

THE ATTITUDES OF STUDENTS TOWARDS INSTAGRAM DENTAL MARKETING, ONLINE COMMUNICATION WITH DENTISTS, AND INFORMATION ABOUT ORAL HEALTH ON THE INTERNET

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Introduction: Information about oral health available on the Internet, videos of dental procedures on YouTube, and Facebook groups, whose members are dentists, have contributed to dentistry finding its place online. **Aim:** The aim of the study was to investigate the attitudes and behavior of student population towards: dental marketing on Instagram, patient-dentist relationship through social media, and information about oral health found on the Internet. **Participants and Methods:** The research included 226 students of the University of Niš, who participated in an anonymous online survey of 16 questions created in Google Forms. **Results:** Every sixth respondent from those who follow a dental office on Instagram have chosen the office because of Instagram. Females search for dentists more frequently on the Internet than males. Most of the respondents, who are friends with dentist on a social network, still most often contact them by phone. The oldest respondents do not find it appropriate to be friends with a dentist on social media. The majority of those who are unsure about the accuracy of oral health informations from the Internet, do not discuss them with their dentist. **Conclusion:** Instagram does not play a key role in the choice of a dentist among respondents, and communication with a dentist through social media is less prevalent than other forms of communication with a dentist. However, more than half of the respondents consult the Internet before going to the dentist.

Keywords: dentistry, students, Internet, social networks, Instagram, dental marketing

Introduction

The development of technology, with the advent of the Internet, has made a large amount of information from different spheres of life available to a lots of people (Leiner et al. 2009). Due to easy access to information about oral health (Shetty et al. 2018), a large number of dental procedure videos on YouTube (Knösel et al. 2011; Madathil et al. 2015; Nason et al. 2016), as well as Facebook groups whose members are dentists, where diagnosis and treatments are discussed (Bhola et al. 2016; Nicolai et al. 2017), dentistry has found its place on the Internet.

In Kamiński et al. 's (2020) study, it was found that toothache ranked ninth on the list of the most searched pain-related topics on Google. This term is often searched in Indonesia, the Philippines, Turkey, Malaysia, as well as Bosnia and Herzegovina (Kamiński et al. 2020). The results of one study indicate that Google users' interest in toothache does not wane throughout the whole year (Lotto et al. 2017), while Gowdar et al. (2022) suggest that 71.3% of the population uses the Internet to search for information about oral health.

The benefits of social media, such as advertising and promotion (Hatzipanagos et al. 2016), as well as facilitated communication between patients and dentists (Parmar et al. 2018), have led to a large number of private dental clinics opting to open accounts on social networks like Instagram and Facebook.

During the recent COVID-19 pandemic, part of the population in Serbia delayed going to the dentist even during urgent situations (Nikolić et al. 2023), which, among other things, highlights the importance of teledentistry - a branch of telemedicine (Ghai, 2020; Wolf et al. 2022), and raises the question of the importance of indirect communication between patients and dentists, which can be achieved through social networks (Holden, 2017).

As future academic citizens, students are expected to be open to a multidisciplinary approach to anything and recognize the importance of linking different areas of knowledge in solving complex problems (Braxton et al. 1995; Levi et al. 2014). Many studies (Anderson, 2001; Feng et al. 2019; Puspita et al. 2018; Wang, 2021) indicate that a large number of students use the Internet daily, among other things, to search for health-related information (Escoffery et al. 2005). Recent researches confirm the significant impact of the Internet on students, finding a link between Internet addiction and poor sleep quality among students (Kumar et al. 2022; Mahmoud et al. 2022; Sagar et al. 2022).

Aim

The aim of this research was to examine the attitudes and behaviors of the student population towards dental marketing on Instagram, the patient-dentist relationship via social networks, and information on oral health available on the Internet.

Participants and Methods

The study included 226 students from the University of Niš, with an average age of 22.71 ± 2.45 years, who gave their consent to participate in the survey. The participants were 175 females and 51 males.

The participants were surveyed through an online questionnaire created using Google Forms, to which they voluntarily accessed through social media. The questions were composed in accordance with the research objectives, following the steps of Regmi et al. (2017) for designing and implementing online surveys. The questionnaire consisted of 16 closed-ended questions divided into 4 sections: Section 1 - demographic characteristics (3 questions), Section 2 - the impact of dental marketing on Instagram (5 questions), Section 3 - the dentist-patient relationship through social networks (5 questions), and Section 4 - information on oral health available on the Internet (3 questions) (Table 1). Participants answered the questionnaire without time limitations and selected only one answer per question.

