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Determining the Knowledge and Attitude of Medical Intern Students about the Effect of Periodontal Diseases on Systemic Diseases

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ABSTRACT

Background: Periodontal diseases are prevalent chronic multifactorial conditions that significantly affect individuals' quality of life across various dimensions. Additionally, the association and impact of periodontal disease on systemic health have been a focus of medical attention for many years. This influence is particularly recognized as a risk factor in several conditions, notably coronary artery disease. Consequently, enhancing awareness and improving the attitudes of healthcare professionals toward this association is of great importance. Numerous studies have been conducted to evaluate the level of awareness and attitudes regarding this impact. This study has investigated the knowledge and attitude of medical intern students of Kashan University of Medical Sciences.

Methods: In this descriptive study, a knowledge of the effect of periodontal disease on systemic diseases and their attitude towards periodontal in medical interns of Kashan University of Medical Sciences, a total of 160 people who were selected by census method, were investigated using a questionnaire based on the study by Thomas and Pralhad in 2011. The obtained data was analyzed by SPSS software with independent t-tests, one-way analysis of variance, and Pearson's correlation coefficient.

Results: A total of 160 medical interns were surveyed. There was a significant positive correlation between the age of students and their attitude toward periodontal health ($p=0.024$). Additionally, the student's knowledge and attitudes toward periodontal health were not significantly associated with the level of information abo ut periodontal disease or the predominant source of oral health information ($p>0.05$).

Moreover, knowledge of the impact of systemic diseases or conditions on periodontal disease was significantly correlated with awareness of the impact of systemic diseases on periodontal health ($p<0.001$). Furthermore, attitudes toward periodontal health showed a significant positive correlation with knowledge of the systemic impact on periodontal disease ($p<0.01$).

Conclusion: The results of the study indicated that the participant's knowledge regarding the impact of periodontal disease on systemic health is moderate. While the majority of participants assess their knowledge about periodontal issues as insufficient, they believe that clinical and theoretical education related to this topic should be included in the curriculum of their studies. Furthermore, they express a positive attitude toward acquiring more information and education on this matter.

Keywords: Knowledge, Attitude, Periodontal diseases, Systemic diseases

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Introduction

Periodontal disease is an inflammatory disease caused by the confrontation of the body's defense systems with the bacteria present in the microbial plaque (Genco, RJ, & Williams, RC,2010 ;Khabazian et al., 2018 ;Umeizudik et al., 2016). Environmental, physical, and social stresses of the host are effective in the occurrence of the host's immune response against infection. Therefore, they are an important factor in determining the extent and severity of periodontal disease, which justifies the diversity of the severity of the disease among people. Systemic disorders and diseases may reduce a person's immunity against periodontal pathogens by affecting the host's physiology and tissue, intensify and accelerate the disease process, and cause advanced types of periodontitis. Studies have shown that there is a close and two-way relationship between metabolic disorders such as diabetes and periodontitis, so that the severity and prevalence of periodontal disease increases in diabetes (Abrishami et al.,2009.; Liccardo et al., 2019. ; Janket et al., 2003. ; Humphrey et al., 2008; Hasuike et al., 2017; Teshome, & Yitayeh ,2017; Cao R et al., 2017).

Changes in the level of sex hormones occur during pregnancy and sexual development, can cause biological changes in periodontal tissues and increase the severity of gingivitis caused by plaque (Daalderop et al., 2018). Immunological disorders as a result of decreased function or number of leukocytes, especially neutrophils, cause fundamental disturbances in the host's response to microbial invasion, severe periodontal destruction, and premature loss of teeth (Kapellas et al., 2019; Maboudi et al., 2017).

In addition, the use of some drugs such as bisphosphonates, the lack of certain vitamins, and the presence of environmental factors such as stress can increase the susceptibility to periodontal disease. It should not be overlooked that systemic conditions and diseases do not cause periodontal disease by themselves. Rather, they accelerate the disease process (Kashefimehr et al., 2018; Shahhosseini et al., 2019 &; Sedrak et al., 2019).

