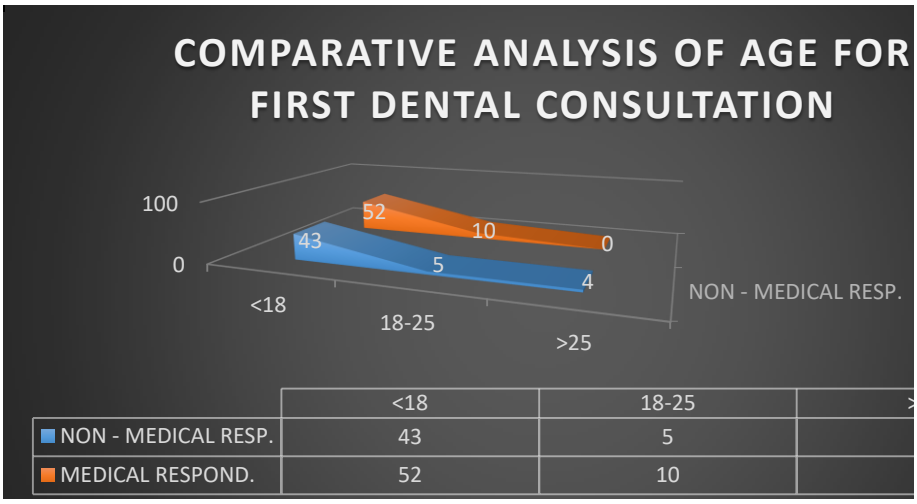


Fig. 4.2. Comparative analysis of respondents from the medical field vs non-medical field regarding the age of the first dental examination
Source: Authors' personal data

Comparative analysis from figure 4.2. of the age for the first dental examination reveals the fact that in the sample of "medical" respondents, the first examination before the age of 18 took place for a larger number of respondents and there are no situations in which it was carried out later than 25 years.

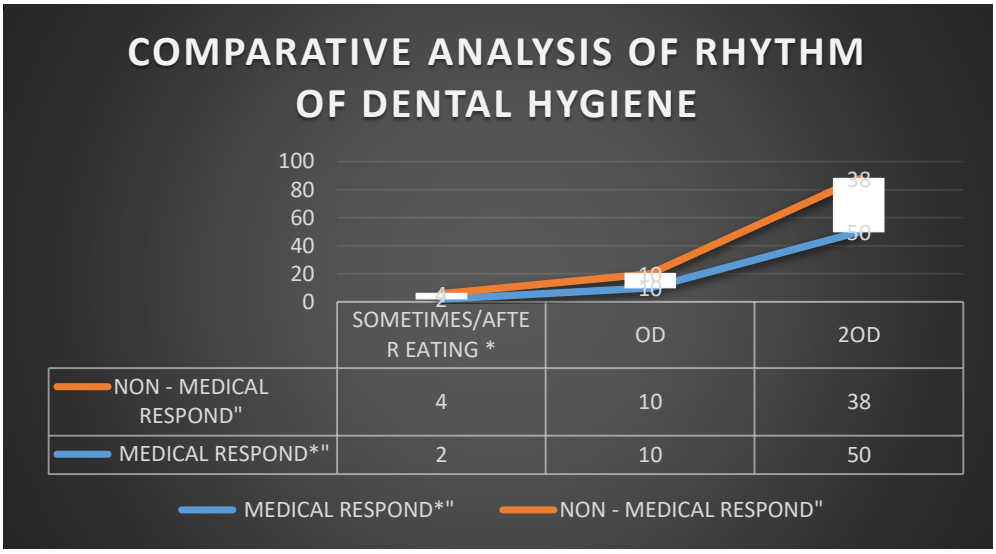


Fig. 4.3 Comparative analysis of the respondents from the medical field vs. the non-medical field regarding tooth brushing/day
Source: Authors' personal data

The comparative analysis regarding the dental hygiene schedule (Fig 4.3) clearly shows a greater concern in this direction, among people with medical knowledge: 50 vs 38. It is worth noting that 2 respondents from the "medical" sample category carry out an intervention after each meal, intervention with a very short duration, thus increasing the share of those with increased concern for dental hygiene at the level of this sample.

