Dental Health Education on Domiciliary Dental Care (DDC): A Systematic Review

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Abstract. The availability of domiciliary dental care (DDC) is one of the efforts to reach dental care to communities with problems visiting dental clinics. This systematic review describes the progression of DDC, including the user profile of the DDC program, its advantages and disadvantages, and the education provided in the DDC program, and summarizes the recommendations reported by researchers over the past five years. There were 27 articles found in the PUBMED database after searching. A total of 2 articles could not be accessed, ten articles were not research articles, and nine articles were also excluded because they were irrelevant to the context of this study. The results showed that DDC services were dominated by older adults living in nursing homes, care-dependent parents, and school-aged children. Few studies reported in the last five years include dental health education sessions in DDC programs. The findings of this systematic review highlight the importance of incorporating dental health education sessions into domiciliary dental care (DDC) programs, particularly for older adults in nursing homes, care-dependent parents, and school-aged children, as it is a key factor for the success of dental health initiatives aimed at reaching communities with limited access to dental clinics.

Keywords: Home Visit, Oral Health, Dental Health.

1 Introduction

The dental caries is the most common chronic oral disease and is considered a global oral health problem. Dental caries is a condition of damage to the tooth structure caused by acids produced by bacteria in dental plaque [1]. Its prevalence has increased in recent years and has various causes, such as diet, lifestyle, use of drugs, exposure to acid, and increased stomach acid due to certain diseases [2]. Bacteria in the oral cavity and the oral microbiome are responsible for the development of caries [3]. Early diagnosis of caries is necessary to avoid tooth loss [1]. Regularly maintaining healthy teeth and visiting the dentist is important to prevent this condition. On the contrary, the number

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of regular dentist visits decreases with age [4]. Increasing age causes older adults to need transportation assistance (mobility barriers) to facilitate their access to dental care clinics [5]. Other than that, the lack of visits to the dentist from an early age also causes many children to experience risks to their dental health in their childhood. Unfortunately, not all dental clinics are proactive in offering alternative care systems, such as home care with mobile care units available to all elderly living at home or in nursing homes [4].

Mobile dental clinics are very useful for dental care for older people with mobility issues [5]. Home dental care, also called domiciliary dental care (DDC), is a term for patients who receive dental care or treatment at home [6]. Dentists and dental hygienists visit patients in their residences, such as homes or nursing homes, or even schools to prevent or treat oral health problems. Generally, DDC treatment received by the age group <60 is scaling, while the age group ≥60 is tooth extraction treatments [7]. The DDC program was reported to be favored by individuals with limited mobility, making it easier for them to access dental care [7–9].

The development of the DDC program needs to be conducted as a literature study. DDC is an excellent solution to help older people and children conveniently receive dental care. However, the choice of not using the program is still there, so it is necessary to conduct a study to see the patients' problems and considerations. There is also no systematic review of the educational sessions in the DDC settings. Thus, this systematic review provides an overview of the development of the DDC, its strengths and weaknesses, and the education provided in the DDC program and summarizes the recommendations researchers have reported from 2019-2023.

2 Method

This review was performed following recommendations from Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) [10].

2.1 Data Sources and Search Strategy

The literature search was completed on June 15, 2023, in the PUBMED database with the terms as follows: ((((((home visit[Title/Abstract]) AND (dental[Title/Abstract])) AND (education[Title/Abstract])) OR (domiciliary dental care[Title/Abstract])) OR (portable dentistry[Title/Abstract])) OR (mobile dentistry[Title/Abstract])). AND is the term used to search for a specific combination of words and OR- is used to search between two words. Titles and abstracts of articles were first screened, and publications that did not meet the written criteria were removed. The research articles analyzed were from the last five years.

2.2 Eligibility Criteria

The criteria for inclusion were as follows; (1) Original articles published in the English language; (2) Research reports with the type of care "home visiting"; (3) Research related to domiciliary dental care, (4) Data obtained from grey literature, meta-analyses,

and reviews were excluded from the review and (5) Articles that were not 'full access' were excluded. An illustration of PRISMA in this study has been presented in Fig. 1.

2.3 Data Selection

A total of 27 papers were searched from the PUBMED database. Articles were downloaded after screening the titles and abstracts of the search results against eligibility criteria. A total of 2 articles were excluded because they were not freely accessible. Of the 25 accessible articles, 10 were not research articles. A total of 9 articles were excluded because they were not relevant (Fig. 1). Table 1 has presented included and excluded studies.