Some of these effects are due to the pathophysiological relationship between systemic conditions and periodontal disease, and some are the result of lifestyle changes. A person who faces the stress of losing loved ones and shows its consequences in the surrounding tissues of the tooth. On the other hand, in another parallel mechanism, this distress and stress affect a person's lifestyle (for example, health and alcohol and drug addiction) and worsen periodontal conditions (Reners & Brecx, M, 2007).

Periodontal disease (PD) is one of the nine accepted risk factors for cardiovascular diseases (Liccardo et al., 2019 ; Humphrey et al., 2008; Helfand et al.,2009). Periodontal treatment has a beneficial effect on some biochemical parameters, which indicates a cardiovascular risk (Roca et al.,2018).

Studies have shown that non-surgical periodontal treatment has a positive effect on reducing the serum level of C-reactive protein. Finally, today PD is accepted as a risk factor for cardiovascular disease (Freitas et al.,2010; Ioannidou et al.,2006).

The present study aims to determine the knowledge and attitude of medical intern students of Kashan University of Medical Sciences about the effect of periodontal diseases on systemic diseases in 1402.

Methods

This study is a cross-sectional descriptive analytical type and a questionnaire tool is used to collect datan. In this research, sampling was not done and all the people of the research community were used as a census. The studied population included 160 medical interns of Kashan University of Medical Sciences.

After obtaining the code of ethics and sending a letter to the respected director of Shahid Beheshti Hospital in Kashan, the researcher prepared a list of all interns, who were about 160 people according to the announced number. Therefore, the research community included all the medical

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interns of Kashan University of Medical Sciences in 1402 who were doing their internship in Shahid Beheshti Hospital.

Data collection tools and methods

Questionnaires were distributed and completed virtually and in person. The sample subjects studied in this research were medical intern students of Kashan University of Medical Sciences, mostly from the 95th and 96th entries, and their contact number information (after the necessary coordination) was received from the medical education unit of the university in the form of an Excel file and a link to the questionnaire. The press release was sent to them through Telegram, SMS and ITA applications. The researcher delivered the physical version of the questionnaires by being in the hospital and referring to the subjects after explaining the purpose of the research and ensuring the confidentiality of the data. The researcher received data after completion of questionnaires.

The distribution, sending and completion of the questionnaires were done in June and July 1402 by sharing the electronic version of the questionnaire through messengers and attending the Shahid Beheshti Hospital in Kashan. Data were collected first from library sources and articles, and then from a questionnaire. The questionnaire of this research was used in a similar study by Arabi et al.(Arabi , 2021)

In order to confirm the validity of the questionnaire, face validity method was used and to confirm the reliability of the questionnaire, it was completed by 10 respondents, and using the Kuder-Richardson method, the questions of the knowledge part were evaluated for validity, which was confirmed according to the calculation of the reliability coefficient of 0.73. Then, by entering the results of attitude spectrum questions into SPSS software and calculating Cronbach's alpha of 0.78, their reliability was evaluated, which was satisfactory. In the present study, to measure the validity of the questions included in the questionnaire, the content validity method was used, and the questionnaire was given to several doctors and dentists, and finally, after making corrections, it was approved by them. Then, to measure the reliability of the questionnaire, a sample of 20 interns was used to estimate Cronbach's alpha, which was equal to 0.83, which indicated the appropriate reliability of the questionnaire. The questionnaire consisted of three parts.

First part, demographic questions

In the first part, demographic characteristics of the subject were recorded. In this section, the respondent's sex, age, and estimation of the adequacy or insufficiency of his information about periodontal diseases were asked. He also stated in the source where he received the information.

The second part, measuring awareness

The questions of the knowledge section were divided into three parts:

• First, in 4 multiple-choice questions, the questioner's knowledge about periodontal diseases in general was measured.

