

Evaluation of family physicians' knowledge, attitudes and awareness on orthodontic treatments and oral health

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ABSTRACT

Aims: This study aims to evaluate the knowledge, attitudes, and awareness of family physicians regarding orthodontic treatments and oral health, which are primary aspects of general healthcare services.

Methods: This descriptive study was conducted in 2023 with the participation of 309 family physicians from Diyarbakir and surrounding provinces. A total of 20 questions, including 16 questions to assess knowledge of orthodontic treatments and oral health, and 4 sociodemographic questions, were administered online to the participating physicians.

Results: Among the physicians who participated in the study, 69.58% had over six years of professional experience, and 65.05% examined more than 51 patients per day. It was observed that 33.01% of the physicians had knowledge about orthodontic treatments. Of the physicians in our study, 24.92% recommended an annual oral and dental examination, while 32.36% reported that they referred patients with observed dental crowding during clinical examinations to an orthodontist/specialist. A statistically significant relationship was found between professional experience and both orthodontic awareness and the likelihood of providing oral hygiene care recommendations to patients ($p < 0.05$).

Conclusion: Regular in-service training sessions should be provided to family physicians to enhance their knowledge and awareness of oral and dental health, orthodontic malocclusions, and preventive and interceptive treatments.

Keywords: Family physician, public health, orthodontics, oral health

INTRODUCTION

Oral and dental health is widely recognized as an essential component of overall health. Oral and dental diseases can adversely affect general health by causing pain, nutritional deficiencies, and disrupted sleep quality. Furthermore, the high costs associated with dental disease treatment impose a significant burden on healthcare systems, impacting the health economy negatively.¹

In recent years, significant advancements have been made in both medical and dental treatment methods. However, regardless of how advanced these methods become, prevention remains the most critical tool in the fight against disease.²

The aim of preventive dentistry is to identify potential dental issues at an early stage and implement precautionary measures. Despite being largely preventable, dental caries remains a prevalent issue due to insufficient tooth brushing and is still considered a major public health concern in some societies. Tooth decay can lead to pain and nutritional challenges during the deciduous tooth period and can predispose individuals to further caries in permanent teeth. In this context, preventive

dentistry practices serve as an effective approach to reducing the incidence of caries.³ Another consequence of inadequate tooth brushing is the development of gum diseases, which can ultimately result in tooth loss. Early diagnosis of these diseases is crucial for both the effectiveness and cost-efficiency of treatment.⁴

The preventive orthodontic approach is a crucial component of preventive dentistry, aiming to prevent potential disorders in the teeth and jaw. These practices include placeholder applications following the early loss of deciduous teeth in children aged 0-15, extraction of molars and deciduous teeth to facilitate the eruption of permanent teeth, correction of simple crossbites with inclined plane aligners, and intervention to prevent harmful oral habits.⁵

A family physician is a primary care provider who delivers comprehensive and continuous healthcare services regardless of patients' age, gender, or specific health conditions.⁶ Oral and dental health assessments should not be overlooked during routine examinations in family medicine. It is

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essential for family physicians to take a holistic approach by assessing patients' oral and dental health, offering appropriate recommendations, and referring patients to a dentist when necessary. Research indicates that primary healthcare providers play a pivotal role in promoting oral and dental health.⁷

This study aims to increase family physicians' awareness of oral health, dental health, and orthodontic issues, while also informing health policies focused on enhancing the population's overall oral and dental health. Additionally, it seeks to support the development of preventive and interceptive orthodontic treatments.

METHODS

This study received approval from the Batman University Clinical Researches Ethics Committee (Date: 31.01.2024, Decision No: 2024/01-22). The research was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Through a review of previous studies and publications on family medicine, oral health, and dental health, key topics essential for family physicians' knowledge of oral health and orthodontics were identified. Survey questions were then developed based on these topics.⁸⁻¹¹

This is a cross-sectional study involving 309 family physicians (88 women, 221 men) aged between 27 and 62 years from Diyarbakir and its neighboring provinces, all of whom voluntarily completed our online questionnaire. The questionnaire was created using Google Forms and shared with doctors who volunteered to participate in the study through a link, ensuring the confidentiality of their responses.

In the first part of the questionnaire, sociodemographic information such as gender, age, weekly working hours, number of patients examined per day, and years of experience in the profession were recorded. The second part included questions assessing the attitudes and behaviors of family physicians regarding oral examinations and recommendations for oral care. Finally, the third part consisted of questions aimed at evaluating the level of knowledge of family physicians concerning the diagnosis, management, and prevention of orthodontic problems in patients. The survey questions are shown in [Table 1](#).

Statistical Analysis

The data obtained in this study were analyzed using IBM SPSS Statistics Version 21 package program. Frequency analysis of the study variables was conducted, with results presented as frequencies and percentages.

Chi-square analysis was used to examine the relationships between groups of nominal variables. For 2x2 tables, Fisher's Exact Test was applied when the expected cell frequencies were insufficient, while for RxC tables, Pearson's Chi-square analysis was conducted using Monte Carlo simulation.

A significance level of 0.05 was set for the interpretation of the results.