3 Results and Discussion

3.1 Advancement of DDC

The inability of patients to visit dental clinics on a routine basis initiated the DDC by dental care. DDC was a beneficial service for the communities. However, only some people choose the facility. DDC services were dominated by the elderly living in nursing homes, the home-dwelling and care-dependent elderly, and school-aged children (Table 2).

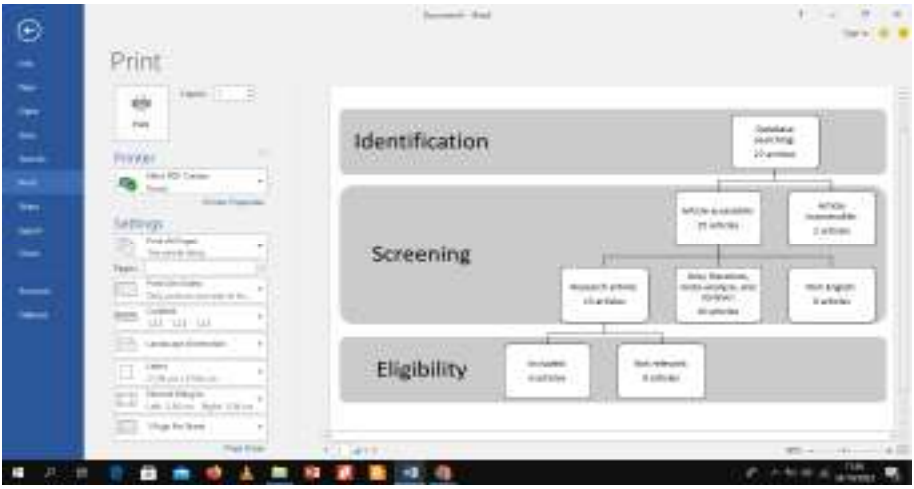

Fig. 1. PRISMA flowchart of included studies.

Table 1. Table type styles.

Included in this study	Not relevant	Excluded as not a research article
[9], [7], [11], [8], [12], and [13].	[14], [15], [16], [17], [18], [19], [20], [21] and [22].	[23], [24], [25], [22], [26], [27], [28], [29], [30], and [31].

Older people who still have teeth, despite about 50% having dental and periodontal problems, have been reported to have better physical function and a better quality of life (QOL) compared to older adults who do not have teeth [32]. There were several reasons reported for why older adults and children had difficulty with dental care. In older adults, the main reason for accessing DDC services were disability [5,7,32–34], limited income [5,32,34], and older people with cognitive problems such as Alzheimer's patients [33]. In early childhood, caries have been reported to be strongly correlated with low socioeconomic status [35] and limited access to early preventive dental issues [36]. Some research has confirmed that patients who choose DDC programs have much better health than those who do not [32,37]. Moreover, dental treatment with the DDC program also contributes to an improved prognosis in elderly patients [37].

Reports on the frequency of the most common dental procedures performed by clinics providing home visits were dentures [38] and scaling [7]. Another study reported that implant patients contributed 2% of patients receiving DDC treatment [22]. Despite the high demand for DDC services, the prevalence of the services is still low. This is due to the lack of enthusiasm among dentists and dental professionals to do home visits [16]. Iwate prefecture reported that more than half of the dental clinics that are members of the Iwate Dental Association do not provide home visit facilities [38].

Table 2. DDC service users.

Age	Total research participant	Reasons for choosing DDC services	Place of visit	Ref.
≥70 years old	356 participants	Subsidised by the government	Nursing home	[13]
5-18 years old	429 students (216 males, 213 females)	N.A.	School	[12]
N.A.	7 household visits, four of who were in private homes and the other 23 in long-term care facilities (LTCFs).	Patients with major depression or agoraphobia, the elderly and the disabled or those with weak health conditions	Private homes and LTCF	[8]
82.4 ± 8.2 years old	74 residents (19 males, 55 females)	N.A.	Long-Term Care Institutions	[11]
≥65 yea rs old	40 participants (27 males and 13 females)	Mobility concern	Private homes	[9]
57.4 ± 21.2	419 patients (251 males and 168 females)	Disability	Private homes,	[7]

years old	vegetative care home, and local hospital

3.2 Advantages and disadvantages of DDC services

The DDC model can be the right choice of dental care for those who have challenges accessing dental clinics manually. The advantage of DDC is that it can reach patients who do not have access to dental clinics by visiting them personally (5,23,32–34). DDC also has a positive social impact [28] and is more comfortable because their services are in their home environment [39]. Patients who preferred regular DDC services were able to maintain several healthy tooth roots [33]. DDC has also been reported to be effective in maintaining dental health in children, especially in reducing Early Childhood Caries (ECC) compared to telephone contacts [35].