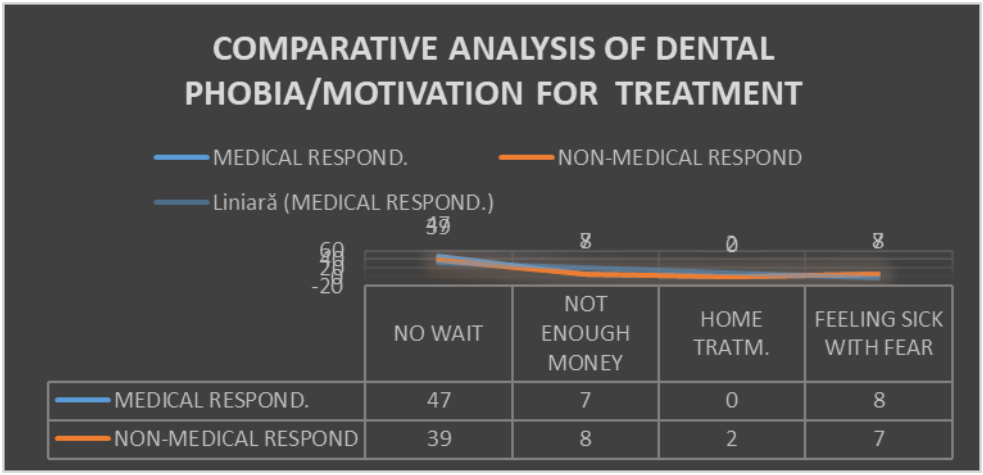


Fig. 4.4. Comparative analysis of respondents from the medical field vs non-medical field regarding dental phobia/motivation for dental treatments
Source: Authors' personal data

The comparative analysis of a phobic behavior or the lack of it in conjunction with other reasons that prevent patients from attending dental consultations are presented in figure 4.4. Thus, the largest number of "medical" patients present themselves without delay for dental treatment. We can observe that the number of those who show symptoms characteristic of phobia is higher in absolute value in "medical" patients; if we refer to the total number of patients in the sample, we notice that phobia with obvious symptoms appears more frequently in patients without medical knowledge.

In terms of anxiety about dental appearance or dental health in both samples, the largest number of subjects did not express this feeling.

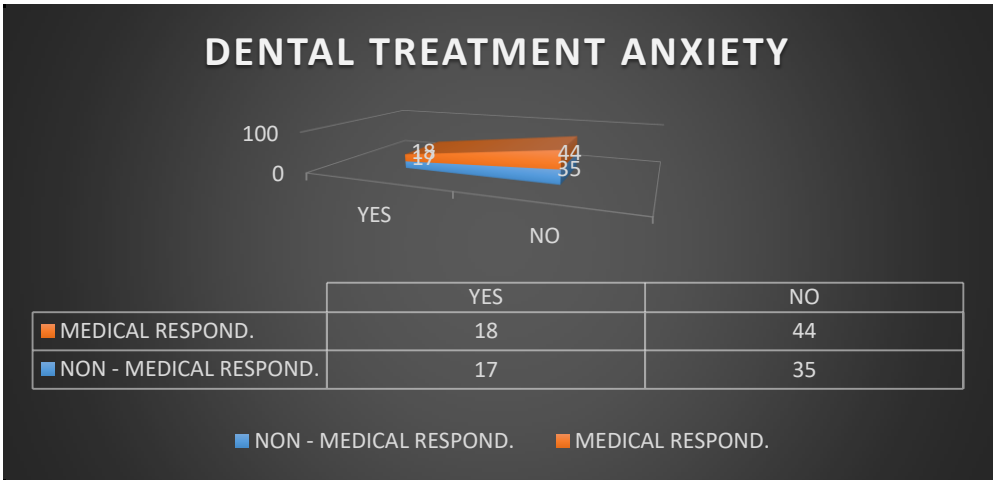


Fig. 4.5. Anxiety about dental treatments respondents from the medical vs non-medical field

Source: Authors' personal data

We notice that in the "medical" sample, anxiety about dental treatments is at a lower level. (Fig. 4.5.).