Table 1. Survey questions						
Do you recommend annual oral and dental examinations for adults?	None	Very little	Little	Middle	Good	Very good
Do you advise your patients on oral hygiene care?	None	Very little	Little	Middle	Good	Very good
Do you give advice to parents about their children's oral hygiene care?	None	Very little	Little	Middle	Good	Very good
Do you perform the first intraoral examination on babies immediately after birth?	None	Very little	Little	Middle	Good	Very good
Do you refer children to the dentist after their first baby teeth erupt?	None	Very little	Little	Middle	Good	Very good
Do you recommend night feeding with a bottle for babies?	None	Very little	Little	Middle	Good	Very good
Do you recommend fluoride toothpaste for families?	None	Very little	Little	Middle	Good	Very good
Can you give advice on oral hygiene care during pregnancy?	None	Very little	Little	Middle	Good	Very good
Do you know the specialties of dentistry?	None	Very little	Little	Middle	Good	Very good
Do you know about orthodontic treatments?	None	Very little	Little	Middle	Good	Very good
In your clinical examinations, do you refer your patients with a history of 'joint pain, noise coming from the joint area' to orthodontists?	None	Very little	Little	Middle	Good	Very good
Do you evaluate your patients with a history of 'mouth breathing' in your clinical examinations in terms of dental and gingival health?	None	Very little	Little	Middle	Good	Very good
Do you refer your patients with a history of 'thumb sucking' in your clinical examinations to orthodontists?	None	Very little	Little	Middle	Good	Very good
Do you refer your patients with a history of 'sleep apnea' in your clinical examinations to orthodontists?	None	Very little	Little	Middle	Good	Very good
Do you refer your patients who have a history of 'wrong swallowing' in your clinical examinations to orthodontists?	None	Very little	Little	Middle	Good	Very good
Do you refer your child/adult patients to orthodontists when you notice crowding in their teeth during your clinical examinations?	None	Very little	Little	Middle	Good	Very good

RESULTS

In our study, 10.03% of the participants were between 24 and 30 years of age, 48.87% were between 31 and 40 years of age, and 41.1% were over 41 years of age. Additionally, 28.48% of the participants were women, and 71.52% were men.

Of the physicians who completed our questionnaire, 69.58% had more than 6 years of professional experience, and 65.05% examined more than 51 patients per day ([Figure 1, 2](#)).

While 24.92% of the study participants recommend annual oral and dental examinations for adults, 27.18% recommend oral hygiene care for their patients ([Table 2](#)).

A total of 30.42% of the physicians provide recommendations to parents regarding the oral hygiene care of their children. However, only 21.86% of the physicians referred children to a dentist after the eruption of the first deciduous teeth ([Table 2](#)).

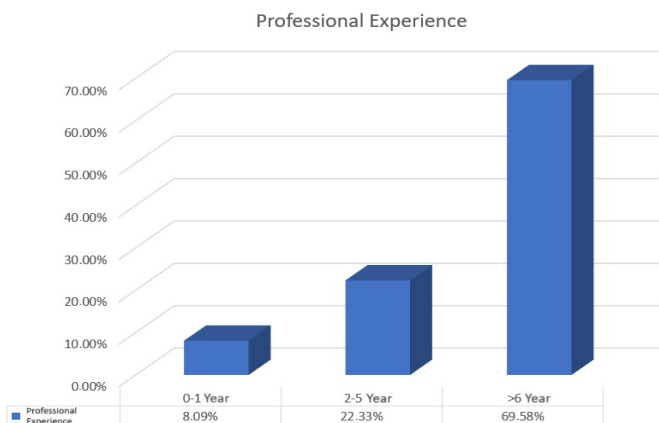


Figure 1. Scatter graph for professional experience

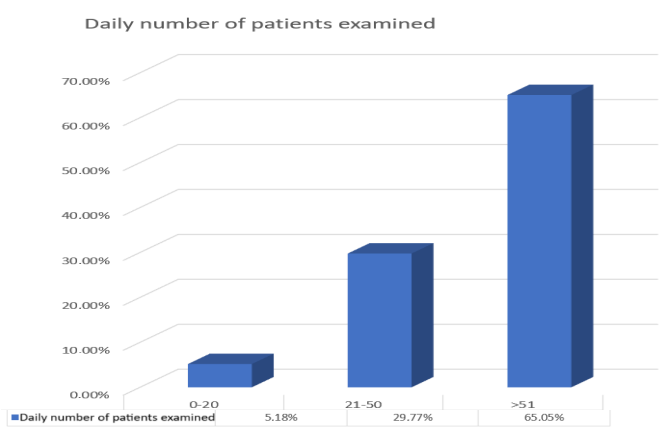


Figure 2. Scatter plot of number of patients

Approximately half of the physicians did not recommend bottle-feeding at night (Table 2).

Overall, 26.21% of the physicians did not recommend fluoride toothpaste to families (Table 3).

Overall, 23.95% of the physicians make recommendations regarding oral hygiene care during pregnancy (Table 3). Additionally, 21.36% of the participating physicians conduct the first oral examination of infants immediately after birth, at a moderate level (Table 4).

Among the physicians participating in the study, 30.01% were aware of the specialty branches of dentistry. The percentage of physicians with knowledge of orthodontic treatments was moderate, at 33.01% (Table 5).

