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Original Article

## Health status and visit reasons for children attending the Pediatric Dentistry department in damascus university, damascus, Syria: A retrospective study

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## ABSTRACT

**Objectives:** This study aimed to discuss the health status and treatment requirements of children visiting the Department of Pediatric Dentistry at the Faculty of Dentistry.**Materials and Methods:** A retrospective study included the records of patients attending the Department of Pediatric Dentistry, from November 29, 2021, to December 14, 2023.**Results:** The study reviewed 2417 patient records, excluding 312. The majority of patients were primary school children aged 6 – <12, primarily from Rif-Dimashq governorate. About 18 % displayed negative behavior during examinations, and 8 % had special health care needs. The most frequent type of disability was medical disabilities, followed by neurological disorders, with percentages of 40.2 % and 28.9 %, respectively. Dental caries were the primary reason for visits, with a mean of  $3.94 \pm 3.13$ . A negative association was found between the number of decayed teeth and the following: age classification, visit year, and Salviou-Tinawi scale. The percentage of males who came for cosmetic problems was higher than females at 57.2 % and 42.8 %, respectively.**Conclusions:** The Department of Pediatric Dentistry at the Faculty of Dentistry, Damascus University, is a public dental clinic that is visited by patients from all governorates, providing free specialized treatments.**Clinical relevance:** Unmet dental needs are a significant issue for both healthy children and those with special health care needs. The Department of Pediatric Dentistry serves as a research and educational center, offering comprehensive dental treatments to children from all socioeconomic backgrounds. Therefore, understanding the dental needs of children is crucial for providing effective support.

## 1. Introduction

In Syria, children's dental health often receives inadequate attention from parents/caregivers due to various reasons, including the high cost of dental treatment, lack of education on the importance of dental care and children's treatment needs (Al Habashneh et al., 2012), and sometimes neglect until pain arises. Syrian children experience a high prevalence of dental caries, a primary reason for seeking dental care (Ballouk and Dashash 2019a). Additionally, they typically maintain an improper diet, consuming high levels of sugars (Jaghasi, Hatahet, and Dashash, 2012), which worsens oral health issues.

Dental services in Syria are frequently not covered by health insurance plans. However, numerous public clinics in Damascus offer free dental treatments such as restorations, extractions, and some endodontic

procedures.

Regarding pediatric dentistry, the Department of Pediatric Dentistry at the Faculty of Dentistry, Damascus University, under the Ministry of Higher Education and Research, serves as the sole public clinic in Damascus providing specialized dental care for children and individuals with special health care needs.

Currently, there are no published studies addressing the reasons for children's visits to the Department of Pediatric Dentistry at Damascus University or their health status. Therefore, this study aims to elucidate the health status and treatment needs of children attending the Department of Pediatric Dentistry at the Faculty of Dentistry, University of Damascus.

**Abbreviations:** MCD, Al-Monaqel classification for disabilities; DPD, Department of Pediatric Dentistry; SHCN, Special health care needs; ADHD, attention deficit hyperactivity disorder; ADD, attention deficit disorder.

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## 2. Materials and Methods

This retrospective study included the records of patients who attended the Department of Pediatric Dentistry at the Faculty of Dentistry, University of Damascus, from November 29, 2021, to December 14, 2023.

Ethical approval was obtained from the Ethics Committee and the Board of Scientific Research at the Faculty of Dentistry, Damascus University, as well as from the Ministry of Higher Education and Research.

The Department of Pediatric Dentistry offers dental services to children aged 0 to 18 years from diverse socioeconomic backgrounds. It also caters to individuals of all ages with special health care needs. The department receives funding from Damascus University and operates under the auspices of the Ministry of Higher Education and Research.

The services provided are entirely free for routine check-ups, preventive procedures, extractions, endodontic and restorative treatments, while fixed and removable prosthetics and orthodontic devices are offered at nominal fees.

The included records were obtained from the department's archive. Each record contains arrival date, demographic information, medical history with relevant documents, and current medications. Additionally, oral examination findings, previous treatments with evaluations, the main complaint, and current treatment needs were recorded.

Data were recorded by first- and second-year master's student in pediatric dentistry during their rotations. Following data recording, x-rays, additional examinations, or consultations were requested as necessary. Subsequently, appointments were scheduled for patients to receive the appropriate treatment.

In cases involving uncooperative children or individuals with special health care needs, they are enrolled in the sedation or general anesthesia program. It is important to note that sedation or general anesthesia procedures are conducted at the Maxillofacial Surgery Hospital affiliated with the Faculty of Dentistry, Damascus University, and are provided free of charge.

