https://dergipark.org.tr/tr/pub/ijhmt Doi Number: 10.31201/ijhmt.1970146

Int Journal of Health Manag. and Tourism 2026, 11(2), 253-272

JHMT Editorial

International Journal of Health Management and Tourism

Dental Care Under General Anesthesia for Individuals with Disabilities: Challenges in Children and Adults

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Received: 13.06.2026
Accepted: 22.07.2026
Research Article

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Cite This Paper:
Beyhan, T. E., Berkel, G., Akmansoy, Ş. C., Mumcu, G. (2026). Dental Care Under General Anesthesia for Individuals with Disabilities: Challenges in Children and Adults. *International Journal of Health Management and Tourism, 11(2): 253-272.*

Abstract

Aim: Individuals with disabilities experience barriers to accessing dental care. This study aimed to evaluate treatment needs and service process indicators of children and adults with disabilities receiving dental care under general anesthesia (GA) at a faculty of dentistry.

Methods: In this retrospective study, Hospital Information Management System records of 262 patients who were examined and/or received dental treatment under GA between March 2017 and March 2020 were analyzed. In the study, GA sessions, waiting times, operation durations, medical consultation and referral status, out-of-pocket payment status and treatment needs as variables were included.

Results: Overall, 38.2% of the patients were children while adults represented 61.8%. The most common medical diagnoses were neurodevelopmental disorders, diseases of the nervous system, and developmental anomalies. The proportion of patients with out-of-pocket payments (Children [C]: 11.0%; Adults [A]: 38.9%; p=0.000) and the rate of receiving multiple GA sessions (C: 1.0%; A: 22.2%; p=0,000) were higher among adults.

Conclusion: Dental treatment needs under GA varied by age group, with a more comprehensive and complex treatment burden emerging among adults. Therefore, improving preventive care and ensuring timely access to dental care should be key priorities in developing oral health policies for individuals with disabilities.

Keywords: Dental care for individuals with disabilities, General anesthesia, Treatment needs, Health services accessibility, Hospital information management systems

INTRODUCTION

Individuals with special health care needs comprise a highly heterogeneous group characterized by complex conditions that require specialized health services because of physical, mental, developmental, behavioral, sensory or cognitive limitations (American Academy of Pediatric Dentistry, 2025). According to the World Health Organization (WHO), approximately 1.3 billion people representing 16% of the global population live with a significant disability. Although individuals with disabilities have the right to equal access to the highest attainable standard of health, persistent health inequities continue to expose them to poorer health outcomes and an increased risk of premature mortality (WHO, 2022). Inadequate accessibility, affordability, and availability of health services are among the principal determinants of these inequities (WHO, 2022; Kuper et al., 2024; Marinho et al., 2022).

Oral health is one of the principal domains where health inequities become more pronounced in individuals with disabilities. Oral health indicators in this population have been

reported to be poorer than those observed among individuals without disabilities, with correspondingly greater treatment needs (Köksal et al., 2021; Zare et al., 2024; Devinsky et al., 2020; Márquez-Arrico et al., 2022; Ciftci and Yazicioglu, 2020). Motor skill limitations, difficulties with cooperation, limited caregiver awareness, challenges in maintaining oral hygiene, medication use, regulation of dietary restrictions, and the presence of comorbidities may all adversely affect oral health status (Polat et al., 2025; Marinho et al., 2022; Köksal et al., 2021). As general health problems take precedence and the caregiving burden increases, oral health problems are postponed or neglected. Consequently, these individuals are at an increased risk of requiring emergency dental care (Devinsky et al., 2020; Biasotto et al., 2024; Auerbacher et al., 2023; Schulz-Weidner et al., 2022). Despite these risks, dental health services remain among the most frequently unmet healthcare needs for individuals with disabilities (Devinsky et al., 2020). Individuals with disabilities who cannot tolerate standard dental procedures because of their behavioral, intellectual, or neurodevelopmental limitations require dental treatment under general anesthesia (GA) (Wilson et al., 2019; Lima et al., 2021). In this group, limited cooperation and behavioral challenges, physical limitations, comprehensive dental treatment needs and the lengthy duration of complex procedures can often make treatment in a conventional clinical setting unfeasible. In some cases, even clinical examinations and radiographic evaluations may be performed only under GA (Márquez-Arrico et al., 2022; Marinho et al., 2022; Choi and Doh, 2021; Jockusch et al., 2020; Schulz-Weidner et al., 2022; Akpinar, 2019; Brailo et al., 2019). After anesthesia-specific clinical risks are assessed, GA enables the safe and effective completion of comprehensive dental care in a single session (Wilson et al., 2019; Choi and Doh, 2021; Mallineni and Yiu; 2016; Brailo et al., 2019). However, the inability to maintain oral hygiene and the need for additional treatments may result in the need for repeated GA over time (McGeown et al., 2024; Márquez-Arrico et al., 2022).