Overall, 27.83% of the physicians did not refer patients with a history of 'joint pain or noise coming from the joint area' to an orthodontist during clinical examinations (Table 5).

Of the physicians who participated in the study, 23.3% evaluated their patients with a history of 'mouth breathing' for dental and gingival health during clinical examinations (Table 6).

The percentage of physicians who referred their patients with a history of 'finger sucking' to an orthodontist during clinical examinations was found to be low, at 26.54% (Table 6).

Overall, 31.39% of the physicians referred their patients with a history of 'sleep apnea' to an orthodontist during clinical examinations. (Table 6).

Table 2. Distribution of evaluations regarding orthodontic treatments and oral health

	None		Very little		Little		Middle		Good		Very good		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Do you recommend annual oral and dental examinations for adults?	17	5.5	58	18.77	57	18.45	77	24.92	53	17.15	47	15.21	309	100
Do you advise your patients on oral hygiene care?	13	4.21	44	14.24	53	17.15	84	27.18	72	23.3	43	13.92	309	100
Do you give recommendations to parents about their children's oral hygiene care?	7	2.27	28	9.06	43	13.92	79	25.57	94	30.42	58	18.77	309	100
Do you perform the first intraoral examination on babies immediately after birth?	40	12.94	64	20.71	41	13.27	66	21.36	62	20.06	36	11.65	309	100
Do you refer children to the dentist after their first milk teeth erupt?	62	20.06	83	26.86	68	22.01	45	14.56	29	9.39	22	7.12	309	100
Do you recommend bottle feeding at night?	170	55.02	82	26.54	32	10.36	22	7.12	2	0.65	1	0.32	309	100

Table 3. Distribution of evaluations regarding orthodontic treatments and oral health

	None		Very little		Little		Middle		Good		Very good		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Do you recommend fluoride toothpaste for families?	81	26.21	47	15.21	40	12.94	64	20.71	56	18.12	21	6.8	309	100
Do you make recommendations about oral hygiene care during pregnancy?	36	11.65	41	13.27	43	13.92	74	23.95	65	21.04	50	16.18	309	100
Do you know the specialties of dentistry?	6	1.94	33	10.68	38	12.3	93	30.1	81	26.21	58	18.77	309	100
Do you know about orthodontic treatments?	12	3.88	52	16.83	52	16.83	102	33.01	60	19.42	31	10.03	309	100
Do you refer your patients with a history of 'joint pain. sound coming from the joint area' to orthodontist/orthodontic specialist in your clinical examinations?	86	27.83	61	19.74	43	13.92	49	15.86	47	15.21	23	7.44	309	100
Do you evaluate your patients with a history of 'mouth breathing' in your clinical examinations in terms of dental and gingival health?	46	14.89	55	17.8	65	21.04	72	23.3	47	15.21	24	7.77	309	100
Do you refer your patients with a history of 'finger sucking' in your clinical examinations to an orthodontist/orthodontic specialist?	69	22.33	82	26.54	50	16.18	43	13.92	41	13.27	24	7.77	309	100
Do you refer your patients with a history of 'sleep apnea' in your clinical examinations to an orthodontist/orthodontic specialist?	94	30.42	97	31.39	50	16.18	32	10.36	24	7.77	12	3.88	309	100
Do you refer your patients with a history of 'wrong swallowing' in your clinical examinations to an orthodontist/orthodontic specialist?	100	32.36	89	28.8	48	15.53	38	12.3	25	8.09	9	2.91	309	100
Do you refer your child/adult patients to orthodontist/orthodontics specialist when you notice crowding in their teeth during your clinical examinations?	16	5.18	25	8.09	22	7.12	50	16.18	100	32.36	96	31.07	309	100

Table 4. Relationships between age group and orthodontic treatments and oral health assessments

	Age									Chi-square test	
	24-30		31-40		>41		Total		Chi-square	p	
	n	%	n	%	n	%	n	%			
Do you recommend annual oral and dental examinations for adults?	None	1	3.23	7	4.64	9	7.09	17	5.5	16.417	0.088
	Very little	11	35.48	31	20.53	16	12.6	58	18.77		
	Little	3	9.68	32	21.19	22	17.32	57	18.45		
	Middle	11	35.48	31	20.53	35	27.56	77	24.92		
	Good	3	9.68	26	17.22	24	18.9	53	17.15		
	Very good	2	6.45	24	15.89	21	16.54	47	15.21		
	Total	31	100	151	100	127	100	309	100		
Do you advise your patients on oral hygiene care?	None	0	0	7	4.64	6	4.72	13	4.21	24.569	0.006
	Very little	9	29.03	23	15.23	12	9.45	44	14.24		
	Little	8	25.81	25	16.56	20	15.75	53	17.15		
	Middle	10	32.26	46	30.46	28	22.05	84	27.18		
	Good	4	12.9	27	17.88	41	32.28	72	23.3		
	Very good	0	0	23	15.23	20	15.75	43	13.92		
	Total	31	100	151	100	127	100	309	100		
Do you give recommendations to parents about their children's oral hygiene care?	None	0	0	4	2.65	3	2.36	7	2.27	*	0.027
	Very little	4	12.9	13	8.61	11	8.66	28	9.06		
	Little	6	19.35	25	16.56	12	9.45	43	13.92		
	Middle	14	45.16	39	25.83	26	20.47	79	25.57		
	Good	6	19.35	39	25.83	49	38.58	94	30.42		
	Very good	1	3.23	31	20.53	26	20.47	58	18.77		
	Total	31	100	151	100	127	100	309	100		
Do you perform the first intraoral examination on babies immediately after birth?	None	2	6.45	22	14.57	16	12.6	40	12.94	11.877	0.293
	Very little	12	38.71	26	17.22	26	20.47	64	20.71		
	Little	4	12.9	21	13.91	16	12.6	41	13.27		
	Middle	6	19.35	33	21.85	27	21.26	66	21.36		
	Good	7	22.58	28	18.54	27	21.26	62	20.06		
	Very good	0	0	21	13.91	15	11.81	36	11.65		
	Total	31	100	151	100	127	100	309	100		
Do you refer children to the dentist after their first milk teeth erupt?	None	6	19.35	29	19.21	27	21.26	62	20.06	11.328	0.333
	Very little	6	19.35	42	27.81	35	27.56	83	26.86		
	Little	4	12.9	34	22.52	30	23.62	68	22.01		
	Middle	10	32.26	21	13.91	14	11.02	45	14.56		
	Good	4	12.9	13	8.61	12	9.45	29	9.39		
	Very good	1	3.23	12	7.95	9	7.09	22	7.12		
	Total	31	100	151	100	127	100	309	100		

