Original Research

Title: A quasi-experimental study comparing the effectiveness of lecture-based and drama teaching methods on oral health outcomes in students with intellectual disabilities

Running Title: Oral health teaching in intellectual disabilities

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Abstract

Purpose: This study aimed to evaluate the effectiveness of a school-based program designed for children with mental disabilities by assessing oral health outcomes after training via two educational methods: lectures and dramas.

Materials and methods: 144 male students with mental disabilities from a special needs school in Qazvin, Iran, were selected as a census sample in 2023. The students were randomly divided into two groups, each consisting of 72 participants aged 10–14 years. Group 1 received oral health counseling via the lecture method, whereas Group 2 was instructed via the drama method. Data were collected via a socio-demographic checklist, and oral health was assessed via the Decayed, Missing, and Filled Teeth (DMFT) Index for caries status and the Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillion for oral hygiene. Assessments were conducted before and four weeks after the intervention. Data analysis was performed via descriptive statistics, t tests, and ANOVA via SPSS software.

Results: A statistically significant improvement in plaque scores was observed in the Drama group compared with the Lecture group after the intervention ($p < 0.05$). The mean tooth filling index (F index) also increased significantly in both groups post intervention, with greater improvement noted in the Drama group. While oral health indices improved in both groups, the extent of improvement was significantly greater in the Drama group.

Conclusion: The drama method used in this study was more effective than the lecture method in improving participants' oral and dental health indices. As a simple and cost-effective approach, drama enables teachers to convey essential health information more effectively.

Keywords: *Drama method, lecture method, oral health education, mentally disabled students*

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Introduction

Intellectual disability (ID) is characterized by significant impairments in both cognitive ability and adaptive behavior (1). This condition emerges during the developmental period (2), typically before the age of 18 (1). The severity of ID categorized as mild, moderate, severe, or profound, which determines the level of support required for daily functioning (2).

Individuals with intellectual disabilities have been found to have poorer dental health than those with typical development (3, 4). Data on Iranian individuals with intellectual disabilities indicate an average decayed, missing, and filled teeth (DMFT) score of 5.14, with 90% experiencing gingival irritation(4). Poor oral hygiene can negatively impact overall well-being, causing pain and discomfort while eating, reduced self-confidence, and disrupted sleep due to tooth cavities (5). Moreover, it is associated with various systemic diseases, including diabetes, pneumonia, and cardiovascular disease(6, 7).

Ensuring that vulnerable and underserved populations, including children with impairments, have access to oral health care is considered a fundamental human right (8). Although oral health initiatives for disadvantaged and marginalized groups have received limited attention, children with disabilities in low-income countries (LICs) face particularly severe challenges (9).

To improve the oral health of individuals with disabilities, oral health education programs have been implemented worldwide in schools and institutions. These programs focus on training individuals in oral hygiene to manage dental plaque effectively (3, 10). Oral health education can be delivered through counseling activities that provide essential information to the public, helping those who are unaware of this information become informed and gain a better understanding (11). Among various counseling methods, the lecture method is the most commonly used method in oral health education. It offers several advantages, including cost-effectiveness, ease of implementation, and the ability to reach a large audience. In contrast, modern learning approaches emphasize active engagement and have demonstrated greater effectiveness (11). The educational drama approach is based on collaborative, interactive, and student-centered learning (12). In drama, learning occurs through dialog, bridging fiction and reality. Students and teachers can safely explore a fictional world created in the theatrical setting. Through this process, students reshape existing meaning structures to generate new ones, allowing both students and teachers to gain fresh insights into themselves, each other, and the world around them (13). However, there is a lack of oral health programs specifically

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designed for individuals with intellectual impairments, and Iran currently has no national or community-based oral health initiatives. This study aimed to evaluate a school-based program for individuals with intellectual impairments, comparing the effectiveness of lecture-based and demonstration-based counseling methods in improving their oral health status. The null hypothesis is that there would be no difference between two methods of teaching.

Materials and methods

Ethical approval

This quasi-experimental study was conducted from March to October 2023 in Qazvin, Iran, in accordance with the guidelines of the Declaration of Helsinki. All procedures involving human participants were approved by the Ethics Committee of Qazvin University of Medical Sciences (approval code: IR.QUMS.REC.1401.260). The participants were informed about the study's objectives and provided written informed consent. The study took place at a special needs school for male children with intellectual disabilities in Qazvin, Iran. Prior to the study, approval was obtained from the school authorities, and informed consent was secured from the participants' parents.

