

Teachers' Role in Regular and Special Need Students' Oral Health: A Narrative Review

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Abstract

Globally, around 530 million children suffer from caries. Several attempts have been made to improve oral health, including oral health (OH) promotion in schools. Teachers as students' role models are expected to play an active role in promoting OH, especially for special need students who need basic life skills for a better quality of life. Literature shows at the school age, children spend a large portion of their time with teachers, which leads to the possibility of their mother figure being replaced somewhat by their teacher. Teachers with good knowledge and attitudes about OH could effectively influence students and potentially play an important role in successful OH promotion.

Literature findings indicate that teachers can demonstrate to regular students how to correctly brush teeth better than dentists; education by teachers decreases children's plaque index, gingival index and caries risk, and increases brushing frequency and OH knowledge.

For special needs students, findings show several different possible outcomes related to the special needs of each student. Regular repetition and strengthening by teachers can support the success of OH promotion programs in schools for regular students as well as special need students.

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Introduction

The World Health Organization (WHO) estimates that around 530 million children worldwide suffer from caries in their primary teeth.¹ In lower-middle countries, dental and oral diseases continue to increase due to increasing urbanization and changes in living conditions. Basic health research data in 2018 showed the prevalence of caries in Indonesia was 88.8%. The data stated that 92.6% of children aged 5-9 years experienced caries. In other words, only 7.4% of children aged 5-9 years were free of caries. The data also stated that 73.4 % of children aged 10-14 experienced caries; only 26.6% of them were free of caries.²

Basic health research data in 2018 showed the average DMF-t index in Indonesia was 7.1.

This shows an increase in caries compared to the 2013 Riskesdas data, which showed the average DMF-t index in Indonesia to be 4.5. The def-t index in 2018 (aged 5-6 years) showed an average of 8.43, which is in the very high category. The DMF-t index in 2018 for 12 year olds showed an average of 1.89. At the age of 65 years, it became 17.12. This figure does not meet the target of the National Action Plan for Dental and Oral Health Services in 2020, namely the DMF-t index of 1.26 in the 12-year age group.² This figure refers to the principle that if the permanent teeth only erupted 6 years ago, the decay rate should minimal.

In the school environment, teachers are the most important figure in the life of a child. At the school age, children spend most of their time at school with teachers. There may be a change in the character figure (model) of children where teachers will replace the mother character.³ In a study where teachers were given training on how and when to brush their teeth and routinely trained their students to do so for 24 effective school days, there was a significant difference in plaque scores in students before and after

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mentoring by teachers.⁴ Other studies have also shown that good brushing behavior is commonly found in elementary school students with good teachers as role models compared to elementary students with less exemplary teachers.⁵

In Japan, the government has designed a program where children will continuously receive education about oral health from dentists in collaboration with teachers.⁶ Besides that, brushing teeth together after lunch is also routinely carried out in Japan under the supervision of teachers.⁷ In 1998, the Brazilian Ministry of Education and Sports set oral dental health as a curriculum topic and ran a school health program in 2007 with the support of teachers.

Several studies and programs have shown that teachers play a role in improving students' oral health. The involvement of a qualified teacher with dental health makes a positive contribution to the students' oral and dental health at school. The previously mentioned studies limited their inclusion criteria to regular students. It is important to remember that students are divided into two categories, namely regular students and students with special needs.

To identify effective efforts to improve students' oral health in schools through the involvement of teachers, in-depth understanding is needed based on research relevant to the topic. However, there is still limited research and literacy that discusses the role of teachers on the caries status of regular students and special needs students in Indonesia, encouraging this narrative literature review to be carried out. The objective of this study was to analyze the teacher's role in regular and special need students' oral health. The aim of this is to plan a program to improve students' oral health with the involvement of teachers as well as the students' quality of life.