Overall, 32.36% of the physicians referred their patients with a history of 'improper swallowing' to an orthodontist (Table 6).

A total of 32.36% of the physicians refer their pediatric and adult patients to an orthodontist when they notice crowding in the teeth during clinical examinations, at a good level (Table 6).

A statistically significant relationship was found between age group and all evaluations (p<0.05) (Table 4-6).

A statistically significant relationship was found between professional experience and the recommendation of annual oral and dental examinations for adults (p<0.05). There was

also a statistically significant difference between 44% of the new family physicians and the other groups regarding the recommendation of annual oral and dental examinations for adults (Table 7).

A statistically significant correlation was found between professional experience and making recommendations to patients about oral hygiene care (p<0.05). Among family physicians, 28% of those with 0-1 years of experience, 24.64% of those with 2-5 years of experience, and 27.91% of those with more than 6 years of experience make moderate recommendations to their patients about oral hygiene care (Table 7).

Table 5. Relationships between age group and orthodontic treatments and oral health assessments											
	Age								Chi-square test		
	24-30		31-40		>41		Total		Chi-square	p	
	n	%	n	%	n	%	n	%			
Do you recommend bottle feeding at night?	None	10	32.26	78	51.66	82	64.57	170	55.02	*	0.071
	Very little	12	38.71	44	29.14	26	20.47	82	26.54		
	Little	5	16.13	13	8.61	14	11.02	32	10.36		
	Middle	4	12.9	13	8.61	5	3.94	22	7.12		
	Good	0	0	2	1.32	0	0	2	0.65		
	Very good	0	0	1	0.66	0	0	1	0.32		
	Total	31	100	151	100	127	100	309	100		
Do you recommend fluoride toothpaste for families?	None	6	19.35	39	25.83	36	28.35	81	26.21	9.485	0.487
	Very little	8	25.81	18	11.92	21	16.54	47	15.21		
	Little	4	12.9	23	15.23	13	10.24	40	12.94		
	Middle	4	12.9	33	21.85	27	21.26	64	20.71		
	Good	8	25.81	25	16.56	23	18.11	56	18.12		
	Very good	1	3.23	13	8.61	7	5.51	21	6.8		
	Total	31	100	151	100	127	100	309	100		
Do you make recommendations about oral hygiene care during pregnancy?	None	1	3.23	20	13.25	15	11.81	36	11.65	28.239	0.002
	Very little	11	35.48	20	13.25	10	7.87	41	13.27		
	Little	6	19.35	22	14.57	15	11.81	43	13.92		
	Middle	5	16.13	42	27.81	27	21.26	74	23.95		
	Good	4	12.9	23	15.23	38	29.92	65	21.04		
	Very good	4	12.9	24	15.89	22	17.32	50	16.18		
	Total	31	100	151	100	127	100	309	100		
Do you know the specialties of dentistry?	None	0	0	3	1.99	3	2.36	6	1.94	*	0.33
	Very little	4	12.9	18	11.92	11	8.66	33	10.68		
	Little	6	19.35	22	14.57	10	7.87	38	12.3		
	Middle	10	32.26	40	26.49	43	33.86	93	30.1		
	Good	8	25.81	34	22.52	39	30.71	81	26.21		
	Very good	3	9.68	34	22.52	21	16.54	58	18.77		
	Total	31	100	151	100	127	100	309	100		
Do you know about orthodontic treatments?	None	0	0	7	4.64	5	3.94	12	3.88	12.866	0.231
	Very little	6	19.35	22	14.57	24	18.9	52	16.83		
	Little	9	29.03	30	19.87	13	10.24	52	16.83		
	Middle	8	25.81	52	34.44	42	33.07	102	33.01		
	Good	7	22.58	26	17.22	27	21.26	60	19.42		
	Very good	1	3.23	14	9.27	16	12.6	31	10.03		
	Total	31	100	151	100	127	100	309	100		
Do you refer your patients with a history of 'joint pain, sound coming from the joint area' to orthodontist/orthodontic specialist in your clinical examinations?	None	7	22.58	47	31.13	32	25.2	86	27.83	9.117	0.521
	Very little	7	22.58	33	21.85	21	16.54	61	19.74		
	Little	5	16.13	17	11.26	21	16.54	43	13.92		
	Middle	7	22.58	25	16.56	17	13.39	49	15.86		
	Good	4	12.9	18	11.92	25	19.69	47	15.21		
	Very good	1	3.23	11	7.28	11	8.66	23	7.44		
	Total	31	100	151	100	127	100	309	100		