Dental treatment under GA for individuals with disabilities is a costly and time-intensive service that requires hospital infrastructure, an anesthesia team, multidisciplinary specialist support, and advanced organizational capacity (Köksal et al., 2021; Marinho et al., 2022; Pecci-Lloret et al., 2021). An insufficient number of treatment centers, workforce shortages, long waiting lists, limited caregiver awareness, coordination challenges between medical and dental teams, and uncertainties in referral and consultation processes may lead to delays in access to care and further deepen existing inequities (Zare et al., 2024; Al-Mashhadani et al., 2024; Marinho et al., 2022; Da

Rosa et al., 2020; WHO, 2022). Under these conditions, dental care under GA for individuals with disabilities should be regarded not only as a clinical treatment modality but also as an important component of health service planning, encompassing equitable access to care, care coordination, and efficient resource allocation.

Within this context, evidence-based data regarding the treatment needs of individuals with disabilities receiving dental treatment under GA are essential for equitable service delivery and resource planning. Patient information, service process data, and treatment records maintained in Hospital Information Management Systems (HIMS) provide critical information for health managers to evaluate healthcare needs, as well as to support planning and monitoring (Kuper et al., 2024; WHO, 2024). Although previous studies have primarily focused on clinical outcomes and treatment characteristics, evidence regarding service process indicators such as waiting times, consultation requirements, the number of GA sessions, operation duration, referral requirements and out-of-pocket payment remains limited (Akpinar, 2019; Marinho et al., 2022). Moreover, children and adults with disabilities have rarely been compared within the same service setting with respect to both treatment needs and GA service process indicators (Arapovic et al., 2021). Therefore, this study aimed to evaluate treatment needs and service process indicators of children and adults with disabilities receiving dental care under general anesthesia (GA) at a faculty of dentistry.

1. RESEARCH METHODOLOGY

1.1. Study Design, Population, and Setting

This retrospective study included 262 individuals with disabilities who received dental health services (examination and/or treatment) under GA at least once between March 27, 2017 and March 11, 2020, at the Marmara University Faculty of Dentistry, a tertiary public oral and dental healthcare provider in Istanbul. Relevant HIMS records were retrospectively reviewed to obtain clinical and administrative data related to the GA service process. The study period was limited to March 11, 2020, because institutional GA services were suspended as of that date during the COVID-19 pandemic. The study was approved by the Ethics Committee of the Institute of Health Sciences at Marmara University (18.10.2021-116). Institutional permission was also obtained to access anonymized electronic health records (EHRs).

The study population included patients who had received dental services under GA at least once at the institution and who required caregiver accompaniment and/or legal consent during the

service process. They were classified as having a disability in the institutional records. According to the institution's practice, patients aged 14 years and younger were classified as children, whereas those aged 15 years and older were classified as adults. In some adult patients (n=43), oral examinations could not be performed in conventional clinical settings and were therefore conducted under GA. While these patients were included in the sociodemographic and clinical profile analyses, they were excluded from the waiting time and operation duration analyses because of their distinct operational pathway. Since 21 of these adult patients were examined under GA without receiving treatment, they were excluded from the treatment-related analyses among adults (n=141). Patients without a documented disability who underwent GA solely for reasons such as dental anxiety, inability to cooperate, or medical risk were excluded.

1.2. Data Sources and Data Collection

The study was conducted using secondary data. Data were obtained from the HIMS using anonymized patient record numbers, with permission from institutional management and the support of the software unit. Records from the demographic information, medical history, examination, anesthesia, surgery, notes, and billing modules were matched using anonymized patient record numbers. Data on treatment procedures were obtained primarily from billing records.