Table 1. Questionnaire divided into 4 sections

Section 1. Demographic characteristics	
1.	What is your gender?
2.	How old are you?
3.	Which university are you studying at?
Section 2. The impact of dental marketing on Instagram	
4.	Do you follow any dental clinic on Instagram?
5.	How often do dental clinic advertisements appear on your Instagram feed?
6.	Have you ever visited a dental clinic because of an advertisement on Instagram?
7.	Do you think it is important for a dental clinic to have an Instagram profile?
8.	Do you think some dental clinics use photoshop on images that represent their work?
Section 3. The dentist-patient relationship through social networks	
9.	Which social media platform do you use most often?
10.	How do you search for a dentist?
11.	Have you ever searched for your dentist on Google?
12.	Are you friends with your dentist on any social media platform?
13.	How do you contact your dentist when you have a question?
Section 4. Informations on oral health available on the Internet	
14.	Do you think that information about oral health available online is professional and reliable?
15.	Have you ever discussed information about oral health that you read online with your dentist?
16.	When you have a problem with your tooth (pain, a fallen filling, a broken tooth, tartar, etc.), do you look for information about it online before scheduling an appointment with your dentist?

The obtained responses were collected and statistically analyzed using non-parametric descriptive statistics methods with IBM SPSS version 26.0. To determine the statistical significance of differences in the responses to the questions by the gender of the participants, their age and the faculty they attend, the Chi-square test with a significance threshold of $p < 0.05$ was used.

Results

The responses to questions 4 to 16 are presented in tables 2-14.

Table 2. Question 4. Do you follow any dental clinic on Instagram?

	No	Yes	I do not use Instagram	Total
Frequency	148	65	13	226
%	65.5	28.8	5.8	100

Table 3. Question 5. How often do dental clinic advertisements appear on your Instagram feed?

	Rarely	Once a week	Never	Once a month	Once a day	Once every few months	I do not use Instagram	Total
Frequency	72	43	38	22	21	17	13	226
%	31.9	19	16.8	9.7	9.3	7.5	5.8	100

Table 4. Question 6. Have you ever visited a dental clinic because of an advertisement on Instagram?

	No	Yes	I do not use Instagram	Total
Frequency	195	18	13	226
%	86.3	8	5.8	100

Table 5. Question 7. Do you think it is important for a dental clinic to have an Instagram profile?

	Yes	No	Total
Frequency	133	93	226
%	58.8	41.2	100

Table 6. Question 8. Do you think some dental clinics use photoshop on images that represent their work?

	Yes	Not sure	No	Total
Frequency	150	66	10	226
%	66.4	29.2	4.4	100

Table 7. Question 9. Which social media platform do you use most often?

	Instagram	TikTok	Facebook	Twiter	Snapchat	I do not use any	Total
Frequency	186	13	12	7	4	4	226
%	82.3	5.8	5.3	3.1	1.8	1.8	100

Table 8. Question 10. How do you search for a dentist?

	I have my own dentist	Through the recommendation of a friend/ acquaintance/ family member	In the student's clinic	Via Google search	I walk into the nearest dentist's office I see	I find a dentist on a social network (Instagram, Facebook,...)	Total
Frequency	145	55	14	5	5	2	226
%	64.2	24.3	6.2	2.2	2.2	0.9	100

Table 9. Question 11. Have you ever searched for your dentist on Google?

	No	Yes	Total
Frequency	147	79	226
%	65	35	100

Table 10. Question 12. Are you friends with your dentist on any social media platform?

	No	Yes	No, I find that inappropriate	Total
Frequency	151	59	16	226
%	66.8	26.1	7.1	100

Table 11. Question 13. How do you contact your dentist when you have a question?

	By phone	I personally go to him	Via Viber/ Whatsapp	Throught social network	Total
Frequency	138	67	14	7	226
%	61.1	29.6	6.2	3.1	100

Table 12. Question 14. Do you think that information about oral health available online is professional and reliable?

	I believe that they are correct, if they were written by doctors	Not sure	I find them to be mostly correct	I find them to be mostly incorrect	Total
Frequency	107	71	33	15	226
%	47.3	31.4	14.6	6.6	100

Table 13. Question 15. Have you ever discussed information about oral health that you read online with your dentist?

	No	Yes	No, because I have never read anything on the Internet about oral health	Total
Frequency	145	58	23	226
%	64.2	25.7	10.2	100

Table 14. Question 16. When you have a problem with your tooth (pain, a fallen filling, a broken tooth, tartar, etc.), do you look for information about it online before scheduling an appointment with your dentist?