A total of 2729 records were obtained meticulously screened by a single author. Duplicates, empty entries, and records with missing data (such as age, oral examination findings, initial diagnosis, and unreadable information) were excluded. Subsequently, the data were entered and organized using the Microsoft Excel 2021 program. A thorough review of the data was conducted post-entry to ensure the reliability of the variables.

Demographic information includes name, age, gender, residence, and phone number. Children's ages were categorized into five groups according to the World Health Organization (WHO, 2013) as follows: I) 0 – <3 years, II) 3 – <6, III) 6 – <12, IV) 12 – <16, and V) 16 – <18.

Health status was divided into two categories: healthy and special health care needs. Special health care needs were further classified into five categories developed by Prof. Almonaqel for this study and adopted in the Department of Pediatric Dentistry, University of Damascus. These categories are:

1. Neurological disorders, including mental retardation, cerebral palsy, cerebral atrophy, brain injuries, brain tumors, epilepsy, hypoxia, and craniostenosis.
2. Sensory impairments, such as auditory, visual, and speech impairments.
3. Behavioral disorders, including autism, oppositional defiant disorder (ODD), conduct disorder (CD) and attention deficit hyperactivity disorder (ADHD).
4. Medical disabilities include chronic respiratory diseases, blood diseases, kidney diseases, cancers, allergies, digestive tract problems, pituitary gland disorders, thyroid disorders, and adrenal disorders.
5. Developmental or congenital impairments include syndromes, congenital heart diseases, and lip and/or palate clefts.

One of the features of the Al-Monaqel classification for disabilities (MCD) is to facilitate the management of patients with disabilities.

Moreover, the reasons for visiting the Pediatric Dentistry Department were classified according to the initial diagnosis into seven categories, which are mentioned as follows: 1) soft tissue lesions, 2) dental caries, 3) missing teeth, 4) functional problems, 5) pain, 6) routine checks, and 7) cosmetic problems.

Soft tissue lesions includes oral mucosa diseases, frenum problems, and tongue diseases.

The reason of dental caries indicates the presence of dental caries in its various stages. In this study, presence of a cavitated lesion on the tooth surface is considered caries, whether it is primary caries or recurrent caries. All permanent and primary teeth that contain cavitated lesions were recorded.

The reason for missing teeth indicates the following: delayed eruption of permanent teeth, previous extraction and the need for a space maintainer, and impacted teeth.

Functional problems refer to malocclusions, temporomandibular disorders, bruxism, oral habits, and the need for orthodontic appliances.

The reason for pain refers to cases in which pain is the main complaint, for example, irreversible pulpitis, abscesses that manifest as obvious swelling and asymmetry in the face, and some cases of dental trauma. Previous cases are usually transferred directly to the relevant personnel.

The reason for routine checks refers to patients who either come for follow-up or without an obvious dental complaint. Oral examinations are performed for these patients, and they are usually referred to receive preventive procedures such as fluoride and sealants.

The reason for cosmetic problems includes cases that affect esthetics, for example, previous dental trauma, developmental dental defects, and stains.

To classify children's behavior, the modified Frankl Behavior Rating Scale was used, which includes five categories: 1) obvious negative, 2) negative, 3) hesitant, 4) positive, and 5) obvious positive.

This study was conducted and reported according to STROBE guidelines for observational studies (Von Elm et al., 2007).

Data was analyzed using IBM SPSS statistics version 26. Descriptive statistics were implemented. Independent-Samples T Test, ANOVA, and Pearson's correlation tests were used. A p-value of < 0.05 was considered significant at a 95 % confidence level.

## 3. Results

A total of 2417 records were included in this study, and 312 records were excluded, Fig. 1. Each record represented one patient. The records date from November 29, 2021, to December 14, 2023; 53 % of records were in 2023.

The patients ranged in age from 1.5 to 45 years, with a mean age of  $8.56 \pm 3.53$ . The percentages of male and female patients were (50.1 % and 49.9 %, respectively), Table 2.

The most frequent age group was primary school children aged 6 to under 12, which represented about (60 %) of the entire sample size. More than half of the patients (58.7 %) were coming from Rif-Dimashq governorate. Almost (18 %) of the patients showed negative and obvious negative behavior during oral examination procedures, while nearly (62 %) showed positive and obvious positive behavior. The prevalence of patients with special health care needs (SHCN) was (8 %), Table 1.