1.3. Institutional Workflow and General Anesthesia Care Pathway

At the institution, patients with disabilities were given priority access to outpatient clinical examinations. During the initial dental assessment, GA was indicated based on the oral examination, radiographic evaluation, the general health status of patients as well as the patient's level of cooperation and communication. Patients were placed on the GA waiting list after their treatment plans had been developed in the clinical setting. However, in selected patients, GA was indicated for diagnostic examination when intraoral and radiographic examinations could not be performed due to a lack of cooperation and communication during the initial assessment.

When a patient's turn came on the waiting list, a pre-anesthesia evaluation (PAE) appointment was scheduled. The anesthesiologist examined the patient to determine their clinical status and perioperative risks and, if needed, requested consultations and laboratory tests. Patients completed these procedures at other healthcare institutions and submitted the results to the dental institution. For patients approved for GA, the operation date was scheduled, information about the process was provided, and written informed consent was obtained from their legal guardians. On

the scheduled date, dental care was performed under general anesthesia. Patients were monitored in the ward and discharged home once they were clinically stable and free of complications. When the entire treatment could not be completed in a single session, additional GA sessions were scheduled.

1.4. Variables and Operational Definitions

The variables were sociodemographic characteristics and clinical profiles, including age at the time of the first GA session, gender, place of residence, insurance/referral status, out-of-pocket payment status, medical diagnoses, American Society of Anesthesiologists (ASA) score, history of dental treatment under GA and/or sedation, and the need for medical consultations before GA. Diagnoses of patients were categorized according to the International Classification of Diseases, 11th Revision (ICD-11), using physician-entered diagnostic records retrieved from the HIMS.

The 'insurance/referral status' variable was categorized based on the patient's health insurance type and referral data recorded in the HIMS. Under the Social Security Institution (SGK) regulations in Türkiye, low-income individuals whose premiums are covered by the state (green card beneficiaries) are subject to a mandatory referral requirement to access covered services at tertiary-level public healthcare institutions (Republic of Türkiye, 2006; Social Security Institution, 2013). Additionally, the out-of-pocket payment was defined according to the presence of any personal payment or billing records in the HIMS database for the dental treatments performed.

Variables related to the GA service process were recorded as follows: the modality of the initial examination (in-clinic or under GA), the number of GA sessions, operation duration, waiting time, treatment under sedation, and in-clinic (chairside) treatment. The number of GA sessions was classified as “once” or “more than once”. The GA operation duration was defined as the total time of operating room utilization. GA waiting time was calculated as the number of days from the date of the initial examination to the first treatment-related GA session, reflecting the standardized care pathway. To evaluate the preoperative preparation process, the time from the first PAE to the first GA operation was calculated separately. In this study, sedation and in-clinic treatment were evaluated only with respect to their occurrence during the service process.

Treatment procedures performed under GA were classified as surgical, specific pediatric dental, periodontal, restorative, endodontic, and prosthetic treatments based on the procedure codes and categories listed in the Healthcare Implementation Communiqué (SUT) published by the Social Security Institution of Türkiye. Each treatment type was coded on a patient level as

either present or absent. A patient could have multiple treatment types. Additionally, the "number of treatment types" variable was calculated as the total number of distinct treatment types performed under GA for each patient. For example, if a patient received restorative, surgical, and endodontic treatments, the number of treatment types was recorded as 3.

1.5.Statistical analysis

Analyses were performed using IBM SPSS Statistics version 28.0. The distributional characteristics of continuous variables were assessed using normality tests and graphical methods. Since the normality assumption was not met, intergroup comparisons were performed using the chi-square test for categorical variables and the Mann–Whitney U test for continuous variables. The significance level was accepted as $p < 0.05$.