Scoring and grading method: The knowledge questions were scored in such a way that 1 point was given to each question if the correct answer was marked. The grades were according to the table below. If needed, the authors interpreted the questions individually from the level (0.33-0) as poor, (0.34-0.66) as moderate, and (0.67-1) as good.

The third part, measuring the attitude: in the last part of the questionnaire, which was dedicated to the evaluation of the attitude of the sample, five-choice questions with a Likert scale (including completely disagree, disagree, have no opinion, agree, completely agree) were used.

Scoring: Numbers 1 to 5 were assigned to the 5-option Likert scale answers from completely disagree to completely agree. Although there are 8 questions in this section, the minimum score will be 8 and the maximum score will be 40.

If the average score was in the range of 8-16, the attitude was negative.

If the average score was in the range of 16-32,

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the attitude was neutral.

If the average score was between 32 and 40, the attitude was positive.

The data collected by the doctors were entered into the SPSS statistics software, and for data analysis, the mean and standard deviation were calculated, frequency distribution tables were prepared, and bar graphs and histograms were drawn for descriptive purposes, as well as independent t-tests, Pearson's correlation coefficient, One-way analysis of variance was used for analytical purposes.

Results

A total of 160 intern students of Kashan University of Medical Sciences participated in this research. The table of descriptive data of the researched students can be seen in Table1 along with frequency and frequency percentage, standard deviation and mean.

the number of participating male and female students was equal. The average age of the students was 25.32 ± 3.50. Only 19 students (12.1%) admitted that their knowledge about periodontal disease was sufficient. Furthermore, more than half of the students stated that they got most of the oral and dental health information from social networks.

The findings showed that the average score of students' general knowledge of periodontal disease was 2.32±0.93 (out of 4 marks), which actually took nearly 60% of the maximum score (10 marks). (Table 1)

Table 1. Descriptive characteristics of the studied students

Frequency variable	**(Percentage) / standard deviation ± mean (minimum maximum)**	
Gender	Man	80(50)
	Woman	80(50)
Age (years)	(40-21) 25.3±32.5	
Amount of information about periodontal disease (self-assessment)*	Enough	19(12.1)
	Insufficient	138(87.9)
The dominant source of oral and dental health information	Radio and TV	23(14.5)
	Social networks	86 (54.1)
	Books and articles	23(14.5)
	Retraining courses	7(4.4)
	Other	20(12.6)

* Three people did not respond to this variable. / # one person did not respond to this variable.

The average score of students' knowledge of the effect of disease or systemic conditions on the development or exacerbation of periodontal disease was 6.90±2.33 (out of 10 points), which was nearly 70% of the ceiling. 10 points was allocated to it.

The average score of students' knowledge of the effect of periodontal disease on the development or exacerbation of disease or systemic conditions was 3.20±2.31 (out of 8 scores), which was actually less than 50% of the ceiling. 8 points was allocated to its.(Table 2)

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Table 2. Distribution of students' answers regarding knowledge of the effect of diseases, systemic conditions, and risk factors on the development or exacerbation of periodontal disease

Disease or systemic condition	N (%) Knowledge of the effect of disease or systemic conditions on the development disease	N(%) Knowledge of the effect of risk factors on the development
Hospital acquired pneumonia	105 (65.6%)	-
Coronary heart disease	76 (47.5%)	-
Stroke	45 (28.1%)	-
Peripheral arterial disease	60 (37.5%)	-
Premature birth or low birth weight	86 (53.8%)	-
Diabetes mellitus/poor sugar control	67 (41.9%)	-
CKD (Chronic Kidney Disease)	44 (27.5%)	95 (59.4%)
Erectile dysfunction	30 (18.8%)	-
Smoking	-	155 (96.9%)
HIV/AIDS	-	130 (81.3%)
Diabetes Mellitus	-	130 (81.3%)
Leukemia	-	102 (63.7%)
Stress	-	106 (66.3%)
Hyperparathyroidism	-	83 (51.9%)
Down syndrome	-	73 (45.6%)
Pregnancy	-	93 (58.1%)
Nutritional deficiencies	-	138 (86.3%)
Mean ± SD		
Mean and standard deviation of total score: Knowledge of the effect of disease or systemic conditions	**3.20 ± 2.31**	-
Mean and standard deviation of total score: Knowledge of the effect of risk factors	-	**6.90 ± 2.33**