Study participants and sampling

This study employed a quasi-experimental design. Male students from a special needs school for children with intellectual disabilities in Qazvin city were selected as the study population. Owing to the small size of the target population, a total population sampling method was used, resulting in the participation of 144 male students (N=144) in the study activities.

Inclusion criteria

The study included individuals with an educable intellectual disability and an IQ between 60 and 65; those whose parents provided consent for participation; those without underlying conditions affecting their health; and those with complete permanent dentition. Participants were excluded if they missed more than one educational session, used medication, required emergency dental treatment, or had a history of oral or dental trauma during the study.

Data collection instruments iand protocols

Initial examinations were conducted by two dentists and two trained dental students, all of whom were calibrated in basic WHO oral health survey methods. Dental assessments were carried out at schools under natural light, using disposable mirrors and WHO probes for plaque

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removal. To ensure diagnostic reliability, all decayed, missing, and filled teeth (DMF) assessments adhered to the WHO criteria and were performed by calibrated examiners who had undergone standardization training. Although natural light was used for practicality, consistency was maintained by standardizing the time and location of the assessments.

Patients' teeth were disclosed, and plaque was recorded by the same evaluator each time via the Oral Hygiene Index-Simplified (OHI-S). The amount of plaque was measured visually via the following methods: (0) No visible plaque, (1) Visible plaque covering no more than one-third of the tooth surface, (2) Plaques covering more than one-third but not more than two-thirds of the tooth surface, (3) Plaques covering more than two-thirds of the tooth surface

Oral health status was evaluated via the decayed, missing, and filled teeth (DMF) index, a widely used method for assessing oral health status.

The checklist for the present study consisted of two components: sociodemographic data and clinical examination data. The first part included provisions to record sociodemographic information such as age, sex, and general background. The second part incorporated the specifically designed Oral Hygiene Index-Simplified (OHI-S) Debris Score (DI-S), developed by John C. Greene and Jack R. Vermillion, to assess plaque. This index has been utilized in numerous studies (3, 14-16).

Oral health education

The intervention involved exposing students to oral health issues through lectures and a drama specifically designed for this study. Among the 144 children, 72 in Group I received oral health instruction through oral presentations once a week for three weeks. The remaining 72 children in Group II were instructed via the drama teaching method.

For Group II, a scenario was developed for the implementation of three 20 to 30 minute sessions held once per week over a three-week period in the school's auditorium. The students received thorough instruction on how to perform the play and participated in multiple practice sessions. For the actual performance, four students were selected: one as the dentist and three as patients, each representing a different group of oral health problems. Each patient, upon visiting the dentist and presenting their issues, highlighted the problems faced by the students, and the dentist responded to their concerns.

The plaque index and decayed, missing, and filled (DMF) scores were assessed before and four weeks after the educational intervention to evaluate oral health outcomes. To examine

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intergroup differences, the resulting data were coded and analyzed. The educational intervention was structured into three sessions for both groups, with each session focusing on a specific aspect of oral health (Table 2). The content was standardized across all educational sessions to ensure consistency, while the delivery methods were intentionally varied. This approach enables researchers to evaluate the effectiveness of different teaching methods for a specific topic while adhering to ethical standards of fairness and comparability.

Statistical analysis

The data were entered and analyzed via IBM SPSS (Statistical Package for the Social Sciences) software, version 21, Armonk, NY, USA). Inferential statistics, including analysis of variance (ANOVA) and dependent t tests, were applied to analyze differences among group means. The Kolmogorov–Smirnov test was used to assess the null hypothesis that the data followed a normal distribution. The confidence interval was set to 95% and p values less than 0.05 were considered significant.

Results

The sample consisted of 144 children with intellectual disabilities, with a mean IQ of 64.1 ± 3.9 in the lecture group and 63.9 ± 1.9 in the drama group. The participants had a mean age of 11.9 ± 1.8 years. Most mothers (86.79%) and fathers (87.5%) of these children had an education level of a high school diploma or below. Additionally, the majority of the mothers (67.3%) were housewives, while most fathers (36.8%) were employed as workers. The detailed characteristics of the participants are presented in Table 1.

