

Prevalence of Hypodontia in Down Syndrome (Scoping Review)

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Abstract: Down syndrome caused by the extra chromosome on chromosome 21, hypodontia can occur in Down syndrome. The purpose of this study was to obtain the prevalence of hypodontia in Down syndrome from the literature study by using Scoping Review. The method follows the framework by Arksey and O'Malley. Study selection was carried out using Preferred Reporting Items for Systematic Review and Meta-analysis Scoping Review. Articles were searched using keywords, limit functions, inclusion criteria in search engines such as PubMed, EBSCOhost, and Google Scholar, as well as hand searching. There were total of 15 articles according inclusion criteria and analyzed. The prevalence of hypodontia in Down syndrome shows high variation among the studies. The lowest prevalence of hypodontia was 16.19% and the highest was 73.17%. Six studies showed that female had higher prevalence of hypodontia than male with a significant difference. Eleven studies provided description of which teeth, most frequently missing teeth after excluding the third molars were maxillary lateral incisors, mandibular lateral incisors, mandibular second premolars, and maxillary second premolars. This study shows that hypodontia is more common in individuals with Down syndrome than normal individuals, with a prevalence ranging from 16.19% to 73.17%.

Keywords: Down Syndrome, hypodontia, prevalence

1. Introduction

Down syndrome is a syndrome caused by the presence of one extra chromosome on chromosome 21.[1] There are three types of Down syndrome based on their etiology, that are full type trisomy, trisomy Robertsonian translocation 21, and mosaic.[2] Full type trisomy 21 occurs in 95% of cases so it is accepted as a the main cause of Down syndrome.[3,4] The other two types only occur in about two to four percent of Down syndrome cases.[5] Down syndrome in most cases is not inherited because this syndrome is caused by meiotic nondisjunction event which is errors in cell division during egg or sperm development and mitotic nondisjunction which occurs during embryonic development.[6]

Down syndrome is the most common chromosomal disorder worldwide, which is one in 600 to 1,000 live births, the number of Down syndrome sufferers worldwide is estimated at around eight million people.[4,7] Based on data from the Indonesia Center for Biodiversity and Biotechnology (ICBB), there are more than 300,000 Down syndrome children in Indonesia[4] Furthermore, based on data from Basic Health Research in Indonesia (Riskesdas), the prevalence of Down syndrome children in Indonesia has also increased over time.[8]

Individuals with Down syndrome have a number of physical and functional disorders associated with this syndrome.[9] The most easily recognized characteristics associated with this syndrome are the features of craniofacial and dental abnormalities.[7] Individuals with Down syndrome are at high risk of developing oral and perioral health

problems.[10,11] Oral health problems which are common in individuals with Down syndrome are oral and perioral soft tissue abnormalities, dental anomalies, malocclusion, and poor oral hygiene.[10,12]

One of the dental developmental anomalies that can occur in Down syndrome is hypodontia.[13–19] Hypodontia is the absence of less than six teeth (excluding third molars) and refers to failure of tooth development.[20,21,22] Based on several studies, hypodontia is recognized as a common phenotypic feature of Down syndrome.[7,13,15] Hypodontia can lead to aesthetic, functional and psychosocial disturbances that have a negative impact on quality of life.[18,22] Early diagnosis and treatment can reduce the psychosocial burden on patient with hypodontia.[21]

Prevalence rates help estimate the magnitude of health problems or diseases in the community and identify high-risk populations.[23] The prevalence of hypodontia in Down's syndrome can provide an overview for clinicians in the field of dentistry regarding the magnitude of the problem so that it can be taken into consideration when identifying oral health in Down syndrome patient and in developing treatment plans. Research in the last ten years regarding dental agenesis in Down's syndrome has been found quite a lot, but publications of scoping reviews that discuss and display the results of the prevalence of hypodontia in Down's syndrome from various studies have not been found so far. The aim of this study was to obtain and map data regarding the prevalence of hypodontia in Down's syndrome from various current literature to find out the extent of available scientific evidence and provide a systematic synthesis from various

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sources as well as to become a guideline for further research related to dental anomalies and hypodontia in Down's syndrome. This study provides an overview of the problem of hypodontia in the Down syndrome group.