It was observed that physicians who made recommendations to parents regarding the oral hygiene care of their children had more than 6 years of professional experience, with a statistically significant difference ($p < 0.05$) (Table 7).

Although a significant proportion of physicians do not refer children to a dentist after the eruption of the first deciduous

teeth, it was found that this rate decreases with increasing professional experience, with a statistically significant difference ($p < 0.05$) (Table 7).

A statistically significant correlation was found between professional experience and making recommendations regarding oral hygiene care during pregnancy ($p < 0.05$).

Table 6. Relationships between age group and orthodontic treatments and oral health assessments

	Age								Chi-square test		
	24-30		31-40		>41		Total		Chi-square	p	
	n	%	n	%	n	%	n	%			
Do you evaluate your patients with a history of 'mouth breathing' in your clinical examinations in terms of dental and gingival health?	None	2	6.45	27	17.88	17	13.39	46	14.89	16.687	0.082
	Very little	9	29.03	30	19.87	16	12.6	55	17.8		
	Little	8	25.81	34	22.52	23	18.11	65	21.04		
	Middle	7	22.58	25	16.56	40	31.5	72	23.3		
	Good	4	12.9	21	13.91	22	17.32	47	15.21		
	Very good	1	3.23	14	9.27	9	7.09	24	7.77		
	Total	31	100	151	100	127	100	309	100		
Do you refer your patients with a history of 'finger sucking' in your clinical examinations to an orthodontist/orthodontic specialist?	None	4	12.9	37	24.5	28	22.05	69	22.33	5.171	0.879
	Very little	11	35.48	41	27.15	30	23.62	82	26.54		
	Little	6	19.35	24	15.89	20	15.75	50	16.18		
	Middle	3	9.68	20	13.25	20	15.75	43	13.92		
	Good	4	12.9	17	11.26	20	15.75	41	13.27		
	Very good	3	9.68	12	7.95	9	7.09	24	7.77		
	Total	31	100	151	100	127	100	309	100		
Do you refer your patients with a history of 'sleep apnea' in your clinical examinations to an orthodontist/orthodontic specialist?	None	7	22.58	45	29.8	42	33.07	94	30.42	10.536	0.395
	Very little	13	41.94	47	31.13	37	29.13	97	31.39		
	Little	2	6.45	27	17.88	21	16.54	50	16.18		
	Middle	4	12.9	17	11.26	11	8.66	32	10.36		
	Good	5	16.13	8	5.3	11	8.66	24	7.77		
	Very good	0	0	7	4.64	5	3.94	12	3.88		
	Total	31	100	151	100	127	100	309	100		
Do you refer your patients with a history of 'wrong swallowing' in your clinical examinations to an orthodontist/orthodontic specialist?	None	7	22.58	52	34.44	41	32.28	100	32.36	*	0.617
	Very little	11	35.48	44	29.14	34	26.77	89	28.8		
	Little	6	19.35	17	11.26	25	19.69	48	15.53		
	Middle	2	6.45	22	14.57	14	11.02	38	12.3		
	Good	4	12.9	11	7.28	10	7.87	25	8.09		
	Very good	1	3.23	5	3.31	3	2.36	9	2.91		
	Total	31	100	151	100	127	100	309	100		
Do you refer your child/adult patients to orthodontist/orthodontics specialist when you notice crowding in their teeth during your clinical examinations?	None	2	6.45	9	5.96	5	3.94	16	5.18	21.564	0.017
	Very little	2	6.45	16	10.6	7	5.51	25	8.09		
	Little	5	16.13	11	7.28	6	4.72	22	7.12		
	Middle	9	29.03	27	17.88	14	11.02	50	16.18		
	Good	9	29.03	48	31.79	43	33.86	100	32.36		
	Very good	4	12.9	40	26.49	52	40.94	96	31.07		
	Total	31	100	151	100	127	100	309	100		

None of the family physicians with 2-5 years of experience (15.94%) or those with over 6 years of experience (11.63%) made recommendations regarding oral hygiene care during pregnancy (Table 8).

A statistically significant correlation was found between professional experience and referring pediatric/adult patients to an orthodontist when crowding in their teeth was noticed during clinical examinations (p<0.05). While 36% of family physicians with 0-1 years of experience, 30.43% with 2-5 years of experience, and 32.56% with more than 6 years of experience referred their pediatric/adult patients to an orthodontist for crowding, 8.7% of those with 2-5 years of experience and

4.65% of those with more than 6 years of experience did not refer their patients in such cases (Table 9).