The average score of students' attitude towards periodontal health was 33.10±3.69 (out of 40 points), which actually achieved more than 80% of the maximum score (40 points). (Table 3)

Table 3. mean and standard deviation of students' attitudes towards periodontal health

Attitude	Mean ± SD
I think regular periodontal examination of patients is important.	4.27 ± 0.64
I think it is important to ask patients about their oral and dental problems.	4.37 ± 0.60
In my opinion, patients should be referred for a general oral and dental routine examination.	4.12 ± 0.82
In my opinion, patients should be referred for oral and dental care when they express oral/dental discomfort.	4.23 ± 0.87
In my opinion, the specialist doctor should follow up the treatment results after referring the patients to the periodontal specialist.	3.78 ± 0.90
In my opinion, theory training in oral and dental health is necessary in the academic course.	4.14 ± 0.63
In my opinion, it is necessary to have clinical training for gum and teeth examination in the academic course.	4.16 ± 0.74
In my opinion, medical and dental students should be trained to work together.	4.03 ± 0.85
The total attitude score	33.10 ± 3.69

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Knowledge of periodontal disease in general had no significant relationship with other variables (p>0.05). Also, knowledge of the effect of disease or systemic conditions on periodontal disease had a significant positive relationship with knowledge of the effect of disease or systemic conditions on periodontal disease (p<0.001). In addition, the attitude towards periodontal had a significant positive relationship with the knowledge of the effect of disease or systemic conditions on periodontal disease and the knowledge of the effect of disease or systemic conditions on periodontal disease (p<0.01). (Table 4)

Table 4. Correlation matrix between students' knowledge and attitude towards periodontal

1	Knowledge of the basics of periodontal disease	1	0.078 (0.326)	-	-
2	Knowledge of the impact of disease or systemic conditions on periodontal disease	0.479 (0.000)	1	-	-
3	Knowledge of the impact of periodontal disease on systemic disease or conditions	-0.121 (0.126)	0.479 (0.000)	1	0.259 (0.001)
4	Attitude towards periodontal health	-0.039 (0.627)	0.306 (0.000)	0.259 (0.001)	1

The average knowledge of periodontal disease among female students was significantly higher than that of male students (p=0.028). Also, there was a significant positive relationship between students' age and attitude towards periodontal health (p=0.024). In addition, the knowledge and attitude of students towards periodontal had no significant relationship with the variables of the amount of information about periodontal disease and the dominant source of receiving oral and dental health information (p>0.05). (Table 5)

Table 5. Correlation of students' awareness and attitude towards periodontal with demographic variables