2. Method

This research is a qualitative scoping review research conducted by following the work steps and methodological framework published by Arksey and O'Malley (2005) and developed by Levac, et al. (2010) and Joanna Briggs Institute (2015).[24–26] The research instruments used were laptops, Microsoft Software, search engines (PubMed, EBSCOhost, and Google Scholar), Mendeley applications, scientific journal articles and internet access. Screening and selection of studies was carried out using the Preferred Reporting Items for Systematic Review and Meta-analysis Scoping Review (PRISMA-SCR).[27]

Articles were obtained by searching through electronic databases conducted on PubMed and EBSCOhost as well as through the Google Scholar search engine using the boolean operators AND and OR and the limit function of each available database. We combined several keywords on electronic search engines to find the articles that meets our study criteria (Table 1). The sample used in this study were articles with inclusion criteria in the form of accessible full-text articles, in English or Indonesian, and reporting the prevalence of hypodontia in Down's syndrome. The year of article publication is limited to the time span from 2011 to 2021. A number of articles in which hypodontia was diagnosed without radiographic examination and included individuals under the age of five years were excluded as not being a definitive diagnosis. In addition, articles in the form of reviews, case reports, and case series were also excluded because this study wanted to measure the prevalence of hypodontia, in which the prevalence can't be measured when viewed from articles in the form of reviews, case reports, and case series. Search on other sources was conducted by hand searching technique. A systematic selection of studies using PRISMA-SCR is presented in Figure 1, accompanied by reasons why full-text articles were excluded. Data analysis was carried out using the principle of thematic analysis, which is a qualitative data analysis method used to identify, describe, and report data patterns or themes.[28]

| | | |
|----------------|--|-------|
| | unbalanced 21 OR 21 Robertsonian translocations OR translocation down syndrome OR mosaic down syndrome) AND (hypodontia OR dental agenesis OR tooth agenesis OR dental anomalies) Limiters Published Date: 20110101-20221231 | |
| Google Scholar | hypodontia AND down syndrome Filters: 2011 – 2022 | 2.330 |

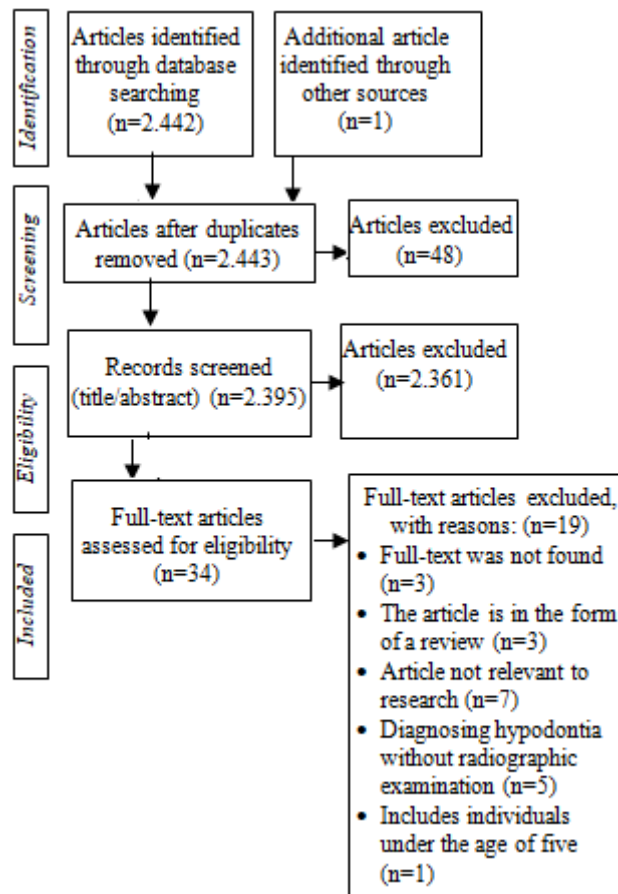


Figure 1: PRISMA-SCR flowchart of article search results

3. Results

A total of 15 studies that met the inclusion criteria were obtained from study search and selection, with the general characteristics of the selected studies listed in table 2. The results of scoping review study conducted regarding the prevalence of hypodontia in Down syndrome are summarized in table 3.

