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ORAL QUALITY OF LIFE IN ADOLESCENTS MEASURED WITH THE CPQ11-14 QUESTIONNAIRE: A SYSTEMATIC REVIEW

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1. RESUMEN

Introducción: La calidad de vida relacionada con la salud bucal (CVRSB) se refiere al impacto de la salud bucal sobre la calidad de vida en distintas dimensiones como la funcionalidad diaria, el bienestar emocional, la interacción social y la satisfacción general con la vida. El Child perception Questionnaire (CPQ) ha sido ampliamente utilizado para medir la CVRSB en adolescentes, y validado en múltiples contextos mostrando propiedades psicométricas adecuadas. El objetivo fue identificar estudios transversales realizados en los últimos 10 años sobre CVRSB utilizando el CPQ11-14 en adolescentes de 11-14 años y realizar una síntesis y evaluación cualitativa.

Material y Métodos: Se realizó una búsqueda bibliográfica en las bases de datos PubMed, Scopus, Lilacs y Web of Science, con las palabras clave “children”, “adolescents”, “scholars”, “CPQ11-14 questionnaire” y “oral quality of life”, siguiendo la declaración PRISMA, y el Riesgo de Sesgo (RdS) fue evaluado con el instrumento AXIS.

Resultados: Se incluyeron siete estudios con una puntuación promedio CPQ11-14 baja (22,23); el dominio “Bienestar social” fue el más afectado (puntuación = 7,02). La calidad de los estudios fue generalmente media y baja con un RdS moderado. La maloclusión y el asma tuvieron un impacto negativo en la CVRSB, no así la experiencia previa de caries. La influencia de la edad, género y clase social no fue concluyente.

Conclusiones: La puntuación promedio CPQ11-14 (22,23) indica un impacto bajo sobre la CVRSB de los adolescentes. La maloclusión fue la única patología oral que tuvo un impacto significativo en la CVRSB, así como la fluorosis dental de grado moderado. Otros factores no mostraron resultados concluyentes. El alto impacto sobre el “Bienestar social” pone de manifiesto el destacado papel de la salud oral en las relaciones interpersonales en este grupo de edad. El conocimiento de estos factores contribuirá a mejorar la salud oral de los adolescentes.

2. ABSTRACT

Introduction: Oral health related quality of life (OHRQOL) refers to, how the individual´s oral health impacts their quality of life in different dimensions like daily functioning, emotional wellbeing, social interaction, and overall life satisfaction. The Child perception Questionnaire (CPQ) has been widely used to measure OHRQOL in adolescents and has been validated in multiple contexts showing adequate psychometric properties. The aim was to identify cross-sectional studies carried out in the past 10 years on oral health related quality of life using the CPQ11-14 questionnaire in adolescents 11-14 years old and to perform a qualitative synthesis and assessment.

Material and Methods: A literature search was carried out in the PubMed, Scopus, Lilacs, and Web of Science databases, with the search words “children”, “adolescents”, “scholar”, “CPQ11-14 questionnaire” and “oral quality of life”. The selection process followed the PRISMA statements and RoB was assessed with the AXIS tool.

Results: Seven studies were included in the systematic review with an average low CPQ 11-14 score (22.23); the domain “Social well-being” was the most affected (score=7.02). The quality of the studies was mostly medium and low with a risk of bias higher than expected. Malocclusion showed a strong negative impact on OHRQOL, so does asthma while previous caries experience did not. The influence of age, gender and social classes was not conclusive. Global satisfaction with oral health showed a positive correlation with OHRQOL.

Conclusions: The average CPQ11-14 score (22.23) reflects a low impact of oral health on quality of life in adolescents. Malocclusion was the only oral pathology showing a significant impact on OHRQOL, as well as dental fluorosis of moderate degree. Other factors’ influence was not conclusive. The high impact on “Social well-being” reveals the prominent role of oral health on interpersonal relations at this age. Knowledge of these factors will improve oral health care in adolescents.

3. KEYWORDS

I. Child perception Questionnaire 11-14
II. Oral quality of life
III. Adolescents
IV. Children

ABBREVIATIONS

AXIS tool = Appraisal tool for Cross-Sectional Studies
C-OIDP = Child Oral Impacts on Daily Performances
COHIP = Child Oral Health Impact Profile
COHIP-SF19 = Child Oral Health Impact Profile short form
CPQ = Child perception Questionnaire
CPQ6-7 = Child perception Questionnaire for 6- to 7-year-old children
CPQ8-10 = Child perception Questionnaire for 8- to 10-year-old children
CPQ11-14 = Child perception Questionnaire for 11- to 14-year-old adolescents
CPQ11-14 ISF8 = Child perception Questionnaire for 11- to 14-year-old adolescents 8-item short-form
CPQ11-14 ISF16 = Child perception Questionnaire for 11- to 14-year-old adolescents 16-item short-form
CVRSB = Calidad de vida relacionada con la salud bucal
DMFT = decayed, missing, and filled teeth
ECOHIS = Early Childhood Oral Health Impact Scale
EWB= Emotional well-being
FIS = Family Impact Scale
FL = Functional Limitations
GOHAI = General oral health assessment index
HRQOL = health related quality of life
MIH = Molar Incisor Hypomineralization
OHRQOL = Oral health related quality of life
OHIP = Oral Health Impact Profile
OIDP = Oral Impacts on Daily Performances
OS = Oral Symptoms
P-CPQ = Parental-Caregiver Child perception Questionnaire
PIO = Population, intervention, outcome
PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analysis
RdS = Riesgo de Sesgos
RoB = Risk of bias
SDG = Sustainable Development Goal
SWB = Social well-being

4. INTRODUCTION

4.1 Background of oral health related quality of life

Oral health related quality of life (OHRQOL) is a multidimensional construct which concerns the perception of the individual's impact of oral conditions including oral diseases, treatments, and interventions, on his daily life and functioning (1,2). Oral health has an influence on how people enjoy their life, speak, socialize and how they feel. Oral health influences the people's quality of life on a psychosocial and physical level (3). There are several definitions given for OHRQOL, one of them defines OHRQOL as “a multidimensional construct that reflects (among other things) people’s comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health”, which is provided by the United States Surgeon General's report (4,5). In general, all definitions of OHRQOL address the patient's oral health complaints and take into account their effect on the daily life of the patient on several dimensions like emotional needs, physical needs, desires and social well-being (6). The surrounding environment is also a dimension which influences OHRQOL, so is treatment expectations and satisfaction. OHRQOL is important because it allows to improve the decision making by also including the patients social and emotional experience and physical functionality for finding the most appropriate treatment goals and outcomes (1,7).

4.2 History of OHRQOL

Before OHRQOL appeared, there was *health related quality of life* (HRQOL) which started in the 1960s. The exclusion of the oral diseases in the quality of life was due to the belief that oral diseases are not related to general health and do not have any impact on the quality of life. The oral diseases did not fit in the classic “sick role” and therefore were not classified as an important problem and more as a cosmetic issue and left out in the theoretical model of HRQOL (4,8,9). OHRQOL started to appear in the 1970 as more evidence was found that oral diseases have an impact on social roles. The clinical indicators of oral diseases (e.g. dental caries, periodontal diseases) did not fit to capture the new definition of health from the WHO which defines health as a complete state

of physical, mental, and social well-being and not just the absence of disease. New indicators and instruments were needed to measure the social, mental, and physical impact of the oral diseases on the individual (1,3,8). Different models were established to link clinical variables with social factors, environmental factors and psychological factors with the aim to reflect the individual's self-perception and his satisfaction with respect to his oral health (1).

4.3 Role of OHRQOL in dentistry

The usage of OHRQOL in dentistry is fundamental in different areas of dental health. Mostly in the clinical practice of dentistry, dental research, and dental education. In clinical practice it is used for identifying and prioritizing problems in the patient, for facilitating communication between the dental team and the patient, for screening for hidden problems which otherwise would not have been noticed, to facilitate shared clinical decision making between dentist and patient and monitoring changes and responses to treatments in the patient (8,9).

Also, OHRQOL has a positive influence on the individual to be motivated to maintain good oral health and visit the dentist periodically for check-ups and maintain an aesthetic dental appearance. OHRQOL also helps with the education of the individual by letting them understand how the different oral diseases influence their quality of life and help them to increase their quality of life by enforcing their preventive measures to prevent a decrease in quality of life (4).

In dental research OHRQOL plays an important role because it can link oral diseases to the impact that they have on daily life and to the general health of the individual. It also has a key function in measuring health disparities and access to care all over the world and improving oral health and the quality of life in different populations and minorities. OHRQOL helps by defining proper treatment goals and helps by decision making especially in chronic oral diseases, where curing the diseases is not possible and increasing the quality of life becomes the main goal (1,4).