Definition and Duties of Teachers, Special Guiding Teachers

The Republic of Indonesia Law Number 14 of 2005 focusing on teachers and lecturers defines teachers as professional educators whose main tasks are educating, guiding, teaching, directing, training, assessing, and evaluating students in early childhood education through formal education, basic education, and secondary education.⁸ Special Guidance Teachers (GPK), also often called Special

Assistant Teachers, are professionals whose roles are very complex in the teaching process of students with disabilities.⁹ The purpose of GPK in accordance with the 2007 inclusive education provider guidebook is teachers who have a history of special needs education or have received training on special needs education assigned to inclusive schools.¹⁰

Definition of Regular Students and Special Needs Students

Definition of regular students or students according to the Republic of Indonesia Law Number 20 of 2003 focusing on the national education system are community members who take a learning process available at particular paths, levels, and types of education in order to develop their potentials.¹¹ Prof. Frieda Mangunsong, professor of psychology at the University of Indonesia, defines students with special needs as students with significant differences in the important dimensions of their human functions.¹²

Students with special needs physically, psychologically, cognitively, or socially experience difficulties in achieving their goals/needs and their full potential. Students with special needs include those who are deaf, blind, have speech disorders, physical disabilities, intellectual disabilities, emotional disorders, etc. Gifted children with high intelligence are also categorized as special needs children because they require trained handling from professionals.¹² Students with special needs require more assistance and depend on teachers more than regular students.

Behavior: Knowledge, Attitude, and Action

From a biological perspective, behavior is an activity of an organism. Human behavior refers to the human activities which include laughing, walking, crying, talking, studying, reading, writing, working, and so on. Therefore, it can be concluded that human behavior refers to all human activities that can be both observed directly and indirectly.¹³

Knowledge is the process of knowing certain objects through the human senses (sight, smell, hearing, touch, and taste). Meanwhile, it is stated that knowledge mostly comes from the ears and eyes. Knowledge is a cognitive domain and remains very crucial in shaping one's actions.

Knowledge in the cognitive domain has six levels, namely knowing, understanding, application, analysis, synthesis, and evaluation. Attitude is a reaction or response that is still closed from a person to a stimulus or object. Attitude manifestations can only be interpreted beforehand from closed behavior that cannot be seen directly. Attitude is not yet an action, but a predisposition to action. Attitude is a readiness to react to objects in a certain environment as an appreciation of the object.¹³

An attitude is not manifested automatically in an action. To turn an attitude into action, a supporting factor or an enabling condition is needed. Actions have three levels starting from guided response (actions according to a sequence of instructions), followed by mechanism (actions are carried out automatically), and finally adoption (actions that are well developed by the subject).¹³

Health Behavior and Dental Health Behavior

Health behavior is a person's response to a stimulus or object related to illness and disease, the health service system, food and drink, and the environment. Dental health behavior includes knowledge, attitudes, and actions related to the concept of healthy teeth and toothaches as well as prevention efforts.¹⁴ Knowledge of dental health is obtained as a result of stimuli captured by the five senses. Knowledge can be obtained through the educational process naturally or in a planned manner. Knowledge remains very important crucial in shaping one's action. Attitudes about dental health consist of three main components: belief in an object, emotional life, and propensity to act. The formation of attitudes itself is strongly influenced by knowledge. Dental health action is a continuation of the process after knowledge and attitudes about dental health. In order to attain complete dental health action, attitudes require supporting factors or enabling conditions, including facilities, infrastructure, and facilities. Dental health measures include choosing a toothbrush, using toothpaste, controlling plaque, brushing teeth, seeking help when feeling tooth and gum pain, etc.

School Health Promotion for Regular & Special Needs Students

The WHO issued guidelines for the

promotion of school health in 2017.¹⁵ The Indonesian Ministry of Health Regulation Number 89 of 2015 regulates oral and dental health efforts.¹⁶ Oral and dental health services for children and adolescents are carried out by prioritizing preventive and promotive approaches without ignoring rehabilitative and curative approaches. Oral and dental health services for children of elementary and secondary schools age are in the form of the School Dental Health Programmes and the advanced School Dental Health Programmes, which are carried out in integration with the School Health Program. The School Dental Health Programmed is carried out in the form of several activities: oral and dental health screening, oral and dental health education, regular oral and dental health check-ups, and advanced oral and dental health services.

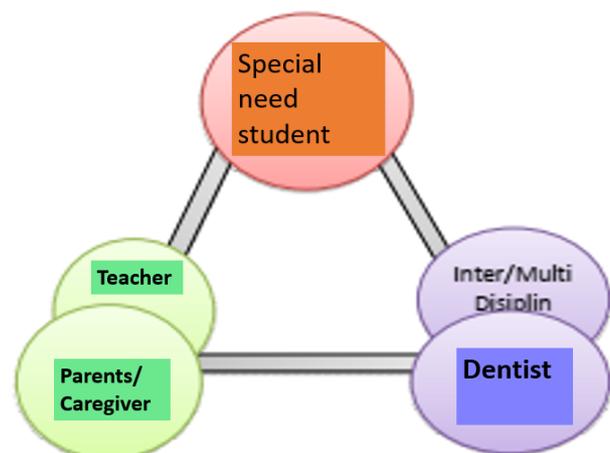


Figure 1. Cooperation in caring for special needs students.