Table 1: Study search strategy

| Electronic search engine | Search strategy | Number of articles searched |
|--------------------------|--|-----------------------------|
| PubMed | (Down syndrome OR Down's syndrome OR Trisomy G OR Mongolism OR Trisomy 21 OR free trisomy OR unbalanced 21 OR 21 Robertsonian translocations OR translocation down syndrome OR mosaic down syndrome) AND (dental agenesis OR tooth agenesis OR hypodontia OR dental anomalies) Filters: from 2011 - 2021 | 77 |
| EBSCOhost | (Down syndrome OR Down's syndrome OR Trisomy G OR Mongolism OR Trisomy 21 OR free trisomy OR | 35 |

Table 2: Characteristics of the Studies Reviewed

| Authors | Publication Year | Journal / Proceedings | Title | Study Location | Study Objectives / Aim | Study Methodology |
|---|------------------|--|---|----------------|---|--|
| T. Mellara et al. ¹⁷ | 2011 | Journal of Disability and Oral Health | Occurrence of Hypodontia, Supernumerary Teeth and Dental Anomalies in Brazilian Individuals with Down Syndrome | Brazil | Determine the occurrence of hypodontia, supernumerary teeth and dental anomalies of size, shape and position in Brazilian individuals with Down syndrome by means of clinical and radiographic examinations | Cross-sectional study |
| Rokaya Hassan Othman Farahat ²⁹ | 2011 | - | Dental Anomalies Among Down Syndrome Children in Khartoum State (Sudan) | Sudan | To assess the dental anomalies among a group of institutionalized Sudanese children with Down Syndrome aged 6 to 14 years | Cross-sectional study |
| Sunjay Suri et al. ³⁰ | 2011 | Angle Orthodontist | Prevalence and Patterns of Permanent Tooth Agenesis in Down Syndrome and Their Association with Craniofacial Morphology | Canada | To document the prevalence and patterns of hypodontia in Down syndrome and explore whether maxillary or mandibular hypodontia or simultaneous agenesis of all third molars was associated with differential alterations of the craniofacial morphology. | Retrospective study |
| Willyanti ¹ | 2011 | Prosiding Forum Ilmiah X | Hypodontia in Mosaic and Full Down Syndrome Patients | Indonesia | To find the occurrences of hypodontia in mosaic and full Down Syndrome patients | Cross-sectional study |
| Ahmet Ercan Sekerci et al. ⁷ | 2014 | Journal of dentistry for children | Prevalence of Dental Anomalies in The Permanent Dentition of Children with Down Syndrome | Turkey | To evaluate the prevalence of various congenital dental anomalies in the permanent dentition of Turkish children with Down syndrome | Retrospective study |
| Els Marie M. Andersson et al. ³¹ | 2014 | European Journal of Orthodontics | Bilateral Hypodontia is More Common than Unilateral Hypodontia in Children with Down Syndrome: A Prospective Population-Based Study | Norway | To describe the prevalence and patterns of hypodontia in a population of 8- to 9-year-old children with Down syndrome | <i>Prospective population-based study (cohort)</i> |
| T. Haliza et al. ³² | 2015 | International Journal of Public Health and Clinical Sciences | Dental Anomalies and Oral Hygiene Status of Down Syndrome Children | Malaysia | To determine the prevalence of dental anomalies (morphology, number, alignment) and facial profile abnormality as well as oral hygiene status in Down syndrome compared to normal children in Kota Bharu, Kelantan | <i>Comparative cross-sectional study</i> |
| Wimke Reuland-Bosma et al. ³³ | 2015 | Special Care in Dentistry Journal | Distribution of Permanent Canine Agenesis in Down Syndrome: 15 Cases From A Centre For Special Care Dentistry | Netherlands | To shed light on the factors determining the distribution of permanent canine agenesis in Down syndrome | Retrospective cross-sectional study |
| D. J. F. van Marrewijk et al. ³⁴ | 2016 | European Journal of Orthodontics | The Relationship Between Craniofacial Development and Hypodontia in Patients with Down Syndrome | Netherlands | To examine craniofacial morphology in patients with DS at different ages and the influence of hypodontia on their craniofacial morphology | Prospective cross-sectional study |
| M. A. Mayoral Trias et al. ¹⁶ | 2016 | European journal of pediatric dentistry | Comparative Study of Dental Anomalies Assessed with Panoramic Radiographs of Down Syndrome and Non-Down Syndrome Patients | Spain | To compare the prevalence of dental anomalies from panoramic radiographs of age-matched individuals with and without Down Syndrome | Retrospective cross-sectional study |
| Osmar Aparecido Cuoghi et al. ¹⁸ | 2016 | The Open Dentistry Journal | Prevalence of Dental Anomalies in Permanent Dentition of Brazilian Individuals with Down Syndrome | Brazil | To evaluate the incidence of dental anomalies in the permanent dentition of individuals with Down Syndrome to increase the knowledge on the dental issues in this syndrome | Cross-sectional study |
| Agim Begzati et al. ³⁵ | 2017 | Journal of International Dental and Medical Research | Oral Health Status, Malocclusions and S. Mutans Counts in Children With Down's Syndrome | Kosovo | To evaluate the prevalence of caries, the presence of malocclusions, oral hygiene index, and the level of cariogenic bacteria, among children with Down's syndrome in Kosovo | Cross-sectional study |
| C. Dara Manja dan | 2018 | Proceedings series Advances | The Use of Panoramic Radiography to Determine | Indonesia | To determine prevalence of dental anomalies in individuals with Down | Cross-sectional |