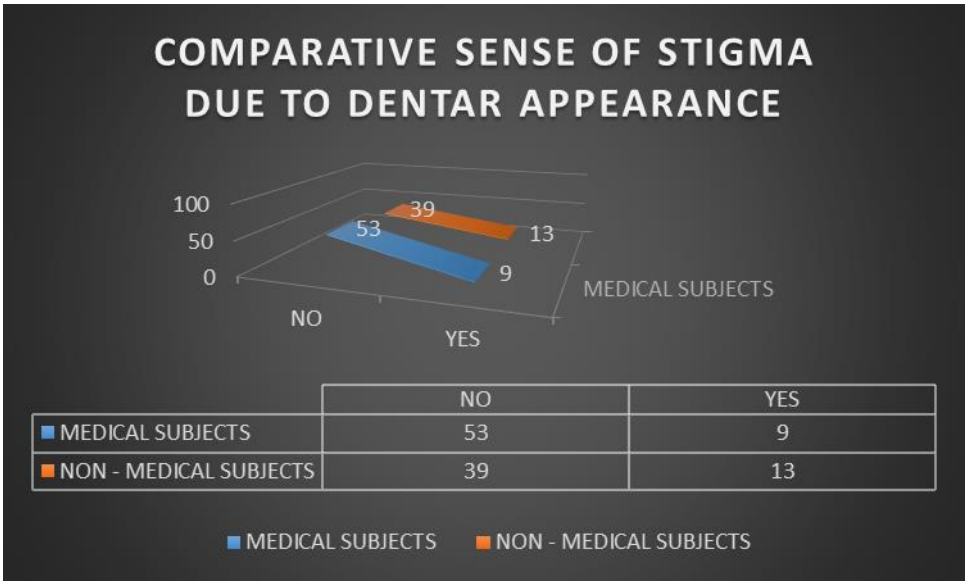


Fig. 4.6. Comparative analysis of the respondents from the medical field vs the non-medical ones regarding the stigmatization resulting from the deficient dental aspect

Source: Authors' personal data

The comparative analysis of the feeling of stigmatization due to dental appearance was experienced by a small number of respondents from the two samples, namely 9 in the medical sample and 13 in the non-medical sample (Fig. 4.6.).

In conclusion, we can say that at the level of the analyzed respondent populations, females are more open to participating in such online studies. In the same register, people from the urban environment participate with a higher frequency in online studies.

Respondents with medical knowledge participated in the largest number through the 18-25 years old sample, while in the other sample the 35-50 years old segment held the lead. The participants with university studies had the highest share in both studied populations, a fact that can emphasize that the level of instruction and education is an important factor in medical education and in making correct decisions regarding this. Also, greater financial possibilities can contribute to making favorable decisions regarding dental treatments. The large number of students with medical studies in the analysis of this indicator shows that an important factor for decision is also given by the level of instruction, beyond just the financial possibilities, fact which correlates positively with the previous finding, namely, a large number of respondents with university studies who adhere to dental treatments. Regarding the addictions of the two samples, the analysis demonstrates the fact that the addiction to coffee and tobacco is higher in the case of staff who have medical knowledge, which is probably related to the level of stress and the work schedule (Chirita et al., 2012). We notice that in the first sample, the superior addictive representation refers to the consumption of alcohol and that of psychostimulants as equal parametres. Among the medical staff, the higher consumption of benzodiazepines can be determined by the sleep disorders determined by the permanent schedule modified for this socio-professional category by the existence of night shifts (Popazu et al., 2022).

With reference to the age of the first examination and the rhythm of dental hygiene, we note that medical patients benefited in the largest proportion of dental examinations before the age of 18 and perform dental hygiene 2 times a day in the largest proportion. An explanation could be that concern for health could be a factor in a professional's choice, but parental education can also be a promoter of medical education.

The problem of dental anxiety is a topic of interest for practitioners in this specialty. This emotional disorder represents an obstacle to dental treatments, not just avoiding or presenting at a late stage to the dentist. That

is why dental practitioners are actively involved in deciphering the intrinsic mechanisms at the cognitive-behavioral and emotional level of dental anxiety disorder (Huff, 2023).

The problem of dental anxiety is currently considered a public health problem considering the ever-increasing prevalence of emotional disorders and the ever-lower age of debut. It is also important to mention that prevention in dentistry must be initiated from infancy by mothers who must have this knowledge, this conduct being deeply involved in the dental health of the person throughout life, but also closely related to health education during life and the behavior approached by the individual in adult life. Also from a behavioral perspective, it is recognized that certain anxiogenic behaviors of parents can initiate the same type of behavior in their children. This aspect is confirmed by a meta-analysis published on the basis of articles found in the PubMed database and published in 2022 (Stein Duker et al., 2022). The data regarding anxiety, avoidance behavior and oral hygiene (Eitner et al., 2006) are confirmed with the results of the study conducted by us.

In the current scientific understanding, the study carried out by us falls within the guidelines of evidence-based medicine, being the result of clinical observations that were the starting point for the compilation of the questionnaire used as working material. It can also be the starting point for the creation of behavioral strategies for the dentist-patient dyad, which will be beneficial to both terms of this medical equation. The practical benefits will be able to be objectified by increasing addressability at the dental office, by a better doctor-patient collaboration and by the results of medical interventions (Hoffman et al., 2022).