	No, I do not look online	No, I make an appointment first, then I look online	Yes	Total
Frequency	106	64	56	226
%	46.9	28.3	24.8	100

Out of 65 respondents who follow a dental clinic on Instagram, only eleven of them went to that clinic because of an Instagram advertisement.

Statistical analysis showed that out of those respondents who think that it is important for a dental clinic to have an Instagram profile, only 10.5% went to a dental clinic because of an advertisement on Instagram.

The majority of respondents who are friends with their dentist on a social network (62.7%) still contact their dentist via phone when they have a question for them.

More than half of the respondents who are not sure about the accuracy of oral health information available on the Internet have never discussed it with their dentist. Nearly 73% of the respondents who believe that this information is generally accurate have also never discussed it with their dentist.

Table 15 shows the values of the chi-square test comparing the responses to questions in relation to the gender of the participants, their age, and the type of faculty they attend.

Table 15. Comparison of answers in relation to demographic characteristics of respondents

Number of question	Gender (male and female)	Aged (18-21, 22-25 and 26-29)	College (natural sciences, social sciences, technological sciences and others)
Q4	$\chi^2=5.629$; DF=2; p=0.060	$\chi^2=6.989$; DF=4; p=0.136	$\chi^2=3.595$; DF=6; p=0.731
Q5	$\chi^2=6.653$; DF=6; p=0.354	$\chi^2=14.499$; DF=12; p=0.270	$\chi^2=13.675$; DF=18; p=0.750
Q6	$\chi^2=1.881$; DF=2; p=0.390	$\chi^2=0.555$; DF=4; p=0.968	$\chi^2=5.068$; DF=6; p=0.535
Q7	$\chi^2=0.413$; DF=1; p=0.521	$\chi^2=3.977$; DF=2; p=0.137	$\chi^2=0.474$; DF=3; p=0.924
Q8	$\chi^2=2.065$; DF=2; p=0.356	$\chi^2=3.751$; DF=4; p=0.441	$\chi^2=2.527$; DF=6; p=0.865
Q9	$\chi^2=8.226$; DF=5; p=0.114	$\chi^2=17.695$; DF=10; p=0.060	$\chi^2=14.316$; DF=15; p=0.655
Q10	$\chi^2=12.378$; DF=5; p=0.030*	$\chi^2=7.610$; DF=10; p=0.667	$\chi^2=15.074$; DF=15; p=0.446
Q11	$\chi^2=8.678$; DF=1; p=0.003*	$\chi^2=1.992$; DF=2; p=0.369	$\chi^2=2.620$; DF=3; p=0.454
Q12	$\chi^2=0.441$; DF=2; p=0.802	$\chi^2=13.662$; DF=4; p=0.008*	$\chi^2=3.624$; DF=6; p=0.727
Q13	$\chi^2=4.335$; DF=3; p=0.227	$\chi^2=11.834$; DF=6; p=0.066	$\chi^2=14.075$; DF=9; p=0.120
Q14	$\chi^2=1.943$; DF=3; p=0.584	$\chi^2=2.253$; DF=6; p=0.895	$\chi^2=7.497$; DF=9; p=0.585
Q15	$\chi^2=0.112$; DF=3; p=0.946	$\chi^2=14.729$; DF=4; p=0.005*	$\chi^2=9.061$; DF=6; p=0.170
Q16	$\chi^2=2.462$; DF=2; p=0.291	$\chi^2=0.295$; DF=4; p=0.990	$\chi^2=1.453$; DF=6; p=0.963

*significance at the level of $p < 0.05$

A statistically significant difference ($p=0.030$) was found between male and female participants in their answers to the question about how they search for a dentist. 3.4% of women and 2% of men search for a dentist through Google search, Instagram, and Facebook. Additionally, a higher percentage of female participants (67.7%) have their own dentist compared to male participants (52.9%), while males (15.7%) more often seek a dentist at the student clinic compared to females (3.4%).

Women statistically significantly more often ($p=0.003$) searched for dentists on Google (40%) compared to men (17.6%).

Although the highest percentage of younger respondents (aged 18-21) are not friends with their dentist on social media (79.1%), a significantly lower ($p=0.008$) percentage of respondents of this age group consider it inappropriate to be friends with their dentist on social media (5.8%), compared to older respondents (aged 26-29) where the percentage is 17.4%.

The statistical analysis also showed that older students (aged 26-29) significantly more often ($p=0.005$) discussed the information on oral health that they read on the Internet with their dentist (52.2%) compared to younger students aged 18-21.

In the analysis of the obtained responses related to the type of faculty that the respondents attended, no statistically significant difference was found in the answers to any of the questions.