| | | | | | | | |
|---------------------------------------|------|--|--|-----------|--|--|------------------------------------|
| N. Azimi ³⁶ | | in Health Sciences Research | Prevalence of Dental Anomaly in Individuals with Down Syndrome | | | syndrome using panoramic radiography | study |
| Nadiya M. Alwafa et al. ³⁷ | 2019 | Journal of International Dental and Medical Research | Frequency Distribution of Missing Teeth in Down Syndrome Children at POTADS Foundation | Indonesia | | To find out the frequency distribution of missing teeth in Down Syndrome children at POTADS Foundation | Descriptive survey technique study |
| Claudio Gallo et al. ³⁸ | 2019 | Journal of Dental Sciences | Symmetry of Dental Agenesis in Down Syndrome Children | Italy | | | |

Table 3: Sample

| | | | | | | | | | | | |
|--|-----------|----|----|-----|-----|----|----|-----|-------|-------|-------|
| C. Dara Manja dan N. Azimi ³⁶ | Indonesia | 12 | No | N/A | N/A | 12 | 26 | N/A | 25% | N/A | N/A |
| Nadiya M. Alwafa et al. ³⁷ | Indonesia | 52 | No | 31 | 21 | 5 | 19 | N/A | 42.3% | 35.5% | 52.4% |
| Claudio Gallo et al. ³⁸ | Italy | 46 | No | 26 | 20 | 8 | 12 | N/A | 61% | N/A | N/A |