2. ANALYSIS

2.1. Sample and Sociodemographic Characteristics

A total of 262 patients with disabilities were included in this retrospective study. Overall, 38.2% of the patients were children while adults represented 61.8%. The mean age was 8,4 ± 3,2 years among children (median: 8 years) and 25,8 ± 9,5 years among adults (median: 23 years). The proportion of patients residing outside Istanbul was 21.0% (n = 21) among children and 13.0% (n = 21) among adults. Patients residing outside Istanbul were from 13 provinces: Kocaeli (n=25), Kastamonu (n=3), Ardahan, Sinop, and Trabzon (n=2 each) and Balıkesir, Bursa, Düzce, Giresun, Mardin, Ordu, Sivas, and Yalova (n=1 each). The proportion of patients with Green Card coverage (a state-subsidized health insurance scheme for low-income individuals) who were subject to a referral requirement was 6.0% (n = 6) among children and 13.0% (n = 21) among adults. All patients were covered by Türkiye's General Health Insurance scheme. The "Other (no referral required)" category included the Government Employees Retirement Fund, the Social Insurance Institution, and voluntary health insurance. According to the HIMS payment and billing records, the proportion of patients with a recorded out-of-pocket payment was significantly higher among adults than among children (38.9% vs. 11.0%, respectively; p=0.000) (Table 1).

2.2. Clinical Profiles and Preoperative Evaluation

When ICD-11 disease chapters were examined, diagnoses in both children and adults were concentrated primarily in Chapter 06 (Mental, behavioral, or neurodevelopmental disorders), Chapter 08 (Diseases of the nervous system), and Chapter 20 (Developmental anomalies). These chapters accounted for 59.0%, 35.0%, and 36.0% of the children, and 82.1%, 41.4%, and 21.6%

of the adults, respectively. Based on the HIMS records, the most prevalent medical diagnoses among children were intellectual disability (30.0%), autism (29.0%), epilepsy (24.0%), and cerebral palsy (17.0%). Among adults, the most frequent medical diagnoses were intellectual disability (71.6%), epilepsy (30.2%), autism (16.7%), and cerebral palsy (14.8%).

The ratio of patients with a history of dental treatment under GA and/or sedation before their first visit was significantly higher among adults than among children (53.7% vs 19.2%; p=0.000). The mean number of recorded medical diagnoses was also higher in adults (2.3 ± 1.2) than in children (2.0 ± 1.0) (p = 0.021). The need for external medical consultation before GA was common in both groups (children: 69.7%; adults: 67.3%; p=0.692) (Table 1). Among patients who required consultations, the most frequently consulted specialties were pediatrics (53.6%), neurology (27.5%), and cardiology (21.7%) among children, and neurology (43.7%), internal medicine (24.3%), cardiology (19.4%), and psychiatry (19.4%) among adults. Patients required consultations from multiple specialties.

Table 1. Profiles of children and adults with disabilities included in the study

Variables	Children (n=100)		Adults (n=162)		
	n	%	n	%	p
Gender					
Female	36	36.0	71	43.8	0.211
Male	64	64.0	91	56.2	
Place of residence					
Istanbul (Asian side)	72	72.0	130	80.2	
Istanbul (European side)	7	7.0	11	6.8	0.219
Other provinces (outside Istanbul)	21	21.0	21	13.0	
Insurance/referral status					
Green card (referral required)	6	6.0	21	13.0	0.072
Other (No referral required)	94	94.0	141	87.0	
Out-of-pocket payment status					
Present	11	11.0	63	38.9	**0.000***
Absent	89	89.0	99	61.1	
ASA					
I	-	-	1	0.7	
II	69	76.7	112	77.8	0.854
III	20	22.2	29	20.1	
IV	1	1.1	2	1.4	
History of dental treatment under GA and/or sedation					
Present	19	19.2	80	53.7	**0.000***
Absent	80	80.8	69	46.3	
Need for pre-GA medical consultation					
Present	69	69.7	103	67.3	0.692

Absent	30	30.3	50	32.7	
	Mean±SD	**Median (Q1-Q3)**	**Mean±SD**	**Median (Q1-Q3)**	**p**
Age	8.4±3.2	8 (6-11)	25.8±9.5	23 (20-30)	**0.000**†
Number of medical diagnoses	2.0±1.0	2 (1–3)	2.3±1.2	2 (1–3)	**0.021**†

Note: * Chi-square test; † Mann-Whitney U test.

2.3. Key Indicators Related to the GA Service Process

In the group, 99.0% of children and 77.8% of adults received a single GA session. The rate of patients receiving multiple GA sessions was 22.2% among adults (19.1% received two sessions and 3.1% received three sessions) (Table 2). The proportion of patients treated under sedation was higher among adults than among children (16.0% vs. 3.0%, respectively; p = 0.001), whereas the proportion receiving in-clinic treatment did not differ significantly between the groups (18.5% vs. 25.0%, respectively; p=0.211) (Table 2). The duration of the first treatment-related GA session was shorter in children (median: 170 min) than in adults (median: 195 min) (p = 0.039) (Table 2). Among adults who underwent multiple GA sessions, the operation duration decreased with successive sessions. Waiting times did not differ significantly between groups (Table 2).