When screening the number of decayed teeth variable in the records, it was found that 57 patients (about 2 %) had missing numbers due to uncooperative behavior. Generally, the mean number of decayed teeth was  $3.94 \pm 3.13$ , Table 2.

The number of patients who had at least one cavity was 2191, meaning the prevalence of caries within the study sample was (92.83 %).

The most frequent type of disabilities in the group of patients with SHCN was medical disabilities, followed by neurological disorders, with

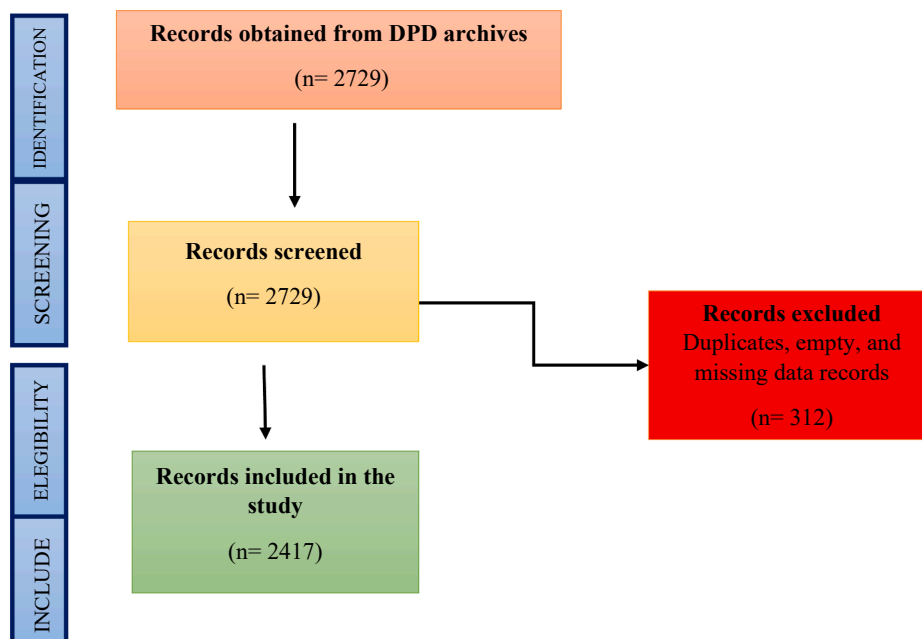


Fig. 1. Flowchart shows the stages of selecting records.

**Table 1**  
Descriptive statistics of sex, age classification, governorate name, Salvioiv-Tinawi scale, and health status.

	variables	Frequency	Percent	Cumulative Percent
sex	male	1211	50.1	50.1
	female	1206	49.9	100.0
Age classification	0 – <3	20	0.8	0.8
	3 – <6	515	21.3	22.1
	6 – <12	1455	60.2	82.3
	12 – <16	366	15.1	97.5
	16 – <18	32	1.3	98.8
	≥18	29	1.2	100.0
Governorate name	Damascus	869	36.0	36.0
	Rif-Dimashq	1419	58.7	94.7
	Al-Qunaitra	35	1.4	96.1
	Hama	3	0.1	96.2
	Daraa	33	1.4	97.6
	Deir ez-Zur	17	0.7	98.3
	Al-Hasakah	10	0.4	98.7
	As-Suwayda	13	0.5	99.3
	Homs	4	0.2	99.4
	Ar-Raqqah	3	0.1	99.5
	Latakia	2	0.1	99.6
	Tartus	3	0.1	99.8
	Qamishli	1	0.0	99.8
	Aleppo	5	0.2	100.0
	Salvioiv-Tinawi scale	Obvious negative	105	4.3
Negative		328	13.6	17.9
Hesitant		490	20.3	38.2
Positive		1444	59.7	97.9
Obvious positive		50	2.1	100.0
Health status	Healthy	2223	92.0	92.0
	SHCN	194	8.0	100.0
	Total	2417	100.0	

percentages of (40.2 %, and 28.9 %, respectively), [Table 3](#).

The most frequent condition within medical disabilities' category was asthma, with a percentage of (42.3 %), while the most frequent disorder within neurological disorders' category was mental retardation, followed by epilepsy, with percentages of (37.5 % and 23.2 %, respectively), [Table 4](#).