Characteristics and Prevalence of Hypodontia in Down syndrome

| Authors | Study Population | Sample Size | Control Group | Sex distribution | | Sample Age (Years) | | | Prevalence of Hypodontia | | |
|---|------------------|-------------|---------------|------------------|--------|--------------------|-------|---------|---------------------------|-------|--------|
| | | | | Male | Female | Min. | Max. | Average | Total | Male | Female |
| T. Mellara et al. ¹⁷ | Brazil | 96 | No | 57 | 39 | 5 | 36 | N/A | 35.4% | N/A | N/A |
| Rokaya Hassan Othman Farahat ²⁹ | Sudan | 92 | No | 43 | 49 | 6 | 14.2 | 10.4 | 54.9% | 38.5% | 72% |
| Sunjay Suri et al. ³⁰ | Canada | 25 | No | 12 | 13 | 11.5 | 18.3 | 15.1 | 56% | 41.7% | 69.2% |
| Willyanti ¹ | Indonesia | 26 | No | N/A | N/A | 8 | 12 | N/A | 26% (Full) 6% (Mosaic) | N/A | N/A |
| Ahmet Ercan Sekerci et al. ⁷ | Turkey | 216 | No | 112 | 104 | 8.5 | 18.7 | 13.5 | 26% | 27% | 26% |
| Els Marie M. Andersson et al. ³¹ | Norway | 26 | No | 11 | 15 | 8.2 | 9.6 | 8.9 | 53.8% | 43.8% | 56.2% |
| T. Haliza et al. ³² | Malaysia | 32 | Yes | 14 | 18 | 7 | 12 | 9.6 | 50% | N/A | N/A |
| Wimke Reuland-Bosma et al. ³³ | Netherlands | 150 | No | 82 | 68 | 7.03 | 26.35 | 16.63 | 46% | N/A | N/A |
| D. J. F. van Marrewijk et al. ³⁴ | Netherlands | 63 | No | 28 | 35 | 6 | 19 | N/A | 36.5% | 21.4% | 48.6% |
| M. A. Mayoral Trias et al. ¹⁶ | Spain | 41 | Yes | 22 | 19 | 9 | 13 | 10.6 | 73.17% | N/A | N/A |
| Osmar Aparecido Cuoghi et al. ¹⁸ | Brazil | 105 | No | 61 | 44 | 7 | 24 | 16.22 | 16.19% | 13.1% | 20.5% |
| Agim Begzati et al. ³⁵ | Kosovo | 65 | No | 29 | 34 | 6 | 18 | N/A | 52% | N/A | N/A |

Min, minimum; Max, maximum; N/A, not available.

The total prevalence value of hypodontia does not include third molars.

Study Characteristics

Studies included in this research were published from 2011 to 2019 and sourced from various journals, including journals in paediatric dentistry (Journal of Dentistry for Children[7], European Journal of Paediatric Dentistry[16]), orthodontics (European Journal of Orthodontics[31,34], Angle Orthodontist[30]), special care dentistry (Special Care in Dentistry Journal[33]), general dentistry (Journal of International Dental and Medical Research[37,35], Journal of Disability and Oral Health[17], The Open Dentistry Journal[18], Journal of Dental Sciences[38]), and general medicine (International Journal of Public Health and Clinical Sciences [32]). In addition, there is one research in the form of a scientific thesis. [29]

A total of ten studies used a cross-sectional study design [1,16–18,29,32–36], three articles used a retrospective study design [7,30,38], one article used a prospective population-based (cohort) study design[31], and one other article using a descriptive study design with survey techniques[39]. The sample sizes of the study varied from 12 to 216 people, while the ages of the study samples ranged from five to 36 years.[1,7,16–18,29–38] Three research articles were conducted in Indonesia[1,36,37], two article in Brazil [17,18], two other articles in the Netherlands [33,34], and another eight studies were conducted in Sudan[29], Canada[30], Turkey[7], Norway [31], Malaysia[32], Spain[16], Kosovo[35], and Italy[38].

The lowest reported prevalence of hypodontia was 16.19% [18] and the highest was 73.17% [16]. The prevalence value of hypodontia does not include third molars and the diagnosis of hypodontia is supported by radiographic examination. [1, 7, 16–18, 29–38]

There is one study that examined the prevalence of hypodontia in different types of Down syndrome, specifically the full type and the mosaic type of Down syndrome.[1] A total of seven studies provide separate hypodontia prevalence data for males and females.[7,18,29–31,34,37] A total of eleven studies provide detailed descriptions of which teeth were found to be missing and the location of missing teeth in the jaws, most of them using the World Dental Federation (FDI) notation to present their findings.[1,7,17,18,25–27,87-89,91] In addition, there is one study that provides information about the incidence of hypodontia in primary teeth while other studies only focus on hypodontia that occurs in permanent teeth.[37] One study concentrates on hypodontia that occurs in canines in individuals with Down syndrome.[33] There are only two studies that have control group and compares the prevalence of hypodontia in Down's syndrome individuals with normal individuals.[16,32]