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Table 1. *Demographic characteristics of mental disabled students*

Variable		**N**	**Frequency**
Age	11.9±1.8	144	
IQ(Lecture Group)	64.1±3.91	72	-
IQ (Drama Group)	63.9± 3.85	72	-
Mothers education	≤12th grade	125	86.79
	12 th grade <	19	13.19
Fathers education	≤12th grade	126	87.5
	12 th grade<	17	11.8
Fathers job	worker	53	36.8
	owner	29	20.13
	Gov.employee	12	8.33
	Unemployment	5	3.47
	Private sector	28	19.44
	others	17	11.8
Mothers job	Housewife	97	67.3
	private	26	18.05
	Gov.employee	9	6.25
	Others	12	8.33

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Table 2. *Curriculum table based on the given topics and their durations.*

Session	Topic	Duration
First Session	Importance of Oral Health	20 minutes
Second Session	Role of Microbial Plaque, Frequency, and Methods of Proper Tooth brushing	20 minutes
Third Session	Flossing Techniques, Importance of Regular Dental Check-ups, and Maintaining a Healthy Diet	30 minutes

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Table 3. *Comparison of the plaque scores of the Oral Hygiene Index-Simplified (OHI-S) Debris (DI-S) and the oral health DMF at the beginning and end of the training period between the two groups.*

Variables	Drama		Lecture		
	before	after	before	after	P Value
OHI	1.03 ±0.28	0.41± 0.09	1.09±0.30	0.69± 0.11	0.035
D	3.1±0.98	1.73±0.53	3.03±0.89	2.01± 0.67	0.26
M	1± 0.18	1.05 ±0.19	1.25± 0.26	1.31± 0.28	0.632
F	1.92±0.55	3.22± 0.99	2.16±0.68	3.12± 0.88	0.046
DMF	6.02± 1.71	6.02± 1.71	6.44± 1.83	6.44±1.83	--

**p < 0.05, significant t test.*

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A statistically significant improvement in plaque scores was observed among children in the Drama group compared with those in the Lecture group following the intervention ($p < 0.05$). In the Drama group, the OHI decreased from 1.03 ± 0.28 before the intervention to 0.41 ± 0.09 after the intervention. Similarly, in the Lecture group, the index decreased from 1.09 ± 0.30 to 0.69 ± 0.11. Statistical analysis via a t test revealed a significant difference between the two groups.

The mean Tooth Filling Index (F index) also increased significantly in both groups after the intervention, with greater improvement noted in the Drama group. A comparison of the Lecture and Drama groups revealed that oral health indices improved in both groups; however, the extent of improvement was significantly greater in the Drama group (Table 3).

Discussion

This study was conducted to evaluate two interventional educational methods, aiming to measure the effectiveness of lecture and drama approaches. The results demonstrated that both methods were effective; however, the drama group achieved better outcomes.

Global research in dentistry has consistently shown that prevention enhances the standard of oral health education by fostering necessary behavioral changes. Childhood, a highly formative period, is when children are most receptive to learning and development through doing, observing, and listening. Since children spend the majority of their time in schools, these institutions are considered the most suitable and cost-effective settings for health promotion, making them a key avenue for raising oral health awareness (17).

Conversely, some studies have indicated that school-based programs, such as single lectures and demonstrations using flashcards, charts, and models, are relatively ineffective because of the limited time available for conveying information. Therefore, oral health education in schools would yield better results if it was delivered in a more supervised, meaningful, and comprehensible manner (16).

Improving the oral health of children with intellectual disabilities is crucial because of their increased vulnerability to dental issues. These children often face challenges in maintaining oral hygiene, which can lead to a greater risk of cavities, gum disease, and other oral health problems (18). Moreover, poor oral health can exacerbate existing health conditions, negatively impact quality of life, and hinder effective communication (19).

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The present study demonstrated a significant improvement in the mean values among the subjects who attended the drama session compared with those who attended the conventional lecture in the posttest conducted four weeks later. When comparing the groups, both Group I and Group II presented significant increases in scores at the posttest. Given the intellectual level of these individuals, these educational methods effectively address their specific learning needs. This conclusion aligns with the findings of Shamsaei *et al.* (14), who demonstrated that the role-playing model improved health behaviors and simplified the oral hygiene index of students with intellectual disabilities. Similarly, GeethaPriya *et al.*(20) reported that a drama-based intervention led to significant improvements in various aspects, including oral health well-being, functional well-being, and the total COHIP (Child Oral Health Impact Profile) score.