4.4 Instruments to measure OHRQOL

To measure the OHRQOL in the population or in individuals, three distinct types of instruments have been developed: social indicators, global self-ratings, and multiple-item questionnaires. *Social indicators* are normally used with large population surveys to assess the burden that oral diseases have on the day-to-day life in the community. Examples for that are work or school loss due to oral conditions. *Social indicators* are mostly used by policy makers. In *global self-ratings* the individual gets asked a general question about their oral health and he has to answer it by means of self-evaluation (4,8). The most used instruments to measure OHRQOL are *multiple item questionnaires*.

4.5 Multiple item questionnaires

There exist many different questionnaires which have been developed for many varied reasons. All multiple item questionnaires need certain properties to which belong validity, appropriateness and acceptability, reliability, responsiveness to change and interpretability (8).

The number of questions (Items) included in the multiple item questionnaires differs from questionnaire to questionnaire and are important to consider when selecting a multiple item questionnaire. By selecting a questionnaire with less items, the possibility of missing relevant information is higher than with questionnaires with many items. Therefore, in studies, which are meant to assess the impact of certain diseases or disorders on the quality of life, more items will give a more sensitive result. If the aim of the study is to evaluate the general OHRQOL in a large population or study sample, multiple item questionnaires with a low item number can be used because they will lower the burden for the respondent and simplify the administration (10). There also have been developed different versions of the same multiple item questionnaires, which differ in item number. In that way it is possible to choose a more suitable version of a questionnaire for a specific study (6,10).

There exist different response options depending on the multiple item questionnaire used. For example, the *Social dental scale questionnaire* has a yes/no response option. A more used response format is a Likert scale rating

where the respondent can choose between various categories like in the *General oral health assessment index* (GOHAI) where there are 6 response options from always to never (8,10,11).

Different multiple item questionnaires have different recall periods. The recall period is the time in the past to which the asked question refers for example the last 3 months. One multiple item questionnaire should have the same recall period for all questions (10).

The administration of the questionnaires to the population or study sample can be different depending on the study design. They can be administered through a personal interview which is face to face, which is suitable in a smaller study sample or by self-administration. In the self-administered method the study sample fills out a questionnaire by themself, which is more recommended when the study implies a large study sample or population (10).

The multiple item questionnaires can be generally classified into two groups, *generic measures,* or *disease specific measures*. The generic instruments can be used to measure the oral health in general and allows a comparison between different populations, interventions, or conditions (10). While the specific instruments were developed to measure a specific oral disorder or disease and its impact on the quality of life (4,6). The problem with the generic instruments is when they are applied to patients suffering oral diseases or disorders, they might not be sensitive or accurate enough to be able to measure that disease's impact on the patient's quality of life. In that case the specific instruments developed for that specific disease or disorder are more suitable to measure the impact on the quality of life. Therefore, the specific instruments might miss broader factors which have an influence on the quality of life of the patient because they are focused on the specific disorder and its symptoms (6,12).

A widely used multiple item questionnaire to measure OHRQOL is the *Oral Health Impact Profile* (OHIP). It was developed by Slade and Spencer in the year 1994 to evaluate the quality of life of old people and was used in research in

different fields like prosthodontics and periodontics (6,8,13). There exist 20 different versions of OHIP questionnaires which were developed for distinct reasons (13). The original OHIP questionnaire consists of 49 items divided into 7 subsections and has a Likert scale rating (6,8,11). Another often used instrument to measure OHRQOL was the *geriatric oral health assessment index* (GOHAI) developed by Atchison and Dolan in the year 1990(8,11,13). It was mainly used to evaluate the degree of the psychosocial impact associated with oral diseases in the older population (11). It consists of 12 items which are administered by self-administration (8,10).

4.6 Multiple item questionnaires for children

Measuring the OHRQOL in children or adolescents is different from measuring in an adult population because children are in a period of development on a cognitive and physical level (1,11,14). There have been multiple item questionnaires developed specifically for children (11,13). To measure OHRQOL in children can be challenging because they change cognitively and physically a lot depending on the age of the child (1,11). Therefore, many instruments have been developed specially for children and adolescents in specific age groups, to be able to measure their OHRQOL depending on their unique factors (2,14).

The most used and famous child OHRQOL instruments are the *Child Perception Questionnaire* (CPQ), the *Child Oral Health Impact Profile* (COHIP) and the *Child Oral Impacts on Daily Performances* (C-OIDP) (14–17). CPQ and COHIP measure the frequency of impact, while C-OIDP measure the frequency and severity of impact. COHIP was developed by Broder and Wilson-Genderson in the year 2007 and has 34 items divided into 5 dimensions and responses are given in a Likert scale rating for events occurring in the last 3 months (11,17,18). This questionnaire was specially developed for children in the age group of 8-15 years and is the first child OHRQOL questionnaire which has also incorporated positive health items (17–19). Another version of COHIP is the *COHIP short form* (COHIP-SF19), which is commonly used because it is faster to administer as it consists of 19 items (14,15,17). The C-OIDP questionnaire was developed in 2004 by Gherunpong et al. in Thailand to measure the OHRQOL in 12-year-old children (11,14). It is a changed version of the adult questionnaire Oral Impact on

Daily Performances (OIDP) (11,17,20,21). It consists of 8 items and has a Likert scale rating as response format (11,14,17). The recall period is 3 months for the questionnaire, and it may be interviewer administered or self-administered (17,20).

4.7 Background of the Child Perception Questionnaire (CPQ)

The Child perception Questionnaire (CPQ) is one of the most widely used instruments to measure the OHRQOL in children and adolescents (11,16,22,23). It was developed by Jokovic et al. in the year 2002 in Canada and is a generic child OHRQOL instrument (11,14,23). Over the time it has been validated in multiple cultural contexts and showed adequate psychometric properties (16,23). It was developed to be used as an outcome measure in clinical trials and evaluation studies to assess the child's own perceptions of the impact of oral diseases or conditions in relation to his quality of life (11,22). Jokovic et al. used in his study for the development and validation of CPQ, children of the age from 11 to 14 years with dental caries, malocclusion and cleft lip and/or cleft palate (24,25). Several studies have shown that the CPQ questionnaire is able to show the impact of different oral conditions or diseases in different fields like Orthodontics, Periodontology, Restorative dentistry, Traumatology and Psychology (16).

The original language of the CPQ questionnaire is English, but over the time there have been multiple validated translations of the questionnaire which makes it suitable to be used in many studies all over the world (16,23). It is a self-administered questionnaire which has a 5-point Likert scale rating as a response format (11,16,17). The response options are “never” with the score 0, “once or twice” with the score 1, “sometimes” with the score 2, “often” with the score 3 and “every day or almost every day” with the score 4. The score gets calculated by adding the points of all questions together. The recall period for the questions is 3 months (11,15,16,22–24,26). A higher score means an increased impact of oral conditions or diseases on the quality of life in the children, meaning a poorer OHRQOL (11,16,23).

4.8 Versions of the CPQ questionnaire

There exist different versions of the CPQ questionnaire for various purposes and different age groups (14,17,23,24,26). In general, there are three questionnaires for children (CPQ6-7, CPQ8-10 and CPQ11-14) and two questionnaires which evaluate the perception of the parents or caregiver of the child's OHRQOL (Parental-Caregiver CPQ (P-CPQ) and Family Impact Scale (FIS)) (11,17,27). In relation to questionnaires for children, **CPQ 6-7** was developed for children in the age group from 6 to 7 years of age and **CPQ 8-10** for children of 8 to 10 years of age (26,27). They have 25 items divided into 4 dimensions and only have a recall period of 4 weeks (14,17). For the **CPQ11-14** questionnaire there are three different versions available. Two of them are *short forms* of the original CPQ11-14 questionnaire. One of the short forms has 16 items (CPQ11-14 16-item short-form (CPQ11-14 ISF-16)) which is frequently used, and the other one has 8 items, in both cases divided into 4 dimensions (CPQ11-14 ISF8). The short forms are often used because they are easier for the respondent and faster to analyze in a large population or study sample (15,17,24,26). In relation to questionnaires to be answered by the parents-caregivers, **P-CPQ** has 31 items and evaluates the impact of oral conditions on the quality of life through the perception of the parents or caregiver. The **FIS** has 14 items and evaluates the impact of oral conditions or diseases on family life. In both questionnaires, the parents or caregiver fill them out as a proxy for the children (2,11,17,28,29).

4.9 CPQ11-14 questionnaire

The original CPQ11-14 questionnaire has 37 items divided into 4 dimensions and a 5-point rating Likert scales response format (11,14,17,25,30). The highest score possible is 148 which means a poor OHRQOL and the lowest is 0 which implies an exceptionally good OHRQOL (11,16,17,25) (Figure S1)**.**

The first dimension is **"oral health"** and consists of a total of 6 items. The first item asks about "pain in the teeth, mouth, lips or jaw". The second one asks about "bleeding gums" and the third about "mouth sores". It follows with "bad breath" as the fourth item and "food stuck in or between the teeth" as the fifth

item. The last item in the first dimension asks about “food stuck to the roof of the mouth” (11,23,25,30).