4. Discussion

Based on the data in Table 3, it is known that the prevalence of hypodontia in Down syndrome ranges from 16.19% to 73.17%, with most studies showing prevalence rates above 40%. [1,7,16–18,29–38] These results indicate that the prevalence of hypodontia in Down syndrome varies widely between studies. The quite large variation in the prevalence of hypodontia can be caused by differences in sampling and examination methods as well as the distribution of age, sex, ethnic, and the location where the study was carried out. [7,13]

There is only one article that examined the prevalence of hypodontia in a specific type of Down syndrome, while 14 other studies did not specifically explain the type of Down syndrome that the study sample had. The study reported that in the mosaic type of Down syndrome, the prevalence of hypodontia was lower, only 6% (1 of 8 patients) compared to the full type of Down syndrome with a prevalence of 26% (7 of 18 patients).[1]

This study has variations in sample age from five to 36 years. The large variation in the age distribution in the included studies may be a source of bias in this study. Previous studies have found that the prevalence of hypodontia decreases with age.[21,31] This decrease in prevalence occurred when a re-examination was carried out after several years in the same sample, but this only occurred in a small number of samples and did not cause a significant difference in prevalence.[21,31]

The results of this study indicate that the prevalence of hypodontia varies between populations and between sexes. The population in the Southern European region has a much higher prevalence of hypodontia compared to Asia, America, Africa, Eurasia, and other parts of Europe with prevalence value above 60%.[16,38] A lower prevalence of hypodontia is found in South America and Eurasia compared to other regions of the included studies.[7,17,18] The population in the Western European section had the lowest prevalence of hypodontia (36.5% - 46%) compared to the population in other parts of Europe which had a prevalence above 50%. [16,31,33–35,38] Populations in the Asian region show a fairly high degree of variation with the prevalence of hypodontia ranging from 25% to 50%, with three studies conducted in Indonesia all reporting hypodontia prevalence below 45%.[1,32,36,37] Results of this study may provide further evidence regarding the hypothesis that ethnic is a determinant factor for the prevalence of hypodontia in Down's syndrome.[7] Almost all studies that provide separate hypodontia prevalence data for men and women show that women have a higher prevalence of hypodontia than men with quite significant differences.[18,29–31,34,37] Research conducted by Sekerci et al. reported the opposite, which is the prevalence of hypodontia in men were higher than in women, but the difference was not so significant (the difference in prevalence was only one percent).[7]

The most frequently missing tooth is the third molar, but missing third molars are generally not considered in studies

of hypodontia because of their high frequency of occurrence in both populations with Down's syndrome and the normal population.[7,30,35,38] The tooth most frequently missing after excluding third molar in most of the studies was the permanent maxillary lateral incisor.[16,17,30,31,34,35,38] Another study by Williyanti, Dara et al. and Nadiya et al., reported that permanent mandibular lateral incisors were the most frequently missing teeth.[1,36,37] In addition, a study conducted by Farahat and Sekerci et al. reported that the mandibular second premolars were the most frequently missing teeth.[7,29] Apart from these three teeth, studies by Marrewijk et al., Sekerci et al., and Andersson et al. found that the maxillary second premolars were also frequently missing.[7,31,34] This suggests that the most frequently missing teeth were the last teeth of each type, which are the lateral incisors, second premolars and third molars.[31,38] Research by Nadiya et al. reported that the most frequently missing primary teeth were the mandibular lateral incisors.[37] The most rarely missing permanent teeth were the maxillary central incisors, followed by the first molars, mandibular canines, second molars, and maxillary canines respectively.[16,17,29,31,34,37,38] Another study by Reuland-Bosma et al. regarding agenesis that occurs in canines states the opposite, that the prevalence of missing canines in Down syndrome individual is high and missing of canines occurs both in the maxilla and the mandible.[33] Hypodontia in Down syndrome individual mostly occurred bilaterally for some specific permanent teeth, which are the lateral incisors and second premolars.[38] In addition, almost all studies that provided data regarding the specific distribution of missing teeth reported that hypodontia was more common on the left side of the jaw.[16,29,31,34,37,38] Hypodontia was also found to be more common in anterior teeth compared to posterior teeth.[1,16,17,36–38] There was no significant difference between hypodontia in maxilla and mandible. A total of five studies reported that hypodontia was more common in the mandible, but two of them did not show a significant difference.[1,16,29,36,38] Three other studies reported that hypodontia was more common in the maxilla and two other studies showed the same incidence of hypodontia in the maxilla and mandible.[17,30,31,34,37] Hypodontia in the maxilla was not associated with significant changes in maxillary morphology, whereas hypodontia in the mandible is associated with reduced mandibular length and an increased ratio between the ramus and body of the mandible.[7,30]