The Indonesian Ministry of Health Regulation Number 89 of 2015 concerning dental and oral health efforts in the fifth section regulates dental and oral health services for persons with disabilities.¹⁶ Dental and oral care for persons with disabilities requires collaboration between dentists and inter- or multi-disciplinary teams/nurses, parents/caregivers, educators/teachers, and the individuals with disabilities (Figure 1).

Given the limited capabilities of persons with disabilities, the success of dental and oral health care and maintenance depends on parents, caregivers, educators, and health workers (dentists, teams, and nurses). Parents, caregivers, and educators/teachers need to have

knowledge and skills on how to maintain the oral health of persons with disabilities. The dental health team consists of dentists and dental and oral therapists who are trained in the field of special dental care, have patience, have empathy, and can provide quality care.

Oral Health

The WHO defines oral health as 'a state of being free from tooth loss and decay, oral infection and sores, mouth and facial pain, oral and throat cancer, periodontal disease and other disorders and diseases that limit an individual's capacity in psychosocial wellbeing, chewing, smiling, biting, and speaking' (FDI).¹⁷ Students' oral health condition can be assessed by various measurement indices.

Tooth decay (dental caries) is a multifactorial disease, caused by the interaction between the tooth surface, the presence of sugars from food, and the bacterial biofilm (dental plaque). Biofilm bacteria produce acids and metabolize sugars, which break down enamel over time.¹⁷ The index used to measure caries severity is DMF-t (decayed, missing, filling) in permanent teeth and def-t (decayed, extraction due to caries, filled due to caries) in primary teeth. In addition, an individual's caries risk can be assessed using a caries risk assessment. There are various caries risk assessments, but they all essentially observe individual conditions from various aspects and assess whether they have high, medium, or low caries risk. The index used to measure oral hygiene is OHI-S (oral hygiene index). OHI-S is the sum of DI (debris index) and CI (calculus index). Plaque index is an index used to assess the severity of plaque attached to the oral cavity. Gingival index is an index used to assess the level of gingival inflammation.

Previous Research

Teacher-Regular Students

Several previous studies have observed the effects of the teacher's role in oral health programs at school on regular students. In addition, several studies have also tried to assess how far teachers' knowledge about oral health went. The following is a list of previous studies, summarized in Table 1.

Teacher-Special Need Students

Several previous studies tried to observe the influence of teachers in oral health programs

in schools on special needs students. Thus far, not much literature has been found on this topic. These studies are summarized in Table 2.

Discussion

Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students. The main task of the teacher will directly affect both regular and special needs students' knowledge, attitudes, and actions (Figure 2). Knowledge, attitudes, and actions of students may be influenced by their teachers and eventually shape their behavior. One of these moldable behaviors is health behavior, and, more specifically related to this narrative review, dental health behavior. Dental health behavior that has been influenced by the teacher will affect students' oral hygiene, which in turn will impact students' oral health.

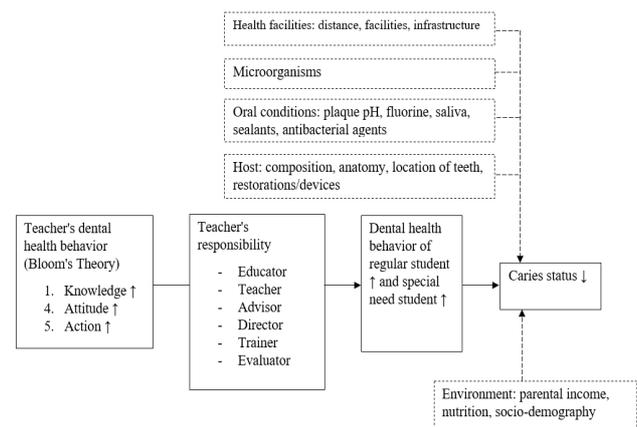


Figure 2. The teacher's role in students' oral hygiene.