The second dimension with 9 items asks about **“functional limitations”** and starts with the seventh item which asks the children about “Breathing through mouth”, followed by the eights item “taken longer than others to eat a meal”. The ninth item asks about “having trouble sleeping” and the tenth is about “difficult to bite or chew food like apples, corn on the cob or steak”. Item number 11 asks the children about “difficulties opening your mouth”, item number 12 asks about “difficulties to say any words" and number 13 about “difficulties eating food you would like to eat”. The last two items in that dimension, item 14 and item 15, are about “difficulties to drink with a straw” and “difficulties to drink or eat hot or cold foods” (11,23,25,30).

The third dimension **“emotional well being“**consists of item number 16 to item number 24, in total also 9 items. The first question asks the children if they “felt irritable or frustrated”, followed by “felt unsure of yourself”. Item 18 is about “feeling shy or embarrassed” and item 19 about “concerned about what other people think about your teeth or mouth”. The next item, item 20, is about “worried that is less attractive than other people” and then followed by item 21 “felt upset”. Item 22 is “felt nervous or afraid” and the last two items in that dimension, items 23 and 24 are if they are “worried that is less healthy than other people” and “worried that is different than other people” (11,23,25,30).

The last dimension **“social well being"** is the biggest one with 13 items. It starts with item 25 “missed school because of your teeth or mouth” and item 26 “had problems paying attention in school”. Item 27 asks about “difficulties doing homework” and item 28 asks about “did not want to speak or read out loud in class”. Then follows item 29 with “not wanting or being unable to participate in sports and club activities” and item 30 with “not wanting to talk to other children”. The next item is number 31 and is about “avoiding smiling or laughing when around other children” and then comes item 32 which is about “had difficulty playing a musical instrument such as a recorder, flute, clarinet, trumpet”. Item 33 is “not wanted to spend time with other children” and item 34 asks if they “argued

with other children or their family". The last 3 items in the questionnaire are item 35 "Teased or called names by other children", item 36 "left out by other children" and item 37 "asked questions about your teeth, lips, jaws or mouth by other children" (11,23,25,30).

5. JUSTIFICATION AND HYPOTHESIS

JUSTIFICATION

The CPQ11-14 is a validated instrument widely used to assess the impact of oral health on the quality of life of children and adolescents between the ages of 11 and 14 (16,22,26). The questionnaire encompasses various dimensions, including oral symptoms, functional limitations, emotional well-being, and social well-being, allowing for a comprehensive evaluation of the influence of oral health on the overall well-being of this age group (14,25,30). This questionnaire has been validated and cross-cultural adapted in various settings, but up to my knowledge, it has been rarely used in Spain, reason it is justified to update the information on its use in the country where I am carrying out my Bachelors Dentistry Degree Thesis as well as in other Spanish speaking countries. Also, this systematic review may contribute to an updated qualitative synthesis of main recent results found on oral quality of life in adolescents, using this questionnaire. The use of CPQ11-14 questionnaire may contribute to achieve Sustainable Development Goal (SDG) “Good health and well-being” in adolescent population, as it considers the effect of oral health on physical, functional, emotional and social factors affecting daily life in this age group; and oral health is a prominent factor contributing to general good health (1,11,25).

HYPOTHESIS

The hypothesis of this systematic review is that the administration of the CPQ11-14 questionnaire in adolescents aged 11 to 14 years, will reveal a significant relation between oral health and oral quality of life.

6. OBJECTIVES

General objective:

The objective of the systematic review is to identify recent cross-sectional studies on oral health related quality of life using the CPQ11-14 questionnaire in adolescents at the age of 11 to 14 years and to perform a qualitative synthesis and evaluate them.

Specific objectives:

1. Identify the impact of oral health on oral quality of life in adolescents
2. Assess risk of bias in transversal studies using the CPQ11-14 questionnaire

7. MATERIAL AND METHODS

This systematic review was done following the PRISMA statement 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analysis).

7.1 Identification of the PIO question

The search strategy was done following the PIO (Population, intervention, outcome) question strategy. The established PIO question for this systematic review was “How is oral quality of life in adolescents measured with the CPQ11-14 questionnaire?”.

- P (Population): adolescents 11-14 years old
- I (Intervention): administration of the questionnaire CPQ11-14
- O (outcome): assessment of the oral quality of life in adolescents

7.2 Eligibility criteria

The eligibility criteria were established using the PIO question strategy as help.

The inclusion criteria were cross-sectional studies on adolescents 11 to 14 years of age using the validated CPQ11-14 questionnaire. It had to be published between 2013 and 2023, in the English language and with access to the original complete article.

The exclusion criteria were: Systematic reviews, meta-analysis, literature reviews, case-control studies, case-series, cohort’s studies, reports, papers, conference proceedings and longitudinal studies. Also, studies including children younger than 11 years old and adolescents and adults older than 14 years of age. Any other kind of questionnaire or not validated CPQ11-14 questionnaires were also an exclusion criterion and additionally any other language than English or no full text access were also excluded (Table 1).

CRITERIA	INCLUSION	EXCLUSION

Study design	cross-sectional	Systematic reviews, meta-analysis, literature reviews, case-control studies, case-series, cohort's studies, reports, papers, conference proceedings, Longitudinal studies
Population	Adolescents	-
Range of age	aged 11–14 years old	-
Type of questionnaire	validated CPQ11-14	Modified CPQ11-14
Publication date	2013-2023	-
language	English	-
Type of publication	Original article, complete text	-

Table 1: Inclusion and exclusion criteria.

7.3 Information sources and search strategy

An electronic systematic literature search was done in the databases PubMed, Web of Science, Scopus, and Lilacs on the 22nd of November 2023 to identify cross-sectional studies that used CPQ11-14 questionnaire for measuring the OHRQOL in 11 to 14 years old adolescents. The search strategy was formulated with the help of the PIO question strategy. The search words used were "children", "adolescents", "scholar", "CPQ11-14 questionnaire" and "oral quality of life ". These search words were connected using the Boolean operators "AND" and "OR". In all 4 databases the same filters were applied, which were publication date between 2013 and 2023, and language English. In the database Scopus, the filter "subject area dentistry" was also applied (Table 2).

PIO	P(population)		I(intervention)		O(outcome)
	adolescents 11-14 years old		administration of the		assessment of the oral quality of life in adolescents

			questionnaire CPQ11-14		
search words/ search strategy	children OR adolescents OR scholar	AND	CPQ11-14 questionnaire	AND	oral quality of life

Table 2: Search strategy with MeSH terms.

A full description of the search strategies is shown in supplementary material Figure S2.

7.4 Selection process

The study selection process was carried out in two stages. The duplicates were removed with Zotero data manager and then the first stage of screening followed. The title and the abstract of each article were read, and the inclusion and exclusion criteria were applied. Articles that did not fit the inclusion criteria were discarded and collected in a table with their author's name, publication year, title of article and reason for exclusion (Table S1). Then the second stage of screening followed. The entire article was read, and the inclusion and exclusion criteria were applied. Articles which did not fit the inclusion criteria were discarded and collected in a table with their author's name, publication years, title of article and reason for exclusion (Table S2). The remaining articles were included in the systematic review. Every step was filled in the PRISMA 2020 flow diagram (Figure 1).

7.5 Data extraction

The following data were extracted from the articles and collected in a table: The author's name, publication year and country of origin of the study, the study's aim, the sample selection method and sample size, the age range of the study sample and the sex in percentages. Also, the mode of completion of the questionnaire (self-administered or interviewed), administration context and the type of intervention that they did on the study sample, if any, for example an additional oral exam. The study's sample inclusion and exclusion criteria, the mean CPQ11-14 questionnaire results and the quality of the study measured with the criteria I selected to apply the AXIS tool (Table 3, Figure S3, Table S3).

7.6 Risk of bias tool and quality assessment

To assess the risk of bias and the quality of the included studies, the Appraisal tool for Cross-Sectional Studies (AXIS tool) was used (Figure S3). The AXIS tool introduced in 2016 is made of 20 items with a “Yes”, “No” or “Do not know/comment” response option. It has one item for the Introduction, 10 items for the Material and Methods, 5 items for the Results, 2 items for the Discussion and 2 items for other parts. For each study, a table was filled out answering the 20 items of the AXIS tool (Table S4-11). It was decided to use these criteria: Studies that complied with 18-20 items were classified as “high quality”. Studies that complied with 16-17 items as “medium quality” and studies that complied with less than 16 items were classified as “low quality”.