The prevalence of hypodontia in Down's syndrome individuals when compared to normal individuals (control group) shows a significant difference. Research by Haliza et al. reported that the prevalence of hypodontia in Down syndrome was 50% whereas in the control group the prevalence of hypodontia was 5%.[32] The study showed a large difference in prevalence, which is 10 times higher in Down syndrome individuals compared to normal individuals. Similar to the study by Mayoral et al. which shows the prevalence of hypodontia in Down syndrome is 73.17% while in the normal group is 7.14%.[16] In addition, the number of missing teeth was also highlighted when comparing hypodontia in Down syndrome individuals with normal individuals.[13] Approximately 48% of hypodontia cases in normal individuals missing only one permanent

tooth.[13] The study of Gallo et al. and Andersson et al. showed the opposite in Down syndrome individuals, that is most Down syndrome individuals with hypodontia missing two or more permanent teeth, while those who only have one tooth missing are fewer in number with percentages ranging from 13%-25%.[31,38] This shows that hypodontia appears to be more severe in Down syndrome individuals than in normal individuals because the number of missing teeth tends to be greater.[7,30]

The etiology of hypodontia is complex and multifactorial.[13,21,22] The etiology that explains why the prevalence of hypodontia is higher in Down syndrome is still difficult to understand, but genetic factors have an important role and a major influence on the occurrence of hypodontia in this population.[7,21] Previous studies suggest that the pattern and high prevalence of hypodontia in Down syndrome individuals are closely related to changes in the growth of the peripheral nervous system and abnormal development of localized chondral elements at the embryonic stage.[7,16,31,33,37,30] Another reason for the occurrence of hypodontia is associated with poor terminal vascularization of the developing tooth bud, especially during the process of odontoblast formation.[7,30] Impaired material supply from blood vessels can inhibit normal tooth development.[13]

This scoping review study has several limitations, which are several studies having small sample sizes and quite large age variations of the sample. Despite these limitations, this scoping review research was carried out systematically (following the PRISMA-SCR guidelines) by maintaining quality at every step. In addition, previously defined inclusion and exclusion criteria allowed the authors to reduce heterogeneity to some extent. An ideal diagnosis of hypodontia requires a radiographic examination to ensure the presence or absence of tooth buds, so studies that diagnose hypodontia without radiographic examination are excluded from this study.[21] Permanent second molars, which are the last teeth to experience mineralization when third molars are not taken into account, usually begin to experience mineralization at the age of 2.5–3.8 years, but in Down syndrome children, it is usually delayed by around 0.7 years.[3,13,40] Therefore, children under five years of age were also excluded from this study.

The recommendation for future studies is to carry out further research clinically based on the type of Down syndrome. Further research regarding the prevalence of hypodontia in primary teeth in Down's syndrome individuals can also be considered because the information regarding this matter is still very minimal. In addition, future research is recommended to have a control group so that it can directly compare the prevalence rate with the normal population.

5. Conclusion

This study shows that hypodontia is more common in individuals with Down syndrome than normal individuals, with a prevalence ranging from 16.19% to 73.17%.

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