In Italy, Scardina *et al*. (21)investigated the impact of oral health education programs on individuals with visual impairments. They assessed the OHI-S and DMF indices in individuals who initially had poor oral hygiene status. Despite the intervention, no improvement in oral hygiene status was observed among the participants. According to the literature, individuals with mental illness may require educational interventions tailored to their specific needs (22). One reason for the failure of such programs could be that most school-based initiatives provide a large amount of information in a short period, neglecting several important aspects necessary for improving oral health habits. In our study, the oral hygiene status of students with intellectual disabilities was poor. This finding is consistent with several studies demonstrating that the oral and dental health status of students with intellectual disabilities is suboptimal. For example, a study by Hashemi *et al*. (23) revealed that the oral hygiene of a sample of the disabled population in Kerman, Iran, was poor, and their caries experience rate was very high. Similarly, in a study by Shamsaei *et al*. (14), the oral health status of students with intellectual disabilities was poor before the educational intervention. Asiri *et al.*(24) examined the oral health behaviors of individuals with disabilities and noted that many exhibited inadequate oral hygiene practices and limited knowledge of proper dental care. They proposed several strategies to improve oral health care for this population, including increasing awareness among healthcare providers, enhancing accessibility in dental clinics, and providing education on oral health practices. According to Manley (25), people with disabilities face numerous barriers that limit their access to healthcare services. To improve their oral health, it

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is essential not only that they receive high-quality clinical care but also that they have sufficient access to dental services.

Another finding of this study was that children with intellectual disabilities in both educational groups did not show an overall reduction in DMF scores. However, an increase in the number of treated teeth was observed, indicating the impact of the educational intervention on these individuals, with a greater effect observed in the Drama group ($p = 0.046$). The results also demonstrated that plaque removal efficacy can be increased in individuals with intellectual impairments. The OHI-S score, a plaque recording method, has been previously utilized in similar school-based oral health programs for both intellectually impaired individuals and healthy children (3, 14, 16, 20).

The mean plaque improvement observed in this study was statistically significant, although its clinical significance remains uncertain. The improvement was attributed to the personalized attention given to children with special needs, which increased their interest in maintaining oral hygiene. Nevertheless, since plaque is the primary determinant of gingivitis, this improvement may contribute to better gingival health among students.

The use of the drama teaching method in this study played a significant role in improving the oral health of students with intellectual disabilities. According to Heward (26), choosing appropriate instructional strategies is essential, as it ensures that children with intellectual disabilities receive education in a manner that is both accessible and effective, thereby enhancing their academic, social, and emotional development.

Such an oral health program could be more effective for children with intellectual impairments if it is implemented earlier in the primary school years, when periodontal status is generally better and dental problems are less severe and fewer in number. The success of the program largely depends on the individual's motivation, as well as on adequate training and support for teachers, parents, and medical personnel, with a particular emphasis on the continuity of the training (3).

Studies suggest that parents play a crucial role in improving and maintaining their children's oral health and behaviors. A key factor in reducing the global prevalence of caries and gingivitis in children is providing parents, guardians, and caregivers with information on the causes of dental diseases and strategies for preventive self-care (27, 28).

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One limitation of this study was the absence of female students with intellectual disabilities. Additionally, their parents did not receive any training. The implementation of a participatory learning approach, such as strengthening the child–parent relationship, is recommended to enhance children's oral health. Future research should compare male and female students with intellectual disabilities to explore potential gender differences. Moreover, oral hygiene programs for individuals with intellectual disabilities must be continuous to ensure lasting benefits. A key limitation of this study was the lack of long-term follow-up to assess the retention of educational effects. While the findings indicate short-term improvements in oral health outcomes, it remains unclear whether these effects persist over time. Future studies should incorporate longitudinal assessments to evaluate the sustained impact of different teaching methods on oral health behaviors and outcomes among students with intellectual disabilities.

Conclusion

Given the extensive oral and dental health needs of children with intellectual disabilities, coupled with their lack of adequate training and the fact that not all educational methods are suitable for them, the drama method used in this study proved more effective than the lecture method in improving their oral and dental health indices. Drama is a simple, cost-effective approach that enables teachers to convey essential health information effectively. By enhancing these students' oral and dental health, significant progress can be made toward improving their overall physical health.