**Table 2**  
Descriptive statistics of the number of decayed teeth.

N	Valid	2360
	Missing	57
Mean		3.94
Median		3.00
Std. Deviation		3.133
Range		20
Minimum		0
Maximum		20

**Table 3**  
Descriptive statistics of Al-X classification of disabilities.

MCD		Frequency	Valid Percent
Children with SHCN	Neurological disorders	56	28.9
	Sensory impairments	10	5.2
	Behavioral disabilities	25	12.9
	Medical disabilities	78	40.2
	Congenital impairments	25	12.9
Total		194	100.0

When screening the reasons of DPD visits, it was found that dental caries was the most frequent reason among the rest of the reasons, followed by pain, with percentages of (63.8 % and 24.3 %, respectively), [Table 5](#).

When comparing the means of the number of decayed teeth between males and females, no significant differences were found ( $P > 0.05$ ). However, the mean number of decayed teeth among the healthy group was lower than the mean of the SHCN group with significant differences ( $3.89 \pm 3.127$ , and  $4.51 \pm 3.158$ , respectively), [Table 6](#).

When comparing the means of the number of decayed teeth between age classification categories, a significant difference was found between means ( $P = 0.000$ ). In addition, there was an inverse relationship between age and the number of caries, [Table 7](#).

The mean number of decayed teeth was decreasing over the years with a significant difference. The mean number of dental caries tends to be higher in children with negative behavior, while the means decrease as the children's behavior moved toward the positive, [Table 7](#).

**Table 4**  
Descriptive statistics for conditions within Al-X classification of disabilities.

		Frequency	Valid Percent
Neurological disorders	Mental retardation	21	37.5
	Cerebral palsy	7	12.5
	Cerebral atrophy	4	7.1
	Epilepsy	13	23.2
	Hemiplegia	1	1.8
	Hypoxia	9	16.1
	Craniosynostosis	1	1.8
	Total	56	100.0
	Sensory impairments	Hearing impairment	2
Visual impairment		1	10.0
Speech impairment		5	50.0
Deaf-mute		2	20.0
Total		10	100.0
Behavioral disorders	ADHD	7	28.0
	ADD	2	8.0
	Autism	16	64.0
	Total	25	100.0
Medical disabilities	Asthma	33	42.3
	Anemia	7	9.0
	Sickle cell anemia	1	1.3
	Thalassemia	6	7.7
	Digestive tract problems	3	3.8
	Kidney diseases	1	1.3
	Cancer	3	3.8
	Hyperthyroidism	1	1.3
	Hypothyroidism	5	6.4
	Pituitary gland disorder	5	6.4
	Rheumatic	1	1.3
	Wilson's disease	1	1.3
	Adrenal insufficiency	2	2.6
	G6PD deficiency	2	2.6
	Hemophilia	2	2.6
	Drug allergies	3	3.8
	Hypoglycemia	1	1.3
	Tuberculosis	1	1.3
	Total	78	100.0
Congenital impairments	Down syndrome	12	48.0
	Lip and/or palate cleft	3	12.0
	Kapuki syndrome	1	4.0
	Tetralogy of fallot	2	8.0
	Noonan syndrome	1	4.0
	Spina bifida	2	8.0
	Cystic fibrosis	1	4.0
	Immune deficiency	3	12.0
	Total	25	100.0

**Table 5**  
Descriptive statistics of reason of visits.

		Frequency	Percent
Reason of visits	Soft tissue lesions	5	0.2
	Dental caries	1543	63.8
	Missed teeth	64	2.6
	Functional problems	46	1.9
	Pain	587	24.3
	Routine checks	27	1.1
	Cosmetic problems	145	6.0
	Total	2417	100.0

**Table 6**  
T-Test results for comparing the number of decayed teeth means among sex and health status' categories.

Number of decayed teeth		N	Mean	Std. Deviation	T-Test P value
sex	male	1178	3.92	3.106	0.8
	female	1182	3.96	3.160	
Health status	Healthy	2180	3.89	3.127	0.012*
	SHCN	180	4.51	3.158	

\* P < 0.05.

No significant differences in dental caries means were found among SHCN categories ( $P > 0.05$ ). However, when studying the visit reasons, it was found that the highest mean was seen in the dental caries category ( $4.42 \pm 3.061$ ), followed by the pain category ( $3.88 \pm 3.131$ ). The lowest mean was for the routine checks category ( $0.35 \pm 0.647$ ), [Table 7](#).

The percentage of males who came for cosmetic problems was higher than females (57.2 % and 42.8 %, respectively). The highest age category that came for cosmetic problems was 6 to under 12, with a percentage of (56.6 %).