Variable	Knowledge of the basics of periodontal disease (Mean ± SD)	Awareness of the impact of disease or systemic conditions on periodontal disease (Mean ± SD)	Knowledge of the impact of periodontal disease on systemic disease or conditions (Mean ± SD)	Attitude towards periodontal health (Mean ± SD)
Man	2.16 ± 0.97	6.66 ± 2.17	3.56 ± 2.26	32.67 ± 3.60
Woman	2.49 ± 0.87	7.15 ± 2.47	2.85 ± 2.32	33.52 ± 3.74
P-value*	0.028	0.188	0.051	0.144
Correlation coefficient (Age)	0.027	0.132	-0.027	0.179
P-value	0.734	0.097	0.735	0.024
Enough information about periodontal disease	2.26 ± 0.99	7.79 ± 2.68	3.74 ± 2.98	34.52 ± 3.42
Insufficient information	2.32 ± 0.93	6.85 ± 2.25	3.17 ± 2.22	32.90 ± 3.72
P-value*	0.784	0.097	0.430	0.073
Radio and TV	2.74 ± 1.14	6.91 ± 1.97	3.87 ± 2.34	31.77 ± 2.72
Social networks	2.22 ± 0.87	6.67 ± 2.46	3.02 ± 2.38	33.32 ± 4.05
Books and articles	2.35 ± 1.07	7.61 ± 1.40	3.00 ± 2.02	33.65 ± 3.83
Retraining courses	2.28 ± 0.75	8.43 ± 1.27	4.14 ± 2.73	33.71 ± 2.43
Other	2.30 ± 0.80	6.75 ± 2.95	3.15 ± 2.21	32.75 ± 3.02
P-value*	0.233	0.196	0.445	0.401

* Independent t-test/ ** Correlation test/ *** ANOVA

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Discussion

The average score for knowledge of periodontal basics (based on the first 4 questions) was 2.32 out of 4, which was considered average.

The average score for awareness of the impact of systemic conditions on gum disease was 6.9 out of 10, indicating a good level of understanding. Additionally, the average score for understanding the impact of periodontal disease on systemic health was 2.3 out of 8, which was also considered average. Also, the average attitude score of this study was 1.33 out of 40, so the attitude of the examined medical interns was considered positive. While general knowledge was average, only 30.6% of the sample correctly answered the first symptom of periodontal disease, suggesting a lack of theoretical knowledge that may impact their performance in basic gum examinations. Regarding the awareness of the influence of systemic conditions on periodontal disease, the items of smoking, nutritional deficiencies, HIV/AIDS and diabetes mellitus had obtained the maximum score. The fact that smoking has become the most well-known condition that imposes adverse effects on periodontal is not too far from the expectation. This was demonstrated in a study by Kohind et al., which found that smoking had the highest impact score among internal residents in Nigerian residents (Umeizudike KA, Iwuala SO, Ozoh OB, Ayanbadejo PO, Fasanmade OA,. 2016). In the case of diabetes, the result was considered significant. These results were consistent with the study by Arabi et al (Arabi, 2021). Considering the high prevalence of diabetes among systemic diseases, there was usually more awareness of it. This heightened awareness was crucial due to its impact on the quality of life of patients, which brings a sense of satisfaction.

The least awareness of the impact of PD on systemic health was assigned to erectile dysfunction, which was in line with Arabi's study (Arabi , 2021). This problem might be because it was a newer issue with fewer established scientific sources available in addition to the fact that this disease was less focused on the two mentioned medical specialties.

In this research, there was a significant positive relationship between students' age and attitude towards periodontal health (p=0.024). In this respect, this study was consistent with the findings of Gholami et al. (Gholami et al.,2011) in the study of general practitioners in Zahedan. The results obtained by Zaghian (Zaghian et al., 2018) et al. were also similar, except that in this study, gender did not show a significant relationship with the level of knowledge of specialists.

Another noteworthy point in the obtained results was that the said score was not high in other diseases included in the questionnaire, specifically three chronic kidney diseases, diabetes and lung, which should be taken into consideration. (especially in the case of diabetes, which accepting this relationship and its possible mechanism was widely accepted and more common than the others; unfortunately, due to the change in lifestyle, special attention should be paid.

One reason for the difference between the average level of awareness in this study and the low level of awareness in Gore's study (Khabazian et l.,2018 ; Gur &, Majra J, 2011) may be due to more information and attention of the public mind towards these diseases, and of course it seems necessary to mention that the results were similar to the findings by Kashifi Fer. (Kashefimehr et al., 2018) which was consistent in assessing the level of knowledge of Tabriz cardiologists about the impact of PD on systemic diseases and Arabs (Arabi ,2021) among internal specialists.