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Türkçe öz: *Zihinsel Engelli Öğrencilerde Ağız Sağlığı Sonuçları Üzerinde Anlatıma Dayalı ve Drama Öğretim Yöntemlerinin Etkinliğini Karşılaştıran Yarı Deneysel Bir Çalışma. Amaç: Bu çalışmanın amacı, zihinsel engelli çocuklara yönelik okul temelli bir programın etkinliğini, anlatım (ders) ve drama olmak üzere iki farklı eğitim yöntemiyle verilen eğitim sonrası ağız sağlığı sonuçlarını değerlendirerek incelemektir. Gereç ve Yöntem: 2023 yılında İran'ın Kazvin şehrindeki özel eğitim okulundan zihinsel engelli 144 erkek öğrenci örneklem olarak seçilmiştir. Öğrenciler rastgele şekilde 72'şer kişilik iki gruba ayrılmıştır ve yaş aralıkları 10-14'tür. 1. grup anlatım (ders) yöntemiyle ağız sağlığı eğitimi alırken, 2. grup drama yöntemiyle eğitilmiştir. Veriler sosyo-demografik kontrol listesiyle toplanmış; çürük durumu için Çürük, Eksik ve Dolgulu Diş İndeksi (DMFT), ağız hijyeni için Greene ve Vermillion'un Basitleştirilmiş Ağız Hijyeni İndeksi (OHI-S) kullanılarak değerlendirme yapılmıştır. Değerlendirmeler müdahaleden önce ve müdahaleden dört hafta sonra gerçekleştirilmiştir. Veriler tanımlayıcı istatistikler, t-testi ve ANOVA kullanılarak SPSS yazılımı ile analiz edilmiştir. Bulgular: Müdahale sonrası Drama grubunda, Anlatım grubuna kıyasla plak skorlarında istatistiksel olarak anlamlı bir iyileşme gözlemlenmiştir ($p < 0.05$). Ortalama diş dolgusu indeksi (F indeksi) her iki grupta da anlamlı şekilde artmış, bu artış Drama grubunda daha belirgin olmuştur. Her iki grupta da ağız sağlığı indekslerinde iyileşme görülmesine rağmen, iyileşmenin düzeyi Drama grubunda anlamlı olarak daha yüksek bulunmuştur. Sonuç: Bu çalışmada kullanılan drama yöntemi, katılımcıların ağız ve diş sağlığı indekslerini iyileştirmede anlatım yöntemine kıyasla daha etkili bulunmuştur. Basit ve düşük maliyetli bir yöntem olan drama, öğretmenlerin temel sağlık bilgilerini daha etkili şekilde aktarmasını sağlamaktadır. Anahtar Kelimeler: Drama yöntemi, anlatım yöntemi, ağız sağlığı eğitimi, zihinsel engelli öğrenciler*

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Ethics Committee Approval: All procedures involving human participants were approved by the Ethics Committee of Qazvin University of Medical Sciences (approval code: IR.QUMS.REC.1401.260).

Informed Consent: Participants' parents or legal guardians provided informed consent.

Peer-review: Externally peer-reviewed.

Author contributions: RE, MP participated in designing the study. RE participated in generating the data for the study. RE participated in gathering the data for the study. RE

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participated in the analysis of the data. MP wrote the majority of the original draft of the paper. MP, ZRK participated in writing the paper. RE has had access to all of the raw data of the study. RE has reviewed the pertinent raw data on which the results and conclusions of this study are based. ZRK have approved the final version of this paper. MP guarantees that all individuals who meet the Journal's authorship criteria are included as authors of this paper.

Conflict of Interest: The authors declared that they have no conflict of interest.