Table 2. Key indicators of general anesthesia utilization among children and adults with disabilities

Variables	**Children**		**Adults**		
	n	**%**	**n**	**%**	**p**
Number of GA session					
Single	99	99.0	126	77.8	-
Multiple (2 or 3 sessions)	1	1.0	36	22.2	
Sedation (present)	3	3.0	26	16.0	-
In-clinic treatment (present)	25	25.0	30	18.5	0.211
	Median (Q1-Q3)		**Median (Q1-Q3)**		
Duration of first GA (min)	170 (125 – 210)		195 (142.5 – 240)		**0.039**†
Waiting time from the initial examination to the first GA (days)	157 (83 - 510)		224 (91 - 365)		0.919
Waiting time from the first PAE to first GA (days)	42 (21 – 89)		43 (23 – 93)		0.491

Note: † Mann-Whitney U test. PAE, Pre-anesthesia evaluation; GA, General anesthesia.

2.4. Level and Distribution of Treatment Needs Under GA

In this study, the mean number of treatment types performed per patient under GA was higher among adults than among children (3,03±1,07 vs. 2,68±1,01 respectively; p=0.006). At the patient level, the most frequently performed treatments under GA among children were restorative

(91.0%), surgical (88.0%), and specific pediatric dental (62.0%) treatments, whereas periodontal (90.1%), restorative (87.2%), and surgical treatments (66.0%) predominated among adults (Table 3). The proportions of patients receiving periodontal (90.1%) and endodontic (34.8%) treatments were higher among adults, whereas the proportion receiving surgical treatment (88.0%) was higher among children (p=0.000) (Table 3).

Table 3. Dental treatments performed under general anesthesia in children and adults with disabilities

Treatment type	Children (n=100)		Adults (n=141)		
	n	%	n	%	p
Surgical treatments	88	88.0	93	66.0	**0.000***
Specific Pediatric dental treatments	62	62.0	0	0.0	-
Periodontal treatments	16	16.0	127	90.1	**0.000***
Restorative treatments	91	91.0	123	87.2	0.412
Endodontic treatments	11	11.0	49	34.8	**0.000***
Prosthetic treatments	0	0.0	36	25.5	-

Note: * Chi-square test. Percentages may exceed 100% as patients could receive multiple types of treatment.

3. DISCUSSION/CONCLUSIONS AND RECOMMENDATIONS

3.1. Discussion

Individuals with disabilities often face difficulties in improving and maintaining their oral health status. In this population, the need for dental treatment under GA reflects an ongoing need for dental care throughout the life course (Lima et al., 2021; Marinho et al., 2022; Márquez-Arrico et al., 2022; Yen et al., 2024). Most studies have predominantly focused on either children (Yazdanbakhsh et al., 2025; Ciftci and Yazicioglu, 2020) or adults (Jockusch et al., 2020; McGeown et al., 2024). However, studies comparing children and adults receiving dental treatment under GA remain limited and have primarily focused on oral health outcomes (Mallineni and Yiu, 2018; Arapovic et al., 2021; Biasotto et al., 2024). By comparatively evaluating the treatment needs of children and adults with disabilities alongside key indicators of the GA service process, the present study extends previous research by adopting a health services management perspective.

In this study, medical diagnoses were primarily clustered within ICD-11 Chapters 06 (Mental, behavioral, and neurodevelopmental disorders), 08 (Diseases of the nervous system), and 20 (Developmental anomalies). This pattern was consistent with previous studies suggesting that