There was no statistically significant relationship between professional experience and the other evaluations (p>0.05).

DISCUSSION

Oral and dental health is recognized as an integral part of general health services by the World Health Organization (WHO), aiming to protect overall health and promote a healthy life. The family medicine system, recognized as primary health care, encompasses both preventive and treatment services.¹²

Table 7. The relationship between professional experience and orthodontic treatments and oral health assessments											
		How many years have you been working as a family physician?						Chi-square test			
		0-1 year		2-5 year		>6 year		Total		Chi-square	p
		n	%	n	%	n	%	n	%		
Do you recommend annual oral and dental examinations for adults?	None	0	0	3	4.35	14	6.51	17	5.5	*	0.023
	Very little	7	28	21	30.43	30	13.95	58	18.77		
	Little	4	16	12	17.39	41	19.07	57	18.45		
	Middle	11	44	13	18.84	53	24.65	77	24.92		
	Good	3	12	10	14.49	40	18.6	53	17.15		
	Very good	0	0	10	14.49	37	17.21	47	15.21		
	Total	25	100	69	100	215	100	309	100		
Do you advise your patients on oral hygiene care?	None	1	4	2	2.9	10	4.65	13	4.21	*	0.022
	Very little	5	20	17	24.64	22	10.23	44	14.24		
	Little	8	32	14	20.29	31	14.42	53	17.15		
	Middle	7	28	17	24.64	60	27.91	84	27.18		
	Good	4	16	11	15.94	57	26.51	72	23.3		
	Very good	0	0	8	11.59	35	16.28	43	13.92		
	Total	25	100	69	100	215	100	309	100		
Do you give recommendations to parents about their children's oral hygiene care?	None	0	0	1	1.45	6	2.79	7	2.27	*	0.038
	Very little	5	20	8	11.59	15	6.98	28	9.06		
	Little	6	24	12	17.39	25	11.63	43	13.92		
	Middle	9	36	21	30.43	49	22.79	79	25.57		
	Good	4	16	16	23.19	74	34.42	94	30.42		
	Very good	1	4	11	15.94	46	21.4	58	18.77		
	Total	25	100	69	100	215	100	309	100		
Do you perform the first intraoral examination on babies immediately after birth?	None	2	8	12	17.39	26	12.09	40	12.94	10.111	0.431
	Very little	9	36	13	18.84	42	19.53	64	20.71		
	Little	4	16	9	13.04	28	13.02	41	13.27		
	Middle	4	16	17	24.64	45	20.93	66	21.36		
	Good	6	24	11	15.94	45	20.93	62	20.06		
	Very good	0	0	7	10.14	29	13.49	36	11.65		
	Total	25	100	69	100	215	100	309	100		
Do you refer children to the dentist after their first milk teeth erupt?	None	4	16	15	21.74	43	20	62	20.06	20.85	0.022
	Very little	4	16	19	27.54	60	27.91	83	26.86		
	Little	4	16	16	23.19	48	22.33	68	22.01		
	Middle	11	44	8	11.59	26	12.09	45	14.56		
	Good	1	4	8	11.59	20	9.3	29	9.39		
	Very good	1	4	3	4.35	18	8.37	22	7.12		
	Total	25	100	69	100	215	100	309	100		

Guidance from family physicians and patient education can help prevent potential problems, provide treatment opportunities, and increase patient awareness. In this regard, primary health care institutions play a crucial role.^{13,14}

In a study conducted on the knowledge, attitudes, and practices of orthodontic patients regarding their treatment, it was observed that although the majority of patients had good knowledge, their attitudes toward orthodontic treatment and their related practices were not as favorable.¹⁵

In another study, it was found that patients who were informed about oral health issues had significantly more positive attitudes toward fixed orthodontic treatment and oral hygiene. The study also suggested that information-provision

strategies could be effective in promoting positive attitudes and increasing awareness within the community".¹⁶

The literature has reported what family physicians should know about oral and dental health.^{8,9,17} The aim of this study was to investigate family physicians' knowledge not only about oral and dental health but also about orthodontic awareness, the presence of orthodontic problems, the necessity of treatment, their awareness of parafunctional habits that may lead to orthodontic issues, and whether they refer their patients for orthodontic treatment.

Within the scope of our study, many family physicians participated via an online survey. There are several survey-based studies aimed at evaluating the awareness and

Tablo 8. The relationship between professional experience and orthodontic treatments and oral health assessments