Also, the study carried out by us can contribute to improving the theoretical knowledge of medical practitioners about dental anxiety, so that they can easily recognize a "masked" anxiety in clinical practice and "translate" the symptoms of the patient with dental anxiety (Höglund et al., 2023).

The data of our study brings into discussion an important aspect that can represent a co-morbid state of anxiety, namely, addictions. Thus, the results obtained by us correlate positively, in general, with those of a study published in 2022 (Åstrøm et al., 2022). Also during pandemic, there was a significant increase in anxiety of patients (Droahnã et al., 2023).

Dental phobia correlates positively with treatment anxiety and seems to be higher in people without medical knowledge. Their consumption of anxiolytic substances - psychostimulants and alcohol is also higher. It is possible that the non-medical answer presents an anxious personality type or

has affections from the category of emotional disorders in a higher proportion or insufficient information in the direction of oral health generates dental anxiety, a fact also supported by the adherence to the performance of some empirical treatment at home.

Although most of the subjects responding to the questionnaire do not declare major addictions or serious oral pathologies, the percentage is over average in both cases.

We also note that although in both samples there is no feeling of stigmatization due to the deficient dental appearance, the correlation with the presentation without delay to the dental consultation is determined by the importance given not only to the appearance but especially to oral health. There is few data about the link between poor oral health and psychological disorders such as anxiety and depression, but there has already been considered a bidirectional link between them (Moroianu et al. 2022; Schenker et al 2022).

Highlights:

The dental profile of a patient with non-medical studies: female, from urban area, age between 35-50 years old, with university/ postgraduate education, having a job, addictive to coffee and tobacco, that had a first dental consultation before 18 years old and performing dental hygiene twice a day, having dental phobia because not having enough financial resources. Also, there is no anxiety regarding their dental aspect, no fear of dental treatments and there is no stigmatization concerning dental appearance.

The dental profile of a patient with medical studies: female, from urban area, age between 18-25 years old, being a student in medical field, addicted to coffee and tobacco, having a first dental consultation before 18 years old, performing dental hygiene twice a day who has dental examinations when needed and who has no anxiety regarding the dental aspect, no fear of dental treatments and no stigmatization regarding the dental appearance.

Limits of the study:

The present study is not without limitations that may affect research and statistical analysis. First of all, our study did not have a controlled study and it was completed online. It should also be mentioned that the study is limited strictly to the 73 respondents who agreed to fill in the questionnaire, the reason for which the issuance of some conclusions is based on hypotheses detected strictly in the case of these patients. For this reason,

from a future research perspective, we can consider the continuation of the study over an extended period of time and an increased number of subjects.

5. Conclusions:

Poor oral health can serve as a precursor to anxiety and depression, creating a link between oral hygiene and mental well-being.

Neglected oral care, such as inadequate brushing, flossing, and regular dental checkups, can lead to dental problems such as cavities, gum disease, and tooth loss.

These oral health problems can cause physical discomfort, affect speech and eating skills, and affect self-esteem and social interactions.

Oral pain, embarrassment, and the resulting self-consciousness can contribute to feelings of anxiety and depression and individuals may have difficulty socializing, communicating, and maintaining a positive self-image, therefore, recognizing the importance of oral health is essential to promoting both physical and mental well-being.

Items of the study:

1. Origin location
2. Age
3. Genre
4. Level of education
5. Economical level
6. Living standards
7. In treatment with
8. My addiction/s is/are
9. Details about the declared addiction/s
10. First dental consultation
11. The rhythm of dental hygiene
12. Dental floss usage
13. Mouth wash usage
14. Known dental problems
15. Reason for not having dental examination
16. Reason for going to the dentist
17. Restlessness about physical aspect
18. Anxiety about physical aspect
19. Hypertension in dental office
20. Anticipatory anxiety before a dental consult
21. Reasons for being scarred about a dentist
22. Fear about dental treatments

23. Satisfied or not about smile
24. Restful sleep regarding dental aspect
25. Inferiority feelings regarding poor dental appearance
26. Stigmatization feelings concerning dental aspect.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript. The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee of Clinical Hospital of Psychiatry "Elisabeta Doamna" Galați, Romania (No. 02/18.05.2021) for studies involving humans, this study being part of the doctoral study of Dr. Marius Moroianu.

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