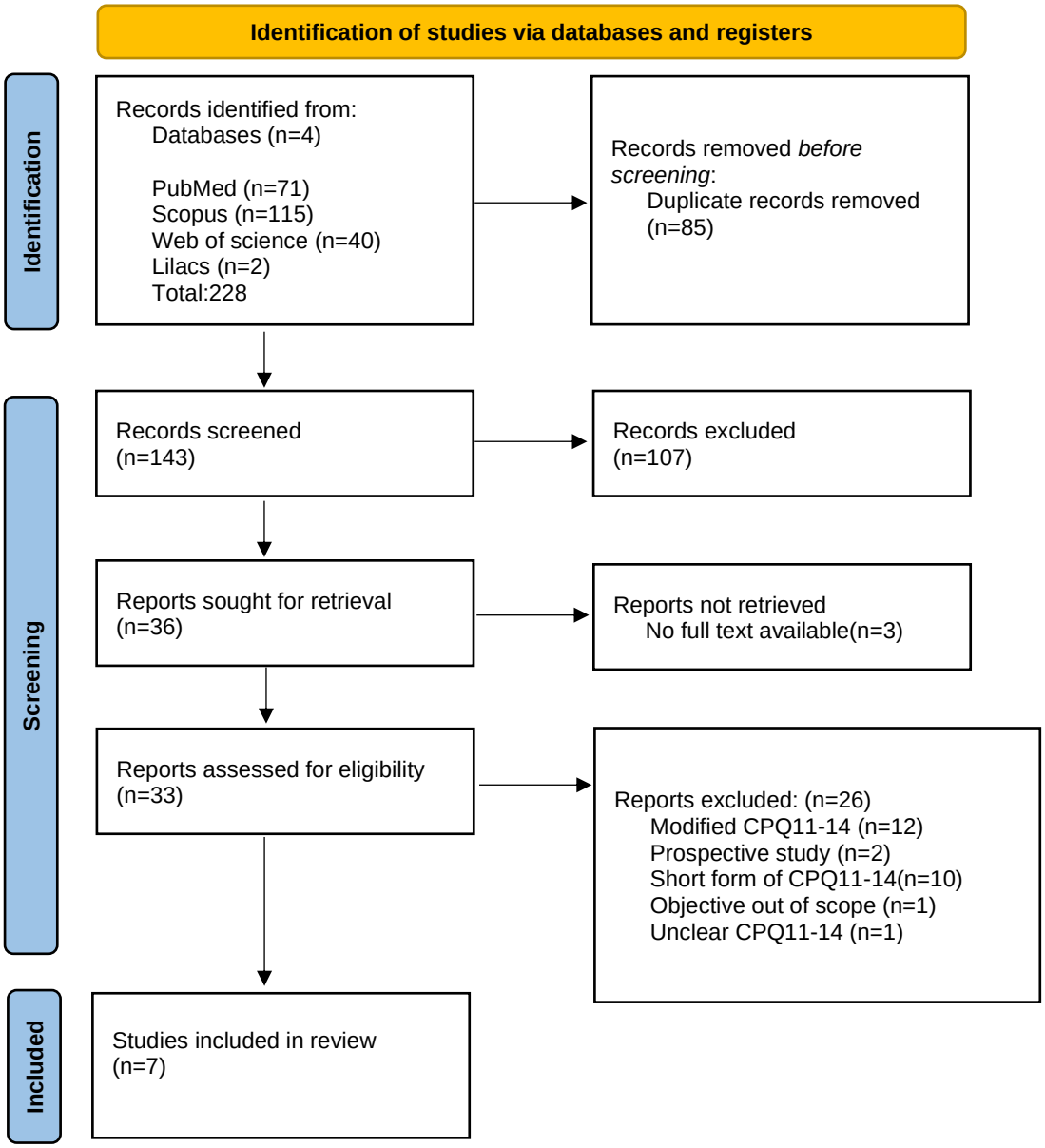
7.7 Data synthesis

The extracted data were divided into qualitative variables and quantitative variables. To the qualitative variables belonged: Author’s name, country, study’s aim, sample selection method, completion of questionnaire, administration context, type of intervention, sample’s inclusion and exclusion criteria, and the quality of the study. The quantitative variables were: Year, sample size, age range and sex in percentage and mean CPQ11-14 score. Both qualitative and quantitative variables will be discussed in the “qualitative synthesis” section, in Results.

8. RESULTS

8.1 Study selection and Flow diagram

The electronic search identified 228 articles in total: 71 in PubMed, 115 in Scopus, 40 in Web of science and 2 in Lilacs. 85 duplicates were removed, and 143 articles remained for the screening of title and abstract. From these 143 articles 107 were excluded (Table S1). 36 articles were sought for retrieval and 3 of them were not retrieved because no full text of the articles was available. 33 articles were assessed for eligibility and 26 were excluded (Table S2). 7 studies remained to be included in the systematic review (Figure 1).



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Figure 1: Flow diagram filled in.

8.2 Characteristics of included studies

Four out of the seven included studies were done in India (31–34) and the other three studies were done in Europe (Spain, Lithuania, and Italy) (30,35,36). Five of the studies were done to validate and evaluate the CPQ11-14 in a new language (30–32,34,36), while the other two studies used an already validated CPQ 11-14 questionnaire to assess the OHRQOL in relation to a diseases/ dental abnormality (33,35) (Table 3).

Regarding the methodology followed in the selected studies, all studies obtained ethical approval and informed consent from participants. Six studies calculated and justified their sample size (30-33,35,36) and one study did not calculate or justified it (34). Three studies did not mention their inclusion and exclusion criteria (30,31,34). One study had as inclusion criteria the birth year 1994 so they only obtained 14-year-old participants (36) and two studies excluded uncooperative children and children suffering from systematic diseases and other developmental anomalies (32,33). Another study included only 11–14-year-old children which were diagnosed at least one year before the study began with asthmatic pathology and excluded children with previous orthodontic treatment, caries or untreated periodontal pathology, craniofacial anomalies, temporomandibular joint pathology, and cognitive disorders (35). Only two studies had a study sample which was representative of the general population (30,32) and the other 5 studies had taken their study sample from only one restricted geographical area (31,33-36). Three studies assessed the non-responders (30,31,36) and the other four studies did not mention or undertake any measures to assess them (32-35). Five studies assessed psychometric properties of the CPQ11-14 in different languages (30-32,34,36) and four of them showed good reliability and validity (30,31,34,36). The other study that assessed psychometric properties showed that the used CPQ11-14 questionnaire lacks discriminant validity (32). One study did not assess the psychometric properties but used a CPQ11-14 which already was validated (35) and another study used a CPQ11-14 questionnaire which showed poor discriminant validity (33). Six

studies in total used Cronbach's Alpha to assess the reliability (30-34,36). Six studies did not describe their methods sufficiently enough to be repeated (30-32,34-36), only one study did (33). All seven studies used appropriate statistical methods to analyze their data. One study did not describe their results adequately (32), the others did (30,31,33-36). All studies have their discussion justified by their results and discussed their limitations of the study, except one which did not mention their limitation (34). One study had a funding source that may lead to a conflict of interests that affects the authors interpretation of the results (36). The other six studies did not have any conflict of interests (30-35). Only two studies mentioned that they followed Strobe Guidelines (33,35).

Author / Year / Country	Study's aim	Sample selection method / Sample size (N)	Age range / Sex (%)	Completion mode of CPQ 11-14 questionnaire / Administration context	Type of intervention	Sample´s inclusion and exclusion criteria	Results (mean CPQ11-14 score)	Quality of study (AXIS tool)
Curto et al. / 2023 / Spain (35)	to analyze the need for orthodontic treatment in asthmatic children aged 11 to 14 years and to evaluate their OHRQOL	through dental screening program at the dental clinic of the university of Salamanca / N=140	11 to 14 years old / female: 52.1, male: 47.9	Completion mode not stated / Dental clinic of the University of Salamanca	Questionnaire, oral clinical examinations	Inclusion criteria: patients aged between 11-14 years, diagnosed at least one year before study began with asthmatic pathology according to the criteria established by the Spanish Society of Pediatrics. Exclusion criteria: previous orthodontic treatment, caries or untreated periodontal pathology, craniofacial anomalies (cleft lip or palate), temporomandibular joint pathology, cognitive disorders	46.69	Low quality
Jain et al. / 2020 / India (31)	to develop a cross-culturally adapted Hindi version of the CPQ11-14 and to assess its validity for use among Hindi-speaking Indian children	two-stage cluster random sampling technique / N= 1000	11 to 14 years old / female: 43.8, male: 56.2	self-administered / 8 schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17	Medium quality