Regular teacher-student research conducted by Abdul H.¹⁸ was done by providing oral health education (OHE) to students through three sources: dentists, teachers, and peers. Then, oral health knowledge (OHK) and oral health simplified (OHI-S) were measured, along with initial OHE and OHE after repetition and strengthening. The results of the study showed that the students' OHK significantly increased in the group trained by dentists and peers ($p < 0.05$). There was only one instance in which OHK did not significantly increase with the involvement of the teacher. There was a significant increase after repetition and reinforcement. Results were statistically unchanged for 12 months.

Regular teacher-student research was conducted by Ana⁴, the teacher was first given a workshop to equalize the teacher's understanding on brushing teeth, and then the teacher gave motivation and accompaniment to the students for 30 days when brushing their teeth. Students' plaque numbers were measured before and after to observe the effects. The results of the study suggested that almost all students experienced a decrease in plaque. This can also be seen from the results of the T-test. It showed that students who got intervention from the teacher experienced a decrease in plaque.

Regular teacher-student research conducted by Eden¹⁹ compared OH knowledge and OH behavior scores after OH education by teachers. This was compared to dentists and followed by measuring plaque index in months 1 and 6. The results of this study indicate the frequency of brushing teeth increased after OHE by both dentists and teachers ($p < 0.001$). Teachers were more effective in correcting students' toothbrushing methods than dentists ($p < 0.001$). A significant decrease was found in plaque score ($p < 0.05$).

Regular teacher-student research conducted by Ghalib Qadri²⁰ had teachers receiving dental and oral health education and then delivering it to students. The control group and intervention group were evaluated before and after the intervention. The results showed that the control group that did not receive educational intervention from the teacher had a 35% higher caries risk. The socio-economic conditions of parents also had an influence. If the socioeconomic conditions of the parents were good, the caries risk decreased to 94% (comparing the data from schools with high and low socioeconomic status students).

Regular teacher-student research was conducted by Naidu²¹ wherein 12 schools ran a dental health program carried out by teachers to students. Two schools were used as controls. The study involved a total of 926 children. Initial measurements were made before intervention, after intervention (6 months) on knowledge, attitudes, actions, oral hygiene, as well as caries and gingival health status. The results of this study indicate that dental health efforts in schools carried out by teachers improve students' knowledge, attitudes, and actions, reduce students' caries risk, and improve students' oral hygiene and gingival health status.

Regular teacher-student research was conducted by Aida²² wherein four schools randomly participated in dental and oral health business activities ($n=200$), with one school as a control ($n=50$). The intervention was done in the form of brushing teeth together once a day after lunch at school under the supervision of the teacher. The gingival unit without inflammation, tooth surface without plaque, and gingival margin without bleeding were measured before and after the intervention. The results showed that the percentages of gingival units without inflammation, tooth surface without plaque, and gingival margin without bleeding were significantly better in the intervention group than in the control group.

Regular teacher-student research was conducted by Sandeep²³ involving nine teachers and 279 students. Questionnaires were distributed to teachers before and after being educated by dentists. Questionnaires were given to students to evaluate their knowledge and actions in regards to oral and dental health before and after the training program by teachers. The OHI-S of students was also measured before and after the training program by teachers. The results suggested that a significant increase was found in students' knowledge and actions after the teacher training program. There was a significant increase in students' oral hygiene status after training. Research conducted by Sandeep is also in line with research conducted by Syed (2016).²⁴

Research conducted by M. Aljanakh²⁵ with the questionnaire method was done among 223 teachers. The results showed 94% of teachers approved that their role in dental health efforts at schools remained effective. 96% were interested in being promoters of dental health programs in schools. 91.9% of teachers agreed that education about oral health should be included in the curriculum. Research by Sami²⁶, showed that teachers in the sample group had good knowledge ($p < 0.001$) and acceptable attitudes ($p = 0.001$) regarding dental and oral health. M. Sami's research supports the research conducted by Prabhadevi²⁶, but not in line with research conducted by Mota²⁷ and Ezgi²⁸ which show teachers did not have good knowledge and attitudes regarding oral health.