Discussion

Survey as a psychometric instrument, despite its drawbacks such as the occurrence of respondents resorting to socially desirable responses which causes the results to represent a report on behavior rather than observation of behavior, still represents an irreplaceable method for quantifying and analyzing differences between people (Singleton et al. 2017).

Although 65% of the respondents do not follow any dental clinic on Instagram, more than three quarters of the examined respondents have seen at least once advertisement for a dental clinic on Instagram. 22.6% of the respondents have never encountered dental clinic advertising on Instagram, 5.8% of which are not Instagram users at all. In the study by Lee et al. (2021)

43.4% of the participants have never been exposed to dental marketing on social media, while the rest have encountered dental clinic advertisements, most commonly (36%) on Instagram.

The study found that only 8% of the respondents visited a dental clinic because of its advertising on Instagram, which differs from the data obtained in the research by Lee et al. (2021) where 22% of the respondents reported contacting a dental clinic because of social network ads. This disagreement can be explained by the fact that in the mentioned study, the question referred to dental clinic ads on social networks in general, not just on Instagram.

60% of the respondents think it is important for a dental office to have an Instagram profile, but only 10% of them visited a dental office because they saw an advertisement on Instagram. Similar to these findings, Alalawi et al. (2019) reported in their study that 77.3% of the participants agreed that having an online presence is important for a dental office. This suggests that there is a prevailing opinion that everything must be present online, regardless of the fact that it cannot influence decision-making.

The obtained results indicate that only 4.4% of the respondents believe that dental offices do not use Photoshop on pictures that represent their work. Such mistrust is likely caused by the significant advancement of image editing software, which is easily accessible to everyone (Ooi et al. 2021).

The results of the study indicate that the majority of participants reported Instagram as their most frequently used social media platform. This is consistent with numerous studies that have shown Instagram to be the most popular social network, particularly among younger users (Ajwa et al. 2018; Huang et al. 2018; Lee et al. 2021). Despite the prevalence of dental marketing on social media (Bhat et al. 2011), particularly on Instagram, only 0.9% of the participants reported using these platforms to find a dentist. More than half of the participants reported having their own dentist, while almost a quarter reported finding a dentist through a recommendation from a friend or acquaintance. Similar to these findings, a study by Khamoushi (2021), where respondents answered questions using a Likert scale, reports that the majority of respondents disagreed with the statement that they would find a dentist on social networks, such as Instagram and Facebook. 85% of the respondents in the mentioned survey state that they agree that they will listen to friends and family when choosing a dentist. In the study by Lee et al. (2021) 61.1% of the respondents would listen to recommendations from friends to select a dentist, while 15.8% of the surveyed individuals would find a dentist through online comments. These results show that for respondents, the recommendation of one satisfied patient whom they know personally is still far more important than hundreds or thousands of positive reviews from unknown people on the Internet.

There is a statistically significant difference ($p=0.030$) between male and female participants in the way they search for a dentist. A small percentage of women will initially seek a dentist through a social network, while no men will do so. There is also a statistically significant difference ($p=0.003$) between male and female participants who searched for their dentist on Google. 50% of women searched for their dentist online, compared to only 17% of men. The explanation for this might be that women, on average, spend more time on social network and the Internet than men (Duggan, 2013). 70% of the participants were not friends with their dentist on social media, and a similar percentage was reported in the study by Parmar et al. (2018), which examined the connection between patients and dentists on Facebook, where 83% of the participants were also not friends with their dentist on any social network. That study also found that 36% of the surveyed patients searched for their dentist online, and 17% added them as a friend. In our study there is a statistically significant difference ($p=0.008$) between the percentage of older participants aged 26-29 (17.4%), compared to participants aged 18-22 (5.8%), who believe that it is inappropriate to be friends with their dentist on social media. The nonformal relationship between a patient and a dentist on social network raises

many ethical questions (Howley, 2019). In the study by Al-Khalifa et al. (2021) which surveyed dentists in Saudi Arabia, about 10% of dentists felt uncomfortable having access to a patient's personal life via social media.

When students have a question for their dentist, 61.1% will contact them via phone, 29.6% will visit them in person, and the remaining 9.3% will contact them via the Internet. Even those participants who are friends with their dentist on a social network will mostly (62.7%) seek the answer to their question through a phone call, while only 12% of them will reach out to their dentist via social media. On the other hand, communication with the dentist via social networks, from the patient's point of view, also has its positive sides. Namely, research by Sivrikaya et al. (2021) showed that dental patients who communicated with the dentist via social networks after an operative treatment were under less stress than those patients who did not.