#### 4. Discussion

In this study, the World Health Organization guidelines for surveys ([WHO, 2013](#)) were adopted in classifying the age of children/patients into six categories. Moreover, the age classification represents the educational stage in Syria: aged 0 to less than 3 years is considered pre-kindergarten age, aged 3 to less than 6 is considered kindergarten age, aged 6 to less than 12 years is considered primary school age, aged 12 to less than 15 years is considered middle school age, and aged 15 to less than 18 years is considered secondary school age. Finally, aged 18 years and over is considered the age of maturity in Syria.

The most frequent age group visiting the DPD was primary school children aged 6 to less than 12 years, due to the high prevalence of dental caries in addition to related problems. Previous studies found similar findings when comparing the prevalence of dental caries in children of different ages ([Mashhadani et al., 2017](#)) ([Shingare et al., 2012](#)).

The incidence of dental caries and oral diseases related to hygiene and nutrition has increased, and oral health has worsened among Syrian children in recent years ([Ballouk and Dashash 2019a](#)) ([Ballouk and Dashash 2019b](#)) ([Alhaffar et al., 2019](#)). In the current study, the highest mean of dental caries was among children aged 3 to under 6, which indicates that the problem still exists.

The most frequent reason for visits was dental caries, accounting for 63.8 %, which agrees with a previous retrospective study conducted in Montreal, Canada ([Ferraz dos Santos and Dabbagh, 2020](#)).

According to the Federal Maternal and Child Health Bureau, children with special health care needs are defined as children who have or are at raised risk of having a chronic physical, developmental, behavioral, or emotional condition and require specific services for their health conditions ([McPherson et al., 1998](#)).

The prevalence of children with SHCN, according to previous studies, ranged from 13 % to 25.3 % ([Van Dyck et al., 2004](#)) ([Newacheck et al., 1998](#)) ([Arrué et al., 2022](#)). In this study, the percentage of patients with SHCN was 8 %. This percentage definitely cannot be generalized to the Syrian society as a whole, since the DPD is a public dental clinic visited by patients from all governorates to receive free and specialized treatments. However, it is possible to conceive unmet dental treatment needs and the health-related conditions of these patients.

The Al- Monaqel classification for disabilities (MCD) was used for the first time in this study to classify patients with SHCN. One of its advantages is that it takes into consideration the specificity of their needs to provide the appropriate technique to treat them dentally.

Arrué et al.'s study found that the most frequent health problems were respiratory conditions, asthma, and allergies ([Arrué et al., 2022](#)). These health conditions are included in this study under the heading of medical disabilities, which are the most frequent conditions of patients with SHCN, accounting for a percentage of 40.2 %.

Although the DPD is located in the city of Damascus, about 60 % of patients were coming from Rif-Dimashq governorate. This can be explained by the referral of rare and distinct medical cases to the DPD, in addition to the presence of many public and private clinics in the city of Damascus, while such clinics are not available in the Rif-Dimashq governorate. Moreover, 5.3 % of the patients came from far governorates from Damascus, indicating the centrality of the DPD in managing

**Table 7**

Statistical tests to study the relationship between research variables and the number of decayed teeth.

Number of decayed teeth					ANOVA P value	Pearson's correlation P value
Research variables		Mean	N	Std. Deviation		
Age classification	0 – <3	2.89	19	2.514	0.000	-0.181**
	3 – <6	5.16	471	3.803		
	6 – <12	3.83	1446	2.903		
	12 – <16	2.95	366	2.576		
	16 – <18	3.44	32	2.723		
	≥18	3.23	26	3.409		
	Total	3.94	2360	3.133		
visit year	2021	4.51	190	3.128	0.000	-0.149**
	2022	4.48	900	3.464		
	2023	3.47	1270	2.795		
	Total	3.94	2360	3.133		
Salviow-Tinawi scale	obvious negative	4.76	99	3.357	0.000	-0.151**
	negative	4.89	304	3.772		
	hesitant	4.22	474	3.244		
	positive	3.62	1433	2.877		
	obvious positive	3.08	50	2.648		
	Total	3.94	2360	3.133		
Al- Monaqel classification for disabilities	Neurological disorders	4.71	49	3.422	0.830	-0.037
	Sensory impairments	5.40	10	3.627		
	Behavioral disabilities	4.75	8	1.982		
	Medical disabilities	4.36	75	2.958		
	Congenital impairments	4.24	38	3.349		
	Total	4.51	180	3.158		
Reason of visits	Soft tissue lesions	1.40	5	2.608	0.000	-0.213**
	Dental caries	4.42	1523	3.061		
	Missed teeth	1.34	64	2.372		
	Functional problems	2.70	46	3.054		
	Pain	3.88	556	3.131		
	Routine checks	0.35	23	0.647		
	Cosmetic problems	1.31	143	1.829		
	Total	3.94	2360	3.133		

\*\* Correlation is significant at the 0.01 level.

specially referred cases.