Kavaliauskiene et al. / 2019 /Lithuania (30)	to validate a Lithuanian version of the full CPQ11-14 questionnaire with a random sample of children aged 11 to 14 years	two-stage cluster sampling technique / N= 307	11 to 14 years old / female: 58.3, male: 41.7	Completion mode not stated / school classrooms	Questionnaires	Sample´s inclusion and exclusion criteria not stated	9.73	High quality
Kumar et al. / 2016 / India (34)	to assess the validity and reliability of CPQ11-14 in Telugu speaking school children in Telangana (India)	multi-stage probability sampling method / N=1342	11 to 14 years old / female: 41, male: 59	Completion mode not stated / schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17.15	Low quality
Olivieri et al. / 2013 /Italy (36)	to develop an Italian version of the CPQ11-14 and to assess the instrument's validity in an Italian population of adolescents	random cluster sampling / N=561	14 years old / female: 48, male: 52	Completion mode not stated / Administration context not stated	Questionnaire, oral clinical examinations	Inclusion criteria: year of birth 1994, consent forms signed by parents	15.4	Medium quality
Shyam et al. / 2020 / India (33)	to assess the impact of dental fluorosis on the OHRQOL among 11 to 14 years old school children in endemic fluoride areas of Haryana (India)	Cluster random sampling technique and simple random sampling procedure / N=2200	11 to 14 years old / female: 54.7, male: 45.3	self-administered / school rooms	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	29.8	Medium quality

Shyam et al. / 2019 / India (32)	to evaluate the Hindi (Indian) version of the CPQ11-14 among 11-14 years old school children in Rohtak City, Haryana (India)	Multistage cluster random sampling technique / N=586	11 to 14 years old / female: 27, male: 73	Interview / Administration context not stated	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	21.6	Low quality

Table 3: Data extraction

8.3 Risk of bias within Studies and Quality Assessment

After filling in for each study the AXIS tool (Figure S3) and applying the criteria for quality assessment (Table S3) the results are that one study is of high quality (30), three are of medium quality (31,33,36) and three are of low quality (32,34,35) (Table S4-10).

8.4 Qualitative Synthesis

8.4.1 Population (P)

The total number of participants among all seven studies was 6136 participants. Six studies had an age range of 11 to 14 years for their sample (30–35,) and only one study used only 14-year-old adolescents (36). All studies included both sexes with a total number of 2870 females and 3266 males, which is 46.77% females and 53.23% males of the sample size. Two studies used a population of diseased adolescents or with dental abnormalities as their sample (asthma, dental fluorosis) (33,35). Four studies did not exclude adolescents with any diseases or abnormality or did not mention it (30,31,34,36) and one study excluded adolescents with systemic diseases or other developmental anomalies (32).

Two studies used a two-stage cluster sampling technique as a selection method for their sample (30,31), two studies used a random cluster sampling technique (33,36), one study used a multistage cluster random sampling technique (32), one a multistage probability sampling method (34) and one study selected their sample through screening at a dental university clinic (35).

8.4.2 Intervention (I) (CPQ11-14 questionnaire)

All studies used the original CPQ 11-14 questionnaire in different languages and six studies also used oral clinical examinations to evaluate the oral health of the participants (31–36)**.** One study used only the CPQ11-14 questionnaire as an Intervention (30). The questionnaire was two times self-administered (31,33), one time administered in an interview mode (32) and four times it was not stated (30,34–36). The intervention was done in schools in four studies (30,31,33,34), one study did it in a dental clinic (35) and two studies did

not mention where the intervention was carried out (32,36). The inclusion and exclusion criteria were clearly stated in three studies (32,33,35), one study did not clearly specify it (36) and three studies did not mention it (30,31,34).

8.4.3 Outcome (O)

The results are given as a mean overall CPQ11-14 score and by the different domains in each study. The overall CPQ 11-14 scores range from 9.73 to 46.69, with a total average of 22.23 for all 6136 participants. The domain “Oral symptom” has an average score of 5.5, the domain “Functional limitation” of 5.43, the domain “Emotional well-being” of 6.14 and the domain “Social well-being” of 7.02.

8.5 Factors affecting impact of oral health on oral quality of life in adolescents

8.5.1 Social demographic factor and oral quality of life

One study showed that age had a significant impact on oral quality of life with 11-year-old adolescents having the worst CPQ11-14 score compared with the other age groups (35). Three studies showed statistically significant differences in the gender regarding OHRQOL, in where two of the studies showed that girls had a significant worse CPQ11-14 score than males (30,36) and one study showed that males had a significant worse CPQ11-14 score (33). Two studies showed that there was significant difference of OHRQOL in children according to their social classes, with a better CPQ11-14 score in higher social classes (30,36).

8.5.2 Pathological background and oral quality of life

Two studies which measured the OHRQOL in a population with an underlying disease (asthma) (35) or dental abnormalities (fluorosis) (33) had the worst CPQ 11-14 score with 46.68 and 29.8. The other five studies which targeted the average 11- to 14-year-old school children without screening for specific diseases or dental abnormalities had better CPQ 11-14 scores with the best score of 9.73 and the worst of 21.6 (30–32,34,36).

8.5.3 Perception of oral health and oral quality of life

Five studies which also measured their participants global satisfaction rating on perceived oral health and overall well-being, showed significant positive correlation between it and the overall CPQ score (30-32,34,36).

8.5.4 Oral clinical status and oral quality of life

Five out of the seven studies showed that malocclusion had a significant impact on OHRQOL in children (30,31,34-36). One study could show that fluorosis has a statistically significant impact on OHRQOL (31), whether another study only could show significant impact of moderate to severe fluorosis and not mild fluorosis (34). A third study could not show any significant impact of fluorosis on OHRQOL, but the author justified it with the fact they only had a mild degree of fluorosis in their sample (33). Only one study could show that caries experience showed a significant negative impact on OHRQOL (30). Three other studies did not have any significant difference in CPQ11-14 score in the children with or without caries (32,34,36).

9. DISCUSSION

The objective of this systematic review was to identify recent cross-sectional studies on oral health related quality of life using the CPQ11-14 questionnaire in adolescents at the age of 11-14 years and to perform a qualitative synthesis and evaluate them.

9.1 On methodology followed in the selected studies.

The most frequent objective of the included studies was the evaluation and validation of the CPQ11-14 questionnaire in a new language, while only two studies assessed the OHRQOL in relation to diseases or dental abnormality. That's because the CPQ11-14 questionnaire is one of the most widely used instrument to measure the OHRQOL in children and therefore there exist many studies to validate it in different languages (11,16,22,23). Nonetheless regarding the geographical distribution, four studies included in the systematic review were done in India and the other three studies were done in Europe, not including any study from Africa, South America, North America or Australia or New Zealand. That is probably because especially in South and North America the short versions of CPQ11-14 (CPQ11-14 ISF16 and ISF8) are more common than the longer original version used in this Systematic review. The systematic review of Antunes et al. (37) was the opposite, he had only studies from South and North America and none of the other Continents. All studies obtained ethical approval from their associated country/region and obtained the necessary informed consent from their participants, which shows the high level of ethical standards upheld in the conduct of the research. This adherence to ethical guidelines is essential for safeguarding the rights and well-being of participants and ensuring the integrity and credibility of the study findings. However, with three studies not mentioning their inclusion/exclusion criteria and six studies not describing their methods sufficiently enough to be repeated, it raises concerns regarding transparency and thoroughness in the study design and give space for bias and limit the reproducibility and reliability of these studies. Antunes et al. (37) had in their systematic review in 6 out of the 19 included studies a lack of the inclusion/exclusion criteria. That shows there may be a lack of transparency in cross-sectional studies regarding the field of OHRQOL. With only two studies,

with a study sample representative of the general population, the ability to generalize the results are limited. The same issue had Sun et al. (38) with their systematic review. Only two studies showed a lack in discriminant validity of the CPQ11-14 questionnaire, the other included studies showed that the CPQ11-14 questionnaire had good reliability and validity, which is in accordance with the findings in the studies from Abanto et al. (39), Kassis et al. (23) and García et al. (40). They all showed good psychometric properties. That all included studies used appropriate statistical methods to analyze their data enhances the credibility of the study findings. On the contrary, Antunes et al. (37) reports in their systematic review the risk of bias due to tendentious statistical analysis of some studies. In relation to the presence of a conflict of interest in one of the studies, it is important to mention that this raises concerns regarding the objectivity and independency of the study finding. Following the Strobe Guidelines enhances the transparency, reproducibility, and overall quality of the observational studies. That only two of the seven included studies mentioned that they followed them shows a lack of adherence to reporting guidelines such as Strobe Guidelines. Also, the studies of de Paula et al. (41), Pulache et al. (42) and Merdad et al (43) did not mentioning following Strobe guidelines which shows there might be a general lack of using reporting guidelines within the research field.

That the assessment of the quality of the included studies showed only one study was of high quality, three of medium quality and the other three of low quality, raises concerns regarding the risk of bias and the credibility of the findings. Jawdekar et al. (44) used in their systematic review the same tool (AXIS tool) to evaluate the risk of bias and perform a quality assessment. They evaluated two studies to be at low risk for bias and four studies with moderate risk for bias, which is in general a better quality of studies than the studies of this systematic review. That might be due to differences in the interpretation and application of the AXIS tool or due to variations in study methodologies.