both difficulties with cooperation and higher comorbidity burden may contribute to the indication for GA (Choi and Doh, 2021; Hendzel, 2014; Márquez-Arrico et al., 2022). Moreover, the predominance of ASA II–III classifications in both groups underscores the importance of comprehensive medical evaluation and preoperative risk management (Choi and Doh, 2021). The need for external medical consultation further highlighted the importance of multidisciplinary collaboration between dental teams and physicians, as well as interinstitutional coordination to ensure safe care for patients with disabilities (Dziedzic, 2017; Akpinar, 2019; Al-Mashhadani et al., 2024). The presence of patients residing outside the city, the referral requirements and the frequent need for external medical consultation suggested that access tertiary-level dental care under GA often involves a multistep care pathway rather than a single clinical encounter. This geographic distribution of patients may reflect the concentration of service capacity in a limited number of centers (Da Rosa et al., 2020; Lima et al., 2021). Such centralization may impose additional burdens on patients and caregivers related to transportation, caregiving responsibilities and time, thereby potentially exacerbating geographic inequities in access to care (Zare et al., 2024; Da Silva et al., 2022; Lima et al., 2024). The mandatory referral requirements for Green Card beneficiaries and the need for external medical consultations represent important organizational dimensions of access (Levesque et al., 2013). Disruptions in these processes have been reported to increase administrative burden, hinder information flow and delay access to care (Al-Mashhadani et al., 2024; Dziedzic, 2017; Geddis-Regan et al., 2022; Chiao et al., 2022). These findings highlight the importance of interinstitutional coordination and well-integrated consultation pathways in ensuring equitable access to tertiary-level dental care under GA.

The relatively long waiting times observed in this study may be associated with the limited operating room capacity allocated to GA services for individuals with disabilities and with the concentration of these services in tertiary care centers (Akpinar, 2019; Da Rosa et al., 2020; Pecci-Lloret et al., 2021; Schulz-Weidner et al., 2022). In such settings, accumulated demand has been reported to prolong waiting times and constitute an important barrier to accessing care (Da Rosa et al., 2020; Jockusch et al., 2021; Lima et al., 2021; Zare et al., 2024). In the present study, waiting times did not differ significantly between children and adults. However, the relatively long waiting times observed in both groups suggest that timely access to GA services was a shared service challenge across age groups. Accordingly, waiting time may serve as a key process indicator for

monitoring capacity constraints and informing decisions regarding prioritization and resource allocation in GA service planning.

Although nearly all children completed treatment in a single GA session, adults more frequently required multiple GA sessions, had a longer duration of the first GA session, and received a higher number of treatment types per patient, suggesting a more extensive and complex treatment burden in this group. Multiple GA procedures have generally been associated with new treatment needs arising during follow-up (Bücher et al., 2016; McGeown et al., 2024; Pecci-Lloret et al., 2021). Additional GA sessions may be required to complete the same course of treatment rather than address newly developed treatment needs. The greater treatment scope and longer operation duration observed among adults suggest that these age-group differences may have implications for operating room time, multidisciplinary team workload, and scheduling requirements. Moreover, the possibility that treatment may require additional GA sessions should be incorporated into capacity and resource planning. Accordingly, treatment burden, operation duration, and the number of GA sessions may be monitored as key process indicators for operating room utilization, workforce planning and waiting-list management in GA services for individuals with disabilities.

Adults were more likely to have a history of dental treatment under GA or sedation before admission to the institution, which may reflect the cumulative need for repeated dental treatment needs over time in this group. Previous studies have linked repeated GA sessions among individuals with disabilities to persistent caries risk, inadequate preventive care and limitations in follow-up care (Choi and Doh, 2021; Dziedzic, 2017; Jockusch et al., 2021; Lima et al., 2021; McGeown et al., 2024; Bücher et al., 2016). In this study, the predominance of young adults was consistent with previous reports indicating that patients with disabilities treated under GA are often concentrated among children, adolescents and young adults (Arapovic et al., 2021; McGeown et al., 2024; Biasotto et al., 2024; Yen et al., 2024). However, the age distribution of GA-treated patients with disabilities should be interpreted cautiously, as it may reflect not only clinical characteristics, such as disability profile, comorbidity burden, and treatment scope, but also differences in service access, service organization, and the broader health policy context (Biasotto et al., 2024; Ciftci and Yazicioglu, 2020; Marinho et al., 2022; Yazdanbakhsh et al., 2025; Zare et al., 2024).