The regular teacher-student studies mentioned previously show that teachers are very likely to play a role in influencing students'

dental health behavior, which in turn will improve students' oral hygiene. It may happen, as revealed in Abdul Haleem's research¹⁸, that the key to this is repetition and reinforcement. The role most likely to be involved with repetition and reinforcement is the teacher when compared to health workers who can only be visited 1-2 times a year. In addition, this is also possible because teachers are close to their students, role models for students, trained in educating, and understand how to teach according to the condition of their students. Previous studies have also shown that teachers should be given training first, and then inform students. The objective of this study is to improve the teacher's knowledge and attitudes about oral health. If the teacher does not have the proper knowledge and attitude about oral health, the effect that will be given will not be maximal. According to the WHO, education through schools is an effective way for developing countries because it can be done early, it is practical, it covers many subjects, and it has proven successful in many countries.

The teacher-student with special needs study conducted by Aarti²⁹ measured the initial OHI-S, and had teachers trained on how to improve oral hygiene and give instructions to student's audio visually and verbally. Seventy-one students with specific learning disabilities were divided randomly into three groups. Group I received no further education, only initial education. Group II received further education from teachers for 15 days, in one month and three months intervals. Group III received further education from dentists for 15 days, in one month and three months intervals. OHI-S score was then measured again. The results showed that Group II showed a significant decrease in the OHI-S score after the intervention and the three groups showed a statistically significant difference in the OHI-S score between the baseline score and the 6th month score.

The teacher-student with special needs study conducted by Kitticai³⁰ had the DMFT/dmft and DI-S of 32 students with special needs measured. An oral health program involving teachers, caregivers, parents, and dental students was formed. The oral health of students with special needs was re-measured one year later. The contents of the program included snacks between meals, choosing fruit or low sugar options, brushing teeth together after eating, and rinsing with fluoride after snacks. The

results showed a decrease in the caries index and debris index as follows: 2DMFT 3.2 deft2.23 DI-S 2.15 in 2015 and DMFT 1.4 deft 1.6 DI-S 2.1 in 2016.

The teacher-student with special needs study conducted by Radhika³¹ had 60 students with mental and physical limitations examined for their initial OH status. They were then taught how to brush their teeth using the fones technique by supervising staff assisted by teachers. Students had their OH status (caries index/DMFt index, gingival health/gingival index, and plaque accumulation/plaque index) measured after three months. The results showed that in the mentally challenged and cerebral palsy groups, the changes in gingival index scores and the plaque index were not significant. The orthopedic disability, hearing loss, and autism groups showed significant improvement in plaque index and gingival index.

The studies above yielded varying results. Research conducted by Aarti²⁹ showed a decrease in OHI-S scores in group II. This seems to be due to students with special needs still being physically capable of practicing oral hygiene despite having difficulty in accepting new concepts. With continuous repetition and strengthening by the teacher, the oral hygiene of students with specific learning disabilities increases. This differs from research conducted by Radhika²⁸, where the results vary widely. It seems that the method of delivering material performed by the teacher must be adapted to the specific needs of students. Special needs students need more guidance, evidenced by research conducted by John³², where it was found that 62% of students with special needs had one or more dental cavities. 80% had no restoration. 70% had moderate to severe plaque scores.^{33,34}

Almost all students with special needs require oral health education. To conclude, regular repetition and strengthening by teachers can support the success of OH promotion programs in schools for regular students as well as special need students. Lack of robust evidence points to the need for further research on the teachers' role in the OH of regular students, especially special need students.

Conclusions

Regular repetition and strengthening by teachers can support the success of OH promotion programs in schools for regular students as well as special need students. Lack of robust evidence points to the need for further research on the teachers' role in the OH of regular students, especially special need students.

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Declaration of Interest

The authors report no conflict of interest.