With a total number of 6136 participants among all the included studies together, the sample size in this systematic review was greater than in the systematic review by Jawdekar et al. (44) which has 2112 participants. The greater sample size of this systematic review contributes to the generalization of

the study findings. Also, with 46.77% females and 53.23% males, the gender distribution is balanced and allows to analyze potential gender related factors regarding OHRQOL. In the systematic review of Sun et al (38) most of the studies used a convenience sample, which limits the findings of the study and raises concerns on generalization of the results. In this systematic review all except one study used either a cluster sampling method or multistage probability sampling method, which reduces the probability of sampling bias and enhances the generalization of the study findings.

All included studies used as Intervention the original CPQ11-14 questionnaire translated into different languages and six studies also did oral clinical examinations to evaluate the oral health. Other systematic reviews also included other multiple items questionnaires to measure the OHRQOL. For example, Antunes et al (37) used in their systematic review the CPQ11-14 questionnaire and the Early Childhood Oral Health Impact Scale (ECOHIS) to measure the OHRQOL. Sun et al (38) included in their systematic review all versions of CPQ8-10 and CP11-14, and Jawdekar et al. (44) included all versions of CPQ8-10, CPQ11-14 and P-CPQ in their systematic review to measure the OHRQOL. In this systematic review the included studies either self-administered or interviewed the questionnaire, but 4 times the studies did not mention how they administered the questionnaire. In comparison with Antunes et al (37), in their systematic review all studies mentioned the administration form, with most times used the self-administered method. On the contrary Sun et al. (38) and Jawdekar (44) did not even mention how the OHRQOL questionnaires were administered. Neither Antunes et al (37), Sun et al (38) or Jawdekar et al (44) mentioned where the administration of the questionnaires was done. In this systematic review four times the administration of the CPQ 11-14 was done in schools, one time in a dental clinic and two times it wasn't mentioned. Knowing the intervention place enhances the reproducibility of the study and ensures more transparency.

9.2 On results obtained in the selected studies.

The overall CPQ11-14 score in this systematic review ranges from 9.73 to 46.69 with an average of 22.23. In a study conducted by Alsumait et al. (45) the average overall score of the CPQ11-14 were 20.72 and the study done by Abanto

et al. (39) had an average score of 20.18. These scores are close to the score in this systematic review. Alsumait et al (45) explained the relative high score with a relatively high DMFT (decayed, missing, and filled teeth) score in his study sample. Also, this systematic review has a study sample including participants with pathological general and oral background (asthma and dental fluorosis) which explains the relative high score. A higher CPQ11-14 score had Tugcu et al (46) in their study with an average score of 33.27, which probably was because their sample had molar incisor hypomineralization (MIH) which has a strong influence on the OHRQOL. In this systematic review the average score for the domain "**Oral symptom**" is 5.5, for "**Functional limitation**" is 5.43, for "**Emotional well-being**" is 6.14 and for "**Social well-being**" is 7.02. On the opposite Alsumait et al (45) found "**Emotional well-being**" was the dimension most affected, as well as Tugcu et al. (46) also reported the highest score in that dimension. Alsumait et al. (45) explained that, with the high impact of missing teeth on the emotional wellbeing which leads to emotional stress, in their study.

9.2.1 Social demographic factor and oral quality of life

Regarding the impact associated to the age of the children, one study showed that 11 years old had a significant worse CPQ11-14 score than the older adolescents. On the opposite the study of Singh et al. (47) showed no significant association between quality of life and age. Regarding the impact associated to the gender of the adolescents, two studies showed that girls had a significant worse CPQ11-14 score and one study showed males had a significant worse score. Different studies showed that girls have a worse OHRQOL compared with males. One study of them is done by Schuch et al. (48) and another one is from Rodd et al. (49). Both showed statistical evidence that girl's perception of OHRQOL is worse than boys. Regarding the impact associated to social factors, two studies could show there was significant better OHRQOL in higher social classes compared with lower ones. This is in coherence with the study done by de Paula et al. (41) which showed that the monthly family income and the mothers education level had a strong favorable impact on the OHRQOL of adolescents.

9.2.2 Pathological background and oral quality of life

Regarding the impact associated to previous general diseases, two studies included in this systematic review used a sample with either an underlying disease (asthma) or with dental abnormality (fluorosis) and had the worst CPQ11-14 score compared to the other studies included in this systematic review and compared to the score of the study from Alsumait et. al (45), who used a sample representative of the general population. This shows that the pathological background plays a role in the oral quality of life.

9.2.3 Perception of oral health and oral quality of life

Five studies were able to show significant positive correlation between the CPQ11-14 score and global satisfaction ratings. The same result had Shin et al. (53) in their study.

9.2.4 Oral clinical status and oral quality of life

Regarding the impact associated to previous oral diseases, five of the included studies showed that malocclusion had a significant impact on the OHRQOL in adolescents. This is in coherence with the findings of the studies done by O'Brien et al. (50) and Wogelius et al (51), who concluded that malocclusion has a statistically significant negative impact on the OHRQOL measured with the CPQ11-14 questionnaire. Regarding the impact of dental fluorosis, the results of this systematic review are not clear. One study showed there is a statistically significant impact on the OHRQOL, whether another study only could prove impact if the fluorosis is of moderate to severe grade and another study could not prove any impact on the OHRQOL. These findings are similar with a study done by Aguilar-Díaz et al. (52) who were able to show that dental fluorosis has a negative impact on OHRQOL if it is moderate to severe. Regarding the impact associated to previous caries experience, only one study could show a statistical negative impact on the OHRQOL. De Stefani et al (16), Abanto et al. (39) and Alsumait et al. (45), all of them showed statistical significance in untreated caries having a negative effect on the OHRQOL in adolescents.

9.3 Limitations

One of the limitations is that only transversal studies were included in this systematic review. Transversal studies don't show the cause-effect relation, they only show the association between variables. Another limitation of this systematic review is that only the longer version of the CPQ11-14 questionnaire was included. Excluding the shorter versions of the CPQ11-14 questionnaire might have led to missing other possible relevant studies that could have reported different results. Also, the criteria selected by the author to apply the AXIS tool for assessing RoB might have been too restrictive. Also, one included study has a founding source that might lead to a conflict of interest and that raises concerns regarding the credibility of the findings.

10. CONCLUSION

10.1 General Conclusion

This systematic review identified 7 cross-sectional studies that examined the oral health related quality of life using the CPQ11-14 questionnaire in adolescents at the age of 11-14 years, with an average CPQ11-14 score of 22.23, that may be considered low. Most studies showed adequate psychometry properties, with good reliability and validity of the CPQ11-14 questionnaire.

Specific Conclusions

1. Malocclusion has a significant impact on the OHRQOL in adolescents, so does asthma, while dental fluorosis and previous caries experience do not. For dental fluorosis to have an impact on OHRQOL, it must be at least of moderate degree. The influence of age, gender and social classes is not conclusive. Global satisfaction with oral health affects oral quality of life in adolescents. “Social well-being” was the domain most affected in adolescents, which shows the importance of interpersonal relations and interactions at this age.

2. The risk of bias in the identified cross-sectional studies is higher than expected though it could be due to the specific interpretation criteria selected by the author.

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12. ANNEX

12.1 Supplementary material

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Table S11: PRISMA 2020 Checklist

Figure S1: CPQ11-14 questionnaire

Domain	Item code	Specified event[a]
OS	O1	Pain in teeth, lips, jaws or mouth
	O2	Bleeding gums
	O3	Mouth sores
	O4	Bad breath
	O5	Food caught in or between teeth
	O6	Food stuck to roof of mouth
FL	F1	Breathing trough mouth
	F2	Taken longer than others to eat a meal
	F3	Trouble sleeping
	F4	Difficulty to bite or chew food like apples, corn on the cob or steak
	F5	Difficulty to open mouth wide
	F6	Difficulty to say any words
	F7	Difficulty to eat foods you would like to eat
	F8	Difficulty to drink with a straw
	F9	Difficulty to drink or eat hot or cold foods
EWB	E1	Irritable or frustrated
	E2	Unsure of himself
	E3	Shy or embarrassed
	E4	Concerned what other people think about you
	E5	Worried that is less attractive than other people
	E6	Upset
	E7	Nervous or afraid
	E8	Worried that is less healthy than other people
	E9	Worried that is different than other people
SWB	S1	Missed school
	S2	Hard time paying attention in school
	S3	Difficulty doing homework
	S4	Avoiding to speak or read out loud in class
	S5	Avoiding activities like sports, clubs, drama, music, school trips
	S6	Avoiding to talk to other children
	S7	Avoiding smiling or laughing when around other children
	S8	Difficulty playing a musical instrument such as a recorder, flute, clarinet, trumpet
	S9	Avoiding to spend time with other children
	S10	Argued with other children or family
	S11	Teased or called names by other children
	S12	Left out by other children
	S13	Asked questions by other children

Figure S2: Full description of the search strategies

The search in PubMed using Mesh terms was the following: (("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields] OR ("adolescences"[All Fields] OR "adolescency"[All Fields] OR "adolescent"[MeSH Terms] OR "adolescent"[All Fields] OR "adolescence"[All Fields] OR "adolescents"[All Fields] OR "adolescent s"[All Fields]) OR ("scholar"[All Fields] OR "scholar s"[All Fields] OR "scholars"[All Fields])) AND ("cpq11-14"[All Fields] AND ("questionnair"[All Fields] OR "questionnaire s"[All Fields] OR "surveys and questionnaires"[MeSH Terms] OR ("surveys"[All Fields] AND "questionnaires"[All Fields]) OR "surveys and questionnaires"[All Fields] OR "questionnaire"[All Fields] OR "questionnaires"[All Fields])) AND (("mouth"[MeSH Terms] OR "mouth"[All Fields] OR "oral"[All Fields]) AND ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields]))) AND ((y_10[Filter]) AND (fft[Filter]) AND (english[Filter])).