The average attitude score (33.1±3.69) out of 40 was evaluated as positive which indicated the understanding of the importance of periodontal diseases among the mentioned medical interns. It was also observed among these students that the average score of the questions regarding the importance of oral and dental diseases (questions 1 and 2, attitude) was more than 3.4, which was consistent with the results of the research of Kashifi Far et al.(Kashefimehr et al.,2016) who stated: "80% of experts believed that medical and

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dental students should be trained to work together." However, it was inconsistent with an Arabic study (Arabi , 2021) that gave the highest priority to inter-sectoral cooperation.

While most of the respondents (87.9%) assessed their knowledge of periodontal as insufficient, most of them had a positive attitude towards the theory and clinical training of gum examination. Another interesting point was that the people who had evaluated their information as sufficient compared to the people who had stated that it was insufficient, had significantly more knowledge of periodontal generalities (P-value <001), which was the case in the planning of institutions in charge of policies. Healthcare deserves to be considered.

Most of the respondents (54.1%) mentioned social networks as the dominant source of their periodontal information, followed by radio, television, books and articles equally (14.5%).

In this study, the average knowledge of periodontal disease among female students was significantly higher than that of male students (p=0.028). In addition, the knowledge and attitude of students towards periodontal had no significant relationship on the variables of the amount of information about periodontal disease and the dominant source of receiving oral and dental health information (p>0.05).

This disparity was probably due to female interns paying more attention to oral and dental diseases and male and female interns expressing almost equal attention to the sources of receiving oral and dental information.

The average score of knowledge of generalities was significantly higher in people who mentioned social networks as the main source of receiving their periodontal information than other groups, which was inconsistent with the results of an Arabic study (Arabi, 2021).

It was noted that books and articles are the primary sources of periodontal information. As a result, two hypotheses can be derived from these findings. First, social networks have played a more active role in disseminating information on scientific topics, and there has been an increase in the participation of young people in social media and virtual spaces. Additionally, another study suggested that individuals who rely on text as their primary source of information demonstrated a greater commitment to learning about science. Second, it was observed that educational content related to internal medicine and cardiology was not readily available to specialists in these fields on social networks.

With the above evaluations, the retraining courses have shown the weakest results, which is a cause for concern for the scientific community and educational groups, and it is necessary to think of necessary measures to improve the educational content and educational activities.

The limitations of this research were access to medical interns due to the dispersion of classrooms and training rounds, and in addition, the interns sometimes did not show a desire to participate in the research.

Conclusion

In general, the results of the study showed that the level of knowledge of medical interns regarding the definitions and effects of systemic conditions on the gums is good, and their knowledge about the effect of periodontal disease on systemic health is average. Meanwhile, most of the people studied did not receive sufficient and coherent information, and evaluated their knowledge about periodontal as insufficient

Therefore, it is recommended to make students interested in a team and interdisciplinary treatment of patients by holding effective training courses and improving the educational content for all medical and dental groups. In order to increase Resilience of the society, a more practical solution is to teach students and the community through the web. You can write a product-oriented proposal in this field and consider teaching through the web, so that people can learn through the phone.

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Conflicts of interest

The authors declared no conflict of interests.

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Ethical considerations

In order to conduct this research, after receiving the code of ethics things such as the principle of voluntary participation in completing the questionnaire and observing the principle of confidentiality in collecting and analyzing information according to the recommendation of the Ethics Committee of Kashan University of Medical Sciences were taken into consideration. The reminder of these items was included in the introduction of the questionnaire according to the suggested format.

Code of ethics

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Authors' Contributions

This article is based on a master's thesis in general dentistry completed under the supervision of Professor M.M., with F.A. as the corresponding author, and final editing and submission by N.K., at Kashan University of Medical Sciences.

All the authors read and approved the final paper and were responsible for any questions related to the paper.

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