	How many years have you been working as a family physician?									Chi-square test	
	0-1 year		2-5 year		>6 year		Total		Chi-square		
	n	%	n	%	n	%	n	%			
Do you recommend bottle feeding at night?	None	10	40	28	40.58	132	61.4	170	55.02	*	0.094
	Very little	7	28	24	34.78	51	23.72	82	26.54		
	Little	4	16	9	13.04	19	8.84	32	10.36		
	Middle	4	16	6	8.7	12	5.58	22	7.12		
	Good	0	0	1	1.45	1	0.47	2	0.65		
	Very good	0	0	1	1.45	0	0	1	0.32		
	Total	25	100	69	100	215	100	309	100		
Do you recommend fluoride toothpaste for families?	None	6	24	15	21.74	60	27.91	81	26.21	*	0.911
	Very little	4	16	14	20.29	29	13.49	47	15.21		
	Little	4	16	11	15.94	25	11.63	40	12.94		
	Middle	5	20	14	20.29	45	20.93	64	20.71		
	Good	5	20	12	17.39	39	18.14	56	18.12		
	Very good	1	4	3	4.35	17	7.91	21	6.8		
	Total	25	100	69	100	215	100	309	100		
Do you make recommendations about oral hygiene care during pregnancy?	None	0	0	11	15.94	25	11.63	36	11.65	22.902	0.011
	Very little	6	24	16	23.19	19	8.84	41	13.27		
	Little	5	20	10	14.49	28	13.02	43	13.92		
	Middle	9	36	13	18.84	52	24.19	74	23.95		
	Good	3	12	10	14.49	52	24.19	65	21.04		
	Very good	2	8	9	13.04	39	18.14	50	16.18		
	Total	25	100	69	100	215	100	309	100		
Do you know the specialties of dentistry?	None	0	0	2	2.9	4	1.86	6	1.94	*	0.295
	Very little	2	8	11	15.94	20	9.3	33	10.68		
	Little	7	28	7	10.14	24	11.16	38	12.3		
	Middle	8	32	16	23.19	69	32.09	93	30.1		
	Good	5	20	21	30.43	55	25.58	81	26.21		
	Very good	3	12	12	17.39	43	20	58	18.77		
	Total	25	100	69	100	215	100	309	100		
Do you know about orthodontic treatments?	None	0	0	3	4.35	9	4.19	12	3.88	*	0.313
	Very little	3	12	15	21.74	34	15.81	52	16.83		
	Little	8	32	8	11.59	36	16.74	52	16.83		
	Middle	8	32	21	30.43	73	33.95	102	33.01		
	Good	6	24	16	23.19	38	17.67	60	19.42		
	Very good	0	0	6	8.7	25	11.63	31	10.03		
	Total	25	100	69	100	215	100	309	100		
Do you refer your patients with a history of 'joint pain, sound coming from the joint area' to orthodontist/orthodontic specialist in your clinical examinations?	None	4	16	24	34.78	58	26.98	86	27.83	*	0.454
	Very little	6	24	16	23.19	39	18.14	61	19.74		
	Little	4	16	9	13.04	30	13.95	43	13.92		
	Middle	7	28	10	14.49	32	14.88	49	15.86		
	Good	3	12	6	8.7	38	17.67	47	15.21		
	Very good	1	4	4	5.8	18	8.37	23	7.44		
	Total	25	100	69	100	215	100	309	100		

knowledge levels of family physicians regarding oral and dental health.^{10,11,18}

It was observed that only a small proportion of the physicians participating in our study recommended annual dental examinations (24.92%), while the majority did not recommend oral hygiene care (35.6%).

Rabiei et al.¹¹ reported that the majority of non-dentist physicians lack sufficient knowledge about oral and dental health, emphasizing the need for training in this field.

According to the treatment protocol published by the American Academy of Pediatric Dentistry (AAPD) in 2018, the first dental visit should occur between the 6th and 12th

Table 9. The relationship between professional experience and orthodontic treatments and oral health assessments

	How many years have you been working as a family physician?									Chi-square test	
	0-1 year		2-5 year		>6 year		Total		Chi-square	p	
	n	%	n	%	n	%	n	%			
Do you evaluate your patients with a history of 'mouth breathing' in your clinical examinations in terms of dental and gingival health?	None	1	4	15	21.74	30	13.95	46	14.89	15.702	0.108
	Very little	7	28	17	24.64	31	14.42	55	17.8		
	Little	7	28	14	20.29	44	20.47	65	21.04		
	Middle	6	24	12	17.39	54	25.12	72	23.3		
	Good	4	16	6	8.7	37	17.21	47	15.21		
	Very good	0	0	5	7.25	19	8.84	24	7.77		
	Total	25	100	69	100	215	100	309	100		
Do you refer your patients with a history of 'finger sucking' in your clinical examinations to an orthodontist/orthodontic specialist?	None	3	12	15	21.74	51	23.72	69	22.33	5.828	0.83
	Very little	8	32	18	26.09	56	26.05	82	26.54		
	Little	6	24	12	17.39	32	14.88	50	16.18		
	Middle	4	16	7	10.14	32	14.88	43	13.92		
	Good	3	12	9	13.04	29	13.49	41	13.27		
	Very good	1	4	8	11.59	15	6.98	24	7.77		
	Total	25	100	69	100	215	100	309	100		
Do you refer your patients with a history of 'sleep apnea' in your clinical examinations to an orthodontist/orthodontic specialist?	None	5	20	20	28.99	69	32.09	94	30.42	*	0.245
	Very little	8	32	26	37.68	63	29.3	97	31.39		
	Little	3	12	6	8.7	41	19.07	50	16.18		
	Middle	5	20	8	11.59	19	8.84	32	10.36		
	Good	4	16	6	8.7	14	6.51	24	7.77		
	Very good	0	0	3	4.35	9	4.19	12	3.88		
	Total	25	100	69	100	215	100	309	100		
Do you refer your patients with a history of 'wrong swallowing' in your clinical examinations to an orthodontist/orthodontic specialist?	None	4	16	23	33.33	73	33.95	100	32.36	*	0.362
	Very little	8	32	25	36.23	56	26.05	89	28.8		
	Little	4	16	5	7.25	39	18.14	48	15.53		
	Middle	5	20	8	11.59	25	11.63	38	12.3		
	Good	3	12	5	7.25	17	7.91	25	8.09		
	Very good	1	4	3	4.35	5	2.33	9	2.91		
	Total	25	100	69	100	215	100	309	100		
Do you refer your child/adult patients to orthodontist/orthodontics specialist when you notice crowding in their teeth during your clinical examinations?	None	0	0	6	8.7	10	4.65	16	5.18	*	0.038
	Very little	2	8	8	11.59	15	6.98	25	8.09		
	Little	5	20	4	5.8	13	6.05	22	7.12		
	Middle	6	24	14	20.29	30	13.95	50	16.18		
	Good	9	36	21	30.43	70	32.56	100	32.36		
	Very good	3	12	16	23.19	77	35.81	96	31.07		
	Total	25	100	69	100	215	100	309	100		