However, DDC also has some disadvantages. Because it requires the dentist to go to the patient's home, it would affect the cost of treatment to be more expensive [5,32,34]. These costs are closely related to geographic area, age, per capita income, prevalence of government assistance programs, frequency of denture making, and quantity of home visits [40]. Another disadvantage is that the types of screenings that can be performed are limited and more exploratory, so the prevalence of caries may be underestimated [33]. In general, the availability of this service has been very limited. Caregivers also described the DDC program as complicated, time-consuming, and physically demanding; because some of the caregivers were older adults with various physical disabilities [8]. Sometimes DDC providers have to wait for a family member/legal representative to give their informed consent for scheduling a visit for an elderly person [8]. Sometimes, it takes more time to get such approvals, which often delays the DDC.

3.3 Dental health education during DDC services

The research published in the last five years included a few dental health education sessions on DDC programs. DDC programs should include educational sessions emphasizing oral health during appointments [5]. A study in West Virginia showed that accessibility or the location of providers and the free cost of services did not seem to be the important factors for children not to receive needed care [12]. This showed that the problem was not only about the weaknesses of the DDC program as described previously, but an increase in campaigns to maintain oral health was needed.

Providing dental health education when visiting schools with the concept of "narrative dentistry" in the classroom, DDC programs could facilitate patient-dentist consultation, structured communication skills, and medical ethics with children [7]. They tended to give their full attention to explanations given face to face by providing direct examples using illustrations or miniature teeth that they could feel with their hand. Furthermore, active interaction between caregivers and parents or guardians could help provide a deeper understanding of the importance of dental health, especially for parents with low education and economic levels.

The oral and systemic functions of older adults needed to be maintained so that they could eat a regular diet to improve their quality of life. Therefore, education on dental health care was important [11]. However, due to the lack of cognitive ability of older adults, dental caries prevention was challenging to apply in nursing homes because the older adults were unable to cooperate during oral care activities [13]. Education to promote the importance of dental care needs to be given not only to older people but also to their guardians or caregivers.

3.4 **The Recommendations**

Oral health education was the most common recommendation for optimal oral function [5,37]. Older people living in nursing homes or dwelling communities were the social group most often targeted in DDC programs. Various dental training programs did not work for people with dementia [33,41]. Long-term care facilities relied on dentists to provide DDC services to these older adults [40]. Some other opportunities to further support nursing homes to maintain the oral health of their residences were to train nursing home staff on how to take care of oral health [41]. In addition to older adults, children were also an important target for oral and dental health education. We recommended emphasizing education during the DDC program. Developing appropriate mechanisms to encourage parents to follow up on referrals made during preventive school DDC visits were essential [12]. Oral health promotion can also be integrated into the school curriculum [21].

The most significant consideration in applying for the DDC program was cost. The cost of dental care was strongly influenced by factors such as geographic region, age, income per capita, prevalence of government assistance programs, frequency of in-office complete dentures, and frequency of home visits [40]. The travel time variable was a better parameter than the distance traveled by the caregiver [14]. Many users of this program reported that the cost of treatment was the main concern of patients joining the DDC program [5,33,40]. Public funding or subsidizing dental care, and providing transportation assistance, were the most suggested strategies [5]. Work and Income New Zealand (WINZ) provided grants for emergency treatment, which were available to those on low incomes or receiving government benefits. However, participants complained that the environment at WINZ was not user-friendly and the financial assistance they provided was not easily accessible [5].

In addition to the cost issue, we found caregiver complaints about residents in nursing homes. The caregivers believed that the barriers preventing them from providing better oral health care for residents were because inadequate training to handle people with dementia, the responsive behavior of the residents (such as gripping the staff, restlessness, or refusing care), high workload, and staff burnout [41]. In many dental clinics, home dental visits were conducted by part-time workers [38]. Infrastructure improvements were needed to fully deliver home dental care services, including additional staff [38] and service delivery models [7].

4 Conclusion

Through our systematic review, DDC services were dominated by the elderly living in nursing homes, the home-dwelling and care-dependent elderly, and school-aged children in maintaining and improving dental health. In addition to the advantages of the DDC program that addresses mobility issues, there are also disadvantages, such as the high cost of treatment. Providing dental health education sessions is also vital in the DDC program. The authors also recommend the development of DDC program targets for all ages, such as home visits to evaluate and educate the dental health of all family members.

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