The search in Scopus was the following: ALL (children OR adolescent OR scholar) AND ALL (cpq11-14 AND questionnaire) AND ALL (oral AND quality AND of AND life) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "DENT")) AND (LIMIT-TO (DOCTYPE , "ar")).

The search in Web of science was the following: ((((ALL=(children)) OR ALL=(adolescent)) OR ALL=(scholar)) AND ALL=(CPQ11-14 questionnaire)) AND ALL=(oral quality of life) and Article (Document Types) and English (Languages) and 2023 or 2022 or 2021 or 2017 or 2018 or 2019 or 2020 or 2016 or 2015 or 2014 or 2013 (Publication Years).

The search in Lilacs was the following: ((children) OR (adolescent) OR (scholar)) AND (cpq11-14 questionnaire) AND (oral quality of life) AND (fulltext:("1" OR "1" OR "1" OR "1" OR "1") AND db:("LILACS") AND la:("en")) AND (year_cluster:[2014 TO 2023]).

Figure S3: AXIS tool

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)			
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?			
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?			

20	Was ethical approval or consent of participants attained?			

Table S1: Articles excluded in selection process stage 1.

Author / Year	Article Title	Reason for exclusion
Dimberg L./ 2019	Validity and reliability of the Swedish versions of the short-form Child Perceptions Questionnaire 11–14 and Parental Perceptions Questionnaire	Short form of CPQ11-14
Baherimoghadam Tahereh/ 2022	Validity and reliability of the Persian version of the short-form child perceptions questionnaire 11-14-year-old children (CPQ11-14)	Short form of CPQ11-14
Bhayat A / 2014	Validity and reliability of the Arabic short version of the child oral health-related quality of life questionnaire (CPQ11-14) in Medina, Saudi Arabia	Short form of CPQ11-14
Barbosa Tais de Souza/ 2015	Validation of the Parental-Caregiver Perceptions Questionnaire: agreement between parental and child reports	other questionnaires
Turton Bathsheba J./2015	Validation of an oral health-related quality of life measure for Cambodian children	age <11-years-old
Ju Xiangqun/ 2020	Validation of a 4-item child perception questionnaire in Australian children	age <11-years-old
Chapman R.A. / 2023	Using the Child Perceptions Questionnaire with young adults	>14-years-old
Eid S.A./ 2020	Untreated dental caries prevalence and impact on the quality of life among 11 to14-year-old Egyptian schoolchildren: A cross-sectional study	Short form of CPQ11-14
Dame-Teixeira/ 2013	Traumatic dental injury with treatment needs negatively affects the quality of life of Brazilian schoolchildren	Short form of CPQ11-14
Barbosa / 2015	The relationship between oral conditions, masticatory performance and oral health-related quality of life in children	age <11-years-old
Tuchtenhagen Simone / 2015	The influence of normative and subjective oral health status on schoolchildren's happiness	Short form of CPQ11-14
Mandall N. / 2023	The effect of treatment timing on clinical and psychological outcomes with Twin Block therapy: A multicentre two-arm parallel randomised controlled trial	randomized controlled trial
Brondani B. / 2018	The effect of dental treatment on oral health-related quality of life in adolescents	longitudinal study
Paula Janice Simpson de/ 2020	The effect of caries increment on oral health-related quality of life among adolescents in Brazil: a 3-year longitudinal study	longitudinal study
Knorst Jessica Klöckner/ 2023	The Different Roles of Structural and Cognitive Social Capital on Oral Health-Related Quality of Life among Adolescents	Short form of CPQ11-14

Leite S.D.C / 2023	The association between malocclusion and health-related quality of life in adolescents: A mediation analysis	Cohort study
Sfreddo Camila S. / 2019	Socioeconomic inequalities in oral health-related quality of life in adolescents: a cohort study	Cohort study
Dalla Nora Angela/ 2023	Sociodemographic disparities in oral health-related quality of life of schoolchildren in rural and urban areas	age <11-years-old
Sun L. / 2022	Sociodemographic and Clinical Factors That Influence Oral Health-Related Quality of Life in Adolescents: a Cohort Study	cohort study
Knorst Jessica Klöckner/ 2022	Sense of coherence moderates the relationship between social capital and oral health-related quality of life in schoolchildren: a 10-year cohort study	cohort study
Noronha Thais Gioda / 2023	Sense of coherence moderates the relationship between perceived racial discrimination and oral health-related quality of life in schoolchildren	short form of CPQ11-14
Turton Bathsheba J./2015	Responsiveness of the Child Perceptions Questionnaire11-14 for Cambodian children undergoing basic dental care	age <11-years-old
Schmidt Buzatti / 2018	Responsiveness of the Brazilian versions of CPQ₁₁₋₁₄ and Child-OIDP	other questionnaires
Jaeken Katrien / 2019	Reported changes in oral health-related quality of life in children and adolescents before, during, and after orthodontic treatment: a longitudinal study	longitudinal study
Long F. / 2023	Reliability and validity of the Child Perception Questionnaire 8 ~ 10 (CPQ8~10) in China: an instrument for measuring oral health-related quality of life among 8–10-year-old children	other questionnaires
Benson Philip E. / 2015	Relationships between dental appearance, self-esteem, socio-economic status, and oral health-related quality of life in UK schoolchildren: A 3-year cohort study	cohort study
Tristao Sylvia Karla de Paiva Cabral / 2023	Relationship between Malocclusion, Bullying, and Quality of Life in Students from Low Social Development Area: A Cross-Sectional Study	age <11-years-old >14-years-old
Leme M.S. / 2013	Relationship among oral habits, orofacial function and oral healthrelated quality of life in children	other questionnaires
Stamm T.A. / 2020	Rasch model of the child perceptions questionnaire in multi-country data	short form of CPQ11-14
Emmanuelli Bruno / 2015	Racial Differences in Oral Health-Related Quality of Life: A Multilevel Analysis in Brazilian Children	short form of CPQ11-14
Maria Salinas-Martinez Ana / 2014	Psychometric properties of the Spanish version of the short-form Child Perceptions Questionnaire for 11-14-year-olds for assessing oral health needs of children	short form of CPQ11-14

Thomson W.M. / 2016	Psychometric assessment of the short-form Child Perceptions Questionnaire: an international collaborative study	short form of CPQ11-14
Kemoli Arthur / 2018	Prevalence and impact of infant oral mutilation on dental occlusion and oral health-related quality of life among Kenyan adolescents from Maasai Mara	>14-years-old
Abreu L.G. / 2013	Preadolescent's oral health-related quality of life during the first month of fixed orthodontic appliance therapy	short form of CPQ11-14
Bretz Y.P.M. / 2018	Perceptions of pain levels and chewing impairment among adolescents undergoing orthodontic treatment with fixed appliances	cohort study
Knorst J.K. / 2022	Pathways between Social Capital and Oral Health from Childhood to Adolescence	cohort study
Martnia Brumini/ 2022	Parental influence is the most important predictor of child's orthodontic treatment demand in a preadolescent age	short form of CPQ11-14
De Stefani / 2021	Orthodontic, maxillofacial surgery, and prosthodontic rehabilitation supported by miniscrew in a patient with cleft lip and palate	clinical case
Husain Akbar F. / 2020	Oral hygiene and oral health related quality of life of children with stunting in Indonesia	age <11-years-old
Kolawole K.A. / 2021	Oral health–related quality of life of adolescents assessed with the Malocclusion Impact and Child Perceptions questionnaires	short form of CPQ11-14
Dimber L. / 2016	Oral health-related quality-of-life among children in Swedish dental care: The impact from malocclusions or orthodontic treatment need	cohort study
El-Housseiny / 2022	Oral health-related quality of life in children with celiac disease	case control study
Barbosa Tais de Souza/ 2016	Oral Health-related Quality of Life in Children and Preadolescents with Caries, Malocclusions or Temporomandibular Disorders	other questionnaires
Ortiz Fernanda Ruffo/ 2022	Oral health-related quality of life determinants throughout adolescence: a cohort study in Brazil	cohort study
Brondani B. / 2022	Oral health-related quality of life as a predictor of alcohol and cigarette consumption in adolescents	cohort study
Bendo Cristiane B. / 2014	Oral health-related quality of life and traumatic dental injuries in Brazilian adolescents	short form of CPQ11-14
Elheeny A.A.H. / 2020	Oral health status and impact on the oral health-related quality of life of Egyptian children and early adolescents with type-1 diabetes: a case-control study	case control study
Monk J. / 2020	Oral Health Related Quality of Life (OHRQoL) outcomes at the time of orthodontic appliance removal and three	Prospective outcome study