It has been observed that one third of the participants are not confident in the accuracy of oral health information that can be found on the Internet. Half of them trust the information, but only if they have been written by a dentist. Such data is justified by the large amount of fake news that can be found on the Internet or on social media. Some of them represent conspiracy theories, while others are the wrong interpretation of things or explanations of certain claims based on false evidence (Kanekar et al. 2019).

More than half of the older student population (respondents aged 26-29) will significantly more often ($p=0.005$) discuss the information related to oral health that they have read on the Internet with a dentist, in contrast to the younger ones, where only 16.3% aged 18-21 and 27.4% of those aged 22-25 will ask their dentist about information related to oral health that they have seen on the Internet. This suggests the fact that older respondents tend to verify the information they have obtained on the Internet more often with professionals, which is expected. This is inconsistent with the results of a study by Naganandini et al. (2014) where 66% of respondents stated that they would discuss oral health information they found online with their dentist. The differences in results can be attributed to the fact that Naganandini et al (2014). had an older population for their sample which, as shown, is more inclined to comment on information available on the Internet with their dentist. Dentists, surveyed in the study by Chestnutt et al. (2006) reported that patients most commonly asked them about information related to cosmetic procedures, amalgams, and implants that they had found on the Internet.

Before going to the dentist, 53.1% of our respondents will search the Internet. Due to the significant number of patients who resort to this action, it is of utmost importance that experiences with dentists written by patients on the Internet are truthful and accurately written (Ajwa et al. 2018). The recent COVID-19 pandemic has led to more Internet searches due to the inability to visit dentists, according to Bağcı et al. (2022), especially since it has also affected people's attitudes about when to visit dentists during the pandemic (Nikolić et al. 2022).

By using the Internet, dentists can also influence the reduction of fear of going to the dentist by sharing posts on social media that encourage patients and explain treatment procedures in a language that is understandable to the population without medical education (Gao et al. 2013)

Conclusion

Although almost 60% of the respondents believe that it is important for a dental clinic to have an Instagram profile, only 0.9% of the respondents were looking for their dentist through social media.

Females tend to search for their dentist more frequently on Google, while a quarter of the surveyed respondents are friends with their dentist on social media.

Based on the results provided, it seems that Instagram does not play a crucial role in the selection of dentists among the students, and communication with dentists via social media is

less prevalent than other forms of communication with dentists. Despite the fact that we live in the expansion of the Internet, the word of a satisfied patient, with whom students have a personal relationship, has the greatest influence in terms of choosing a dentist.

When they have a dental problem, more than half of the surveyed students will search for information about it on the Internet, regardless of whether they have previously made an appointment with a dentist or not. Most will not check this information with a dentist. It follows from this that it is important that the information shared on the Internet about oral health, either by the patient or the dentist, be true.

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STAVOVI STUDENATA PREMA DENTALNOM MARKETINGU SA INSTAGRAMA, ONLAJN KOMUNIKACIJI SA STOMATOLOZIMA I INFORMACIJAMA O ORALNOM ZDRAVLJU SA INTERNETA

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Uvod: Informacije o oralnom zdravlju dostupne na internetu, snimci stomatoloških procedura na *YouTube*-u, grupe na *Facebook*-u, čiji su članovi stomatolozi, doprineli su da stomatologija pronade mesto na internetu. Cilj istraživanja je bio ispitivanje stavova i ponašanja studentske populacije prema: dentalnom marketingu sa *Instagram*-a, relaciji pacijent-stomatolog preko društvenih mreža i informacijama o oralnom zdravlju sa interneta. Istraživanjem je obuhvaćeno 226 studenata Univerziteta u Nišu, putem anonimne ankete od 16 pitanja, koja je kreirana u *Google Forms*-u. Svaki šesti ispitanik od onih koji prate neku stomatološku ordinaciju na *Instagram*-u, je izabrao ordinaciju zbog *Instagram*-a. Ženski ispitanici češće pretražuju stomatologe na internetu, za razliku od muških. Većina ispitanika, koji su prijatelji sa stomatolozima na društvenoj mreži, ipak ih najčešće kontaktira telefonom. Najstarijim ispitanicima nije prikladno da budu prijatelji sa stomatolozima na društvenim mrežama. Najveći broj onih, koji su nesigurni u tačnost informacija o oralnom zdravlju sa interneta, ne diskutuje sa stomatologom o njima. *Instagram* ne igra ključnu ulogu u odabiru stomatologa kod ispitanika, a komunikacija sa stomatologom preko društvenih mreža je manje zastupljena od ostalih vidova komunikacije sa stomatologom. Ipak, više od polovine ispitanika konsultuje internet pre odlaska kod stomatologa.

Ključne reči: stomatologija, studenti, internet, društvene mreže, instagram, dentalni marketing