month of life, following the eruption of the first deciduous tooth.¹⁹ In our study, 26.86% of the participating physicians believed that the first dental examination should occur immediately after the eruption of a child's first teeth, which aligns with the findings of other studies.²⁰⁻²²

Cleft palate and pediatric syndromes can lead to sleep apnea by restricting mouth opening and neck movements, enlarging the tongue, and obstructing the airway. Therefore, it is crucial to perform an oral cavity examination in newborns to identify and address potential life-threatening risks.²³ Among the physicians who participated in our study, 21.36% reported performing an oral cavity examination after delivery, which was considered a moderate rate.

The use of fluoride toothpaste is recommended by the AAPD.²⁴ In our study, the proportion of physicians who did not recommend fluoride toothpaste to families was lower than those who did recommend it. Additionally, a significant relationship was found between years of professional experience and the likelihood of recommending fluoride toothpaste. This finding is consistent with previous studies.^{22,25}

During pregnancy, oral and dental health is as important as the health of other tissues and organs. Numerous studies have shown that oral and dental health issues during the prenatal period, particularly periodontal diseases and dental caries, may be associated with certain pregnancy complications.^{26,27} Therefore, in primary care family medicine practices, it is

essential to assess the oral and dental health of all pregnant women, educate them on proper oral hygiene, and refer them to a dentist when necessary.²⁸ However, in our study, only 23.95% of the physicians provided recommendations to pregnant women regarding oral and dental health.

In our study, 30.01% of family physicians had a moderate level of knowledge about the specialty branches of dentistry, while the proportion of physicians who were knowledgeable about orthodontic treatments was lower than those who lacked such knowledge. Studies have reported that physicians often acquire insufficient knowledge and skills in oral health during their education and training.^{29,30}

Early diagnosis of parafunctional habits, such as thumb sucking, abnormal swallowing, and mouth breathing, and referral to the appropriate specialist is crucial for ensuring optimal oral hygiene, preventing the costs of orthodontic treatment, and avoiding potential complications.³¹⁻³³ A study conducted with pediatricians found that physicians with more than 21 years of professional experience increased the rate of referring patients with dental and jaw problems to orthodontists by 12.75%.³⁴

A study on dentists reported that physicians with more than 6 years of professional experience had a higher rate of diagnosing and being aware of orthodontic problems.³⁵

In our study, the increase in awareness of orthodontic problems and the rate of patient referral to orthodontists with increasing professional experience among family physicians was statistically significant ($p < 0.05$). This finding aligns with the results of the study by Büyük et al.,³⁶ in which the orthodontic awareness of family physicians was examined.

Similar to our study, other studies have found that the number of medical practitioners performing oral, dental, and maxillofacial examinations during routine check-ups is low.³⁴⁻³⁶

CONCLUSION

As a result of our study, we observed that family physicians have below-average knowledge and awareness of general oral and dental health, as well as orthodontic problems and their early treatment. To improve the public's oral health on a broader scale, cooperation between dentists and physicians from all medical specialties is essential.

Family medicine, as a primary health care institution, plays a critical role in preventive dentistry, early detection, and treatment of orthodontic problems and parafunctional habits. To enhance knowledge and improve practices, training seminars, online courses, webinars, and informational brochures or books on basic oral and dental health, as well as orthodontic treatments, should be organized by orthodontists.

Undergraduate and/or specialty training curricula for medical doctors can be enriched with oral and dental health education. Joint clinical studies or rotation programs with orthodontists, as well as multidisciplinary meetings and case discussions, can also be organized. A combination of these approaches may be effective in enhancing the orthodontic knowledge and awareness of family physicians. Expanding

training and practical opportunities is crucial for physicians to more effectively identify orthodontic problems and guide patients appropriately.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Batman University Clinical Researches Ethics Committee (Date: 31.01.2024, Decision No: 2024/01-22).

Informed Consent

Written informed consent forms were obtained from physicians in the study.

Peer Review Process

External peer review.

Conflict of Interest Declaration

The authors have no conflict of interest to declare.

Financial Disclosure

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Author Contributions

All the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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