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References

1. Schalock RL, Borthwick-Duffy SA, Bradley VJ, Buntinx WH, Coulter DL, Craig EM, Gomez SC, Lachapelle Y, Luckasson R, Reeve A. Intellectual disability: Definition, classification, and systems of supports: ERIC; 2010.
2. Vahia VNJIjop. Diagnostic and statistical manual of mental disorders 5: A quick glance. 2013;55:220.
3. Kavvadia K, Polychronopoulou A, Taoufik KJJDOH. Oral hygiene education programme for intellectually impaired students attending a special school. J Disab Oral Health 2009;10:65-71.
4. Khadem P, Karami M, Salehinia R. Evaluation of oral health status in mild to moderate mental disabled children in comparison with normal children in isfahan (iran) %j journal of mashhad dental school. 2011;35:253-62.
5. Bonetti D, Hampson V, Queen K, Kirk D, Clarkson J, Young LJNS. Improving oral hygiene for patients. Nursing Standard 2015;29:44.
6. Waldron C, Nunn J, Mac Giolla Phadraig C, Comiskey C, Guerin S, van Harten MT, Donnelly-Swift E, Clarke MJ. Oral hygiene interventions for people with intellectual disabilities. The Cochrane database of systematic reviews 2019;5:Cd012628.
7. Borgnakke WSJDC. Does treatment of periodontal disease influence systemic disease? Dental Clinics 2015;59:885-917.
8. Jean G, Kruger E, Lok VJIdj. Oral health as a human right: Support for a rights-based approach to oral health system design. International dental journal 2021;71:353.
9. Khanagar S, Kumar A, Rajanna V, Badiyani BK, Jathanna VR, Kini PV. Oral health care education and its effect on caregivers' knowledge, attitudes, and practices: A randomized controlled trial. Journal of International Society of Preventive & Community Dentistry 2014;4:122-8.
10. Shyama M, Al-Mutawa SA, Honkala S, Honkala EJSciD. Supervised toothbrushing and oral health education program in kuwait for children and young adults with down syndrome. Special care in Dentistry 2003;23:94-9.
11. Sari RY, Chemiawan E, Sudarsana NJPJoD. Differences in knowledge of oral health before and after counseling between lecture and role play method. Padjadjaran Journal of Dentistry 2010;22:175-9.
12. Joronen K, Rankin SH, Astedt-Kurki P. School-based drama interventions in health promotion for children and adolescents: Systematic review. Journal of advanced nursing 2008;63:116-31.
13. Joronen K, Konu A, Rankin HS, Astedt-Kurki P. An evaluation of a drama program to enhance social relationships and anti-bullying at elementary school: A controlled study. Health promotion international 2012;27:5-14.
14. Shamsaei F, Ashtarani E, Meschi M, Ashtarani F. The effect of oral health education through role playing on health behavior of educable mentally disabled boy students in hamadan %j 2 journal of nursing education. journal of nursing education 2018;7:17-23.
15. Jain M, Mathur A, Sawla L, Choudhary G, Kabra K, Duraiswamy P, Kulkarni S. Oral health status of mentally disabled subjects in india. Journal of oral science 2009;51:333-40.
16. Sharma S, Saxena S, Naik SN, Bhandari R, Shukla AK, Gupta P. Comparison between conventional, game-based, and self-made storybook-based oral health education on children's oral hygiene status: A prospective cohort study. International journal of clinical pediatric dentistry 2021;14:273-7.
17. Habbu SG, Krishnappa PJIdj. Effectiveness of oral health education in children–a systematic review of current evidence (2005–2011). 2015;65:57-64.

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18. Anders PL, Davis ELJScid. Oral health of patients with intellectual disabilities: A systematic review. Special care in dentistry 2010;30:110-7.
19. Faulks D, Freedman L, Thompson S, Sagheri D, Dougall AJEJoDE. The value of education in special care dentistry as a means of reducing inequalities in oral health. European Journal of Dental Education 2012;16:195-201.
20. GeethaPriya PR, Asokan S, Kandaswamy D, Ms M, Shyam S. Effectiveness of different modes of school dental health education on the oral health status of children - an interventional study with 2-year follow-up. International Journal of Health Promotion and Education 2019;58:1-15.
21. Scardina GA, Buonamente A, Messina P. Efficacy of an oral health training programme for visually impaired individuals. Igiene e sanita pubblica 2008;64:509-16.
22. Macnamara A, Mishu MP, Faisal MR, Islam M, Peckham E. Improving oral health in people with severe mental illness (smi): A systematic review. PloS one 2021;16:e0260766.
23. Hashemi Z, Hajizamani A, Bozorgmehr E, Omrani F. Oral health status of a sample of disabled population in iran %j journal of oral health and oral epidemiology. 2012;1:23-8.
24. Asiri FYI, Tennant M, Kruger E. Oral health status, oral health behaviors, and oral health care utilization among persons with disabilities in saudi arabia. International Journal of Environmental Research Public Health 2022;19:16633.

25. Manley MCG. Oral health and dental treatment of adults with disability, a problem and solution. Int J Collab Res Intern Med Public Health 2021;13:1047-9.
26. Heward W. Exceptional children: An introduction to special education, 10th edition (pearson, 2013): Pearson; 2013.
27. Shah RK, Choudhary S, Tandon S. Oral health status in mentally disabled children, dental care knowledge of parents, and the impact of audiovisual oral health education program. International journal of clinical pediatric dentistry 2022;15:143-8.
28. Pareek S, Nagaraj A, Yousuf A, Ganta S, Atri M, Singh K. Effectiveness of supervised oral health maintenance in hearing impaired and mute children- a parallel randomized controlled trial. Journal of International Society of Preventive & Community Dentistry 2015;5:176-82.

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