In the present study, the distribution of treatment types performed under GA differed significantly between age groups. Restorative and surgical treatments predominated among children, whereas periodontal, endodontic, and prosthetic treatments were more frequently observed among adults, alongside restorative treatment needs. These results are consistent with the accumulation of oral health problems with age and persistent difficulties in maintaining oral hygiene (Jockusch et al., 2021; McGeown et al., 2024). The higher frequency of endodontic treatment and the presence of prosthetic treatment needs among adults suggest a broader scope of care involving tooth preservation and functional rehabilitation. However, the range of treatments performed under GA may also depend on the institution's technical infrastructure and service capacity (Lima et al., 2021; McGeown et al., 2022). The predominance of restorative treatment needs suggests an emphasis on tooth preservation. However, the greater frequency of surgical treatment among children may be explained by the higher prevalence of teeth with poor prognosis during the primary dentition period (Biasotto et al., 2024; Sari et al., 2014; Schulz-Weidner et al., 2022). These results highlighted the importance of early personalized risk-based preventive programs, regular follow-up, and improving caregivers' oral health literacy (Jockusch et al., 2021; Marinho et al., 2022; McGeown et al., 2024; Schulz-Weidner et al., 2022; Akdoğan and Çabuk, 2024; Sari et al., 2014; Brailo et al., 2019).

In the present study, out-of-pocket payments were more commonly observed among adults. Socioeconomic disadvantage has been recognized as an important barrier to accessing dental care for individuals with disabilities and may further exacerbate oral health inequities (Kim and Ryu, 2023; Marinho et al., 2022; Zare et al., 2024). Considered together with the greater cumulative treatment burden observed among adults, this finding suggests that the economic burden of care may be more pronounced in this group. However, the specific services and payment amounts underlying out-of-pocket payments were not examined in this study.

When patients were assessed according to gender, the higher proportion of males in both groups was consistent with studies reporting that males are more frequently represented among individuals with disabilities treated under GA (Hendzel, 2014; Jockusch et al., 2020; Marinho et al., 2022; Pecci-Lloret et al., 2021; Yılmaz et al., 2023). This may be related to the higher prevalence of certain neurodevelopmental conditions (e.g., autism) among males (Akpinar, 2019; Marinho et al., 2022; Polat et al., 2025).

Previous studies have primarily focused on the clinical characteristics and dental treatment needs of individuals with disabilities receiving dental care under GA (Kaynar and Dinçer, 2025; Yang et al., 2026). However, evidence regarding service process indicators, such as waiting times, the number of GA sessions, and out-of-pocket payments, remains limited, particularly in comparative evaluations of children and adults with disabilities. By examining these indicators alongside treatment needs in both age groups, the present study extends previous research from an oral health services and policy perspective. From this perspective, our findings highlight that the provision of dental care under GA for individuals with disabilities should be considered not only in relation to clinical treatment needs but also with respect to access pathways, care coordination, and the organization of dental services.

3.2. Limitations and Strengths

The retrospective design and reliance on institutional HIMS data limited the analyses to routinely recorded variables and precluded detailed assessment of incompletely documented factors (e.g., disability type and severity), patient experiences, and the underlying reasons for service process patterns. Since the study was conducted at a single tertiary public dental institution, the results may reflect institution-specific organizational structures and service processes that should therefore only be generalized to other healthcare settings with caution. Moreover, the onset of the COVID-19 pandemic led to the suspension of institutional dental services under general anesthesia, thereby limiting the data collection period to the pre-pandemic era. Despite these limitations, the study has several strengths, including its comparative evaluation of children and adults with disabilities and its assessment of service process indicators alongside treatment needs, thereby providing evidence to inform oral health policy, service planning, resource allocation, and future research on individuals with disabilities requiring GA for dental treatment.

3.3. Conclusion and Recommendations

This study indicated that strategies to reduce the accumulated treatment burden and the need for GA in individuals with disabilities should be developed within an oral health policy framework. In this context, such strategies should extend beyond increasing treatment capacity and prioritize early, risk-based, preventive, and continuous care. Results related to comprehensive care needs and service process indicators, including consultation requirements, referral status, and waiting times, highlight the importance of multidisciplinary care coordination and structured follow-up strategies for improving oral health outcomes among individuals with disabilities. From

the perspective of special care dentistry, standardized recording systems and the routine monitoring of core process indicators within hospital information management systems (HIMS) may generate more robust evidence to support service planning, priority setting, and the development of oral health policies.

Conflicts of Interest: The authors declare that there is no conflict of interest.

Funding: The authors declare that this study has received no financial support.

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