In the current study, negative behavior was associated with a higher rate of dental caries. To the best of our knowledge, there are no studies discussing this association. However, this somewhat agrees with Shao et al.'s study, which found that children who visited the clinic due to pain were more likely to exhibit negative behavior towards dental procedures (Shao, Kahabuka, and Mbawalla, 2016).

Usually, patients who showed negative behavior during oral examinations despite the application of non-pharmacological behavioral management methods were referred to enroll in the sedation or general anesthesia program.

Patients whose reason for visiting DPD was dental caries that did not manifest as spontaneous and continuous pain, indicating no need for immediate intervention, while patients who showed spontaneous and continuous pain due to caries had the reason for their visit recorded under pain.

6 % of visits were for cosmetic problems, which included dental anomalies, types of which are widespread among Syrian children (Makieh et al., 2022), and cases of dental trauma. This indicates the importance of aesthetics in childhood, especially since most visits for cosmetic problems were from primary school children aged 6 to under 12.

Scheffel et al.'s study found that children with esthetic-related dental problems are potential targets for bullies, and providing adequate esthetic dental treatment improved their self-confidence, socialization, and academic performance (Scheffel et al., 2014).

The percentage of males who came for cosmetic problems was higher than the percentage of females (57.2 % and 42.8 %, respectively), in contrast to previous studies that reported females are the most concerned about the cosmetic-related dental problems (Hassan et al., 2022) (Ellakany et al., 2021).

As mentioned previously, the reason for the visit was established according to the initial diagnosis and not only according to the patient's

complaint.

After obtaining the initial diagnosis, patients were referred to receive appropriate treatment. Treatment is carried out either by pediatric dentistry master students, or by undergraduate students following the educational methodological plan.

Unmet dental needs are a greater problem in children with SHCN than in healthy children (McKinney et al., 2014). Lewis et al. found that 10.4 % of children with SHCN have unmet dental needs (Lewis, Robertson, and Phelps, 2005), while a national survey found that 6.6 % of all American children have unmet dental needs (Bloom et al., 2011).

It is worth noting that a portion of patients' treatment requirements are met, while a considerable portion remains unmet. In any case, the Pediatric Dentistry Department at Damascus University remains an educational and research center and not a service center, as it is not supposed to meet all patients' needs.

Since this was a retrospective study, it relies on records previously kept in the archives, so it is possible that there were missing records, which may be considered one of the study's limitations. Additionally, the small number of years included in this study is due to the interruption of work during the COVID-19 pandemic, which is also considered a limitation of the study.

## 5. Conclusions

The most frequent age group was primary school children aged 6 to under 12, accounting for 60 % of patients. 58.7 % of patients were from Rif-Dimashq governorate. Almost 18 % of the patients exhibited negative and obvious negative behavior during oral examination procedures. The prevalence of patients with special health care needs was 8 %. The most frequent type of disability was medical disabilities, followed by neurological disorders, with percentages of 40.2 % and 28.9 %, respectively. The most frequent reason for visits was dental caries, accounting for 63.8 %. The mean number of decayed teeth was 3.94 ±

3.13. There is a negative association between the number of decayed teeth and age classification, visits year, and Salvio-Tinawi scale. Additionally, the percentage of males who came for cosmetic problems was higher than females 57.2 % and 42.8 %, respectively. In light of this study, it was concluded that the Department of Pediatric Dentistry at the Faculty of Dentistry, Damascus University, is a public dental clinic visited by patients from all governorates to receive free and specialized treatments.

#### Declarations

##### Ethics approval and consent to participate.

Ethical approval was obtained from the Ethics Committee and the Board of Scientific Research at the Faculty of Dentistry, and the Ministry of Higher Education and Research. Written informed consent was also obtained from all participants' parents/caregivers to participate in the study.

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##### Author contributions statement.

"A. Research concept and design, B. screened, organized, analyzed data, and wrote the paper, both A and B. made the critical revision and the final proof".

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