No	Title	Author	Year	Conclusion
1	The role of repetition and reinforcement in school-based oral health education-a cluster randomized controlled trial	Abdul Haleem	2016	Repetition and reinforcement play an important role in the success of health efforts in schools. Teachers can be coaches in this program
2	Effect of Training School Teachers on Oral Hygiene Status of 8-10 Years Old Government School Children of Udaipur City, India	Sandeep Jain	2016	Teachers need good knowledge, attitudes and actions about dental and oral health (can be obtained from dentists) and can be effectively conveyed to students
3	Effect of a school-based oral health education in preventing untreated dental caries and increasing knowledge, attitude, and practices among adolescents in Bangladesh	Syed Emdadul Haque	2016	Dental and oral health education is proven to increase students' knowledge of attitudes and actions. This also reduces the number of untreated caries.
4	Evaluation of the Effectiveness of a Primary Preventive Dental Health Education Programme Implemented Through School Teachers for Primary School Children in Mysore City	Jaya Naidu	2017	School teachers are the right personnel in running a dental health program at school
5	Effect of a School-Based Supervised Tooth Brushing Program In Mexico City: A Cluster Randomized Intervention	S. Aida Borges	2017	The toothbrushing supervision program in schools is effective and can improve oral hygiene and has a major impact on plaque and gingivitis. Need to improve this program in schools
6	The role of the teacher in improving the dental and oral health of students in elementary school	Ana Riolina	2017	teachers play a role in improving the dental and oral health of students in elementary schools.
7	School-based oral health education increases caries inequalities	Ghalib Qadri	2017	Educational programs by teachers can run effectively in groups of students with good socio-economic conditions. No caries prevention effect was found in groups with low socioeconomic conditions.
8	Comparison of Two School-Based Oral Health Education Programs in 9-Year-Old Children	Ece Eden	2018	Dentists and teachers can provide good knowledge for a short period of time. Further research is needed for a longer period of time
9	The role of teachers in the promotion of dental and oral health in schools	Hermien Nugraheni	2018	It is necessary to hold regular training for teachers to improve their knowledge and attitudes so that they can motivate teachers to actively take the initiative to develop various activities related to the promotion of dental and oral health in schools.
10	Oral Health Knowledge and Attitude among Primary School Teachers of Madinah, Saudi Arabia	Mohammad Sami Ahmad	2015	Further research is needed to measure the teacher's OH condition and its relationship to knowledge, attitudes and actions and evaluate whether teachers pass this knowledge on to students
11	Oral Health Knowledge, Attitude, and Approaches of Pre-Primary and Primary School Teachers in Mumbai, India	Ankita Mota	2016	Teachers in research subjects do not provide students with good knowledge about dental and oral health, do not provide good examples and do not have a qualified approach. Though this will be transferred to the students
12	Teachers' Knowledge about Oral Health and Their Interest in Oral Health Education in Hail, Saudi Arabia	Mohammad Aljanakh	2016	Prepare teachers who are competent in teaching dental and oral health and incorporate this material into the curriculum.
13	Evaluation of the knowledge, attitudes and behaviors of pre-school teachers on oral and dental health in the city center of Trabzon	Ezgi Baltaci	2017	Future teachers should acquire knowledge about oral health during undergraduate education (important and must care for primary teeth, cleaning primary teeth, dentist visits, fluoride toothpaste). This will be applied to students on a regular basis.
14	Knowledge, attitudes, and practices of school teachers toward oral health in davangere, India	Prabhadevi C Maganur	2017	Teachers need comprehensive training on dental and oral health and teachers need to create awareness of the importance of dental and oral health to students.
15	Demography of Oral Health Status for Students and Teachers in Islamic Boarding School	Muhammad Ruslin	2019	Teachers on research subjects must increase knowledge of attitudes and actions about dental and oral health and convey to students because teachers play an important role in preventing students' dental and oral problems
16	Developing leadership in dentists and schoolteachers to improve oral health inequalities	Valerie wordley	2020	With more than 1 million students attending school, school teachers can spread the message of the importance of effectively preventing dental and oral problems. Improving dental and oral health from an early age will have a global impact on increasing the population who cares about dental and oral health.

Table 1. Studies: teachers –regular students.

No	Title	Author	Year	Conclusion
1	Impact of Dental Health Education on "Specific Learning Needs" Children	Aarti H Relwani	2016	School teachers can play a role in the success of dental health efforts on "Specific Learning Needs" students effectively.
2	Oral health status and treatment needs of school children undergoing special education integrated programme in Malaysia – a pilot study	J John	2017	Students with special needs are less aware of the importance of oral hygiene and need further strengthening. Parents and teachers can act as teachers about oral health
3	Preventive Oral Health Care in a School for Children with Special Health Care Needs	Kittichai Sireerat	2017	The program to prevent dental and oral problems has succeeded in improving the dental and oral health of children with special needs. The role of parents, teachers, caregivers is very important.
4	Oral Hygiene Needs of Special Children and the Effects of Supervised Tooth Brushing	Radhika Lamba	2015	Students with special needs still show poor oral hygiene after education. This may be due to lack of coordination, understanding, physical limitations, muscle limitations. Although some groups showed improvement, further research is still needed urgently.

Table 2. Studies: teachers – students with special needs.

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