	months into retention	
Ghijselings Ines / 2014	Normative and self-perceived orthodontic treatment need in 11- to 16-year-old children	>14-years-old
Dias / 2021	Molar-incisor hypomineralization: parent's and children's impact perceptions on the oral health-related quality of life	age <11-years-old
Portella P.D / 2018	Molar-incisor hypomineralization and associated factors: A case-control study	case control study
Scapini A. / 2013	Malocclusion impacts adolescents' oral health-related quality of life	short form of CPQ11-14
Da Silva / 2022	Low-Level Laser Therapy for Management of Hypersensitivity in Molar-Incisor Hypomineralization and Oral Health-Related Quality of Life: Case Report	case report
Yau David / 2018	Longitudinal measurement invariance and explanatory IRT models for adolescents' oral health-related quality of life	longitudinal study
Paula Janice Simpson de/ 2017	Longitudinal impact of clinical and socioenvironmental variables on oral health-related quality of life in adolescents	Cohort study
Shin, Hye-Sun / 2015	Korean Version of Child Perceptions Questionnaire and Dental Caries among Korean Children	age <11-years-old
Vargas / 2022	Influence of toothache on oral health-related quality of life during adolescence: a cohort study	cohort study
Gracco A. / 2019	Importance of clinical and genetical evaluation for non-syndromic oligodontia in orthodontics	case report
Raziee Leila / 2020	Impacts of oligodontia on oral health-related quality of life reported by affected children and their parents	age <11-years-old >14-years-old
Costa / 2016	Impact of wearing fixed orthodontic appliances on quality of life among adolescents: Case-control study	case control study
Antunes Leonardo Santos / 2013	Impact of traumatic dental injury on the quality-of-life of children and adolescents: A case-control study	case control study
Roque / 2021	Impact of oral conditions on the quality of life of adolescents in a rural area of Brazil	short form of CPQ11-14
Ukra / 2013	Impact of malocclusion on quality of life among New Zealand adolescents	short form of CPQ11-14
Zemolin / 2023	Impact of licit and illicit substances on the oral health-related quality of life in adolescents	>14-years-old
Thilakarathne / 2023	Impact of dental fluorosis on the oral health related quality of life of adolescents in an endemic area	>14-years-old
do Vale Oliveira / 2023	Impact of dental caries severity and activity on oral health-related quality of life among children aged 8-11 years	age <11-years-old

Magno / 2019	Impact of crown fracture treatment on oral health-related quality of life of children, adolescents, and their families: A prospective clinical study	prospectice clinical study
Knorst / 2022	Impact of community and individual social capital during early childhood on oral health-related quality of life: A 10-year prospective cohort study	cohort study
García-Pérez / 2017	Impact of caries and dental fluorosis on oral health-related quality of life: a cross-sectional study in schoolchildren receiving water naturally fluoridated at above-optimal levels	age <11-years-old
Sarit / 2019	Impact of bruxism on oral health-related quality of life among schoolchildren in mangaluru city-a case control study	case control study
Alsumait / 2019	Impact evaluation of a school-based oral health program: Kuwait National Program	longitudinal study
Ortiz Fernanda Ruffo/ 2020	Gingivitis influences oral health-related quality of life in adolescents: findings from a cohort study	cohort study
Menegazzo / 2018	Family Religiosity and Oral Health Related Quality of Life: a Multilevel Analysis in Brazilian Schoolchildren	short form of CPQ11-14
Foster Page / 2013	Factors influencing adolescents' oral health-related quality of life (OHRQoL)	short form of CPQ11-14
Yau David / 2019	Evaluation of psychometric properties and differential item functioning of 8-item Child Perceptions Questionnaires using item response theory	short form of CPQ11-14
Onoriobe / 2014	Effects of enamel fluorosis and dental caries on quality of life	other questionnaires
Abreu L.G. / 2014	Effect of year one orthodontic treatment on the quality of life of adolescents, assessed by the short form of the Child Perceptions Questionnaire	short form of CPQ11-14
Maroneze / 2018	Edema and gingival bleeding in anterior region have a negative influence on quality of life of adolescents	>14-years-old
Antunes / 2020	Does traumatic dental injury impact oral health-related to quality of life of children and adolescents? Systematic review and meta-analysis	systematic review
Foster Page / 2013	Do we need more than one Child Perceptions Questionnaire for children and adolescents?	other questionnaires
van Harten / 2020	Do socio-economic circumstances affect oral health related quality of life?	cohort study
Gururatana / 2014	Determinants of children's oral-health-related quality of life over time	longitudinal study
Maroneze / 2019	Dental treatment improves the oral health-related quality of life of adolescents: A mixed-methods approach	age <11-years-old >14-years-old

Catananti / 2023	Dental trauma and oral health-related quality of life among 7th-grade students of public elementary schools1	short form of CPQ11-14
Martins / 2015	Dental caries and social factors: impact on quality of life in Brazilian children	age <11-years-old
Fernandes / 2013	Dental caries and need of orthodontic treatment: Impact on the quality of life of schoolchildren	age <11-years-old
Agou / 2022	Cross-cultural adaptation and validation of the malocclusion impact questionnaire for patients seeking orthodontic treatment	other questionnaires
Martins / 2018	Cross-cultural adaptation and validation of the COHIP-SF19 to be used in Brazil	other questionnaires
Knorst / 2021	COVID-19 pandemic reduces the negative perception of oral health-related quality of life in adolescents	cohort study
Patanapu / 2020	Correlation of oral health related quality of life with dentition status and treatment need among 12 year old school children of Dilsukhnagar, Hyderabad	short form of CPQ11-14
Silva / 2020	Clinical Consequences of Untreated Dental Caries, Individual Characteristics, and Environmental Factors on Self-Reported Oral Health Measures in Adolescents: A Follow-Up Prevalence Study	Follow up prevalence study
Feldens / 2016	Clarifying the Impact of Untreated and Treated Dental Caries on Oral Health-Related Quality of Life among Adolescents	short form of CPQ11-14
Toulia / 2021	Child perceptions questionnaire: translation, cultural adaptation and initial validation in a Greek adolescent population with malocclusion	short form of CPQ11-14
Aimée / 2020	Changes in Adolescents' Oral Health Status: Responsiveness of the Child Perception Questionnaire11-14	>14-years-old
Matta Felisberto Fernandes/ 2015	Caries prevalence and impact on oral health-related quality of life in children with sickle cell disease: cross-sectional study	age <11-years-old
Carvalho / 2015	Bruxism and quality of life in schoolchildren aged 11 to 14	short form of CPQ11-14
Pinheiro / 2020	Association of dental caries morbidity stages with oral health-related quality of life in children and adolescents	age <11-years-old
Sun L. / 2018	Association Between the Severity of Malocclusion, Assessed by Occlusal Indices, and Oral Health Related Quality of Life: A Systematic Review and Meta-Analysis	systematic review
Jawdekar / 2022	Assessment of oral health-related quality of life (OHRQoL) in children with molar incisor hypomineralization (MIH) - A systematic review and meta-analysis of observational studies	systematic review

Dimberg L./ 2019	Agreement between children and parents in rating oral health-related quality of life using the Swedish versions of the short-form Child Perceptions Questionnaire 11–14 and Parental Perceptions Questionnaire	short form of CPQ11-14
Abreu / 2015	Agreement between adolescents and parents/caregivers in rating the impact of malocclusion on adolescents' quality of life	short form of CPQ11-14
Meyfarth / 2021	Aesthetic-functional reconstruction of dental fracture and its impact on the psychosocial aspect	short form of CPQ11-14
Hamid / 2021	A short-term approach for promoting oral health of internally displaced children with PTSD: the key is improving mental health—results from a quasi-randomized trial	clinical trial
Isola / 2019	The impact of temporomandibular joint arthritis on functional disability and global health in patients with juvenile idiopathic arthritis	other questionnaires
Li /2014	The impact of oral health status on the Oral Health-Related Quality of Life (OHRQpL) of 12-year-olds from children's and parents' perspectives	other questionnaires
Tadakamadla / 2020	Psychometric Analyses of the Indian (Hindi) Version of the Child Perception Questionnaire (CPQ₁₁₋₁₄)	other questionnaires
Paula / 2015	Oral health, socio-economic and home environmental factors associated with general and oral-health related quality of life and convergent validity of two instruments	other questionnaires
da Silva / 2017	Temporomandibular disorders and quality of life among 12-year-old schoolchildren	out of scope

Table S2: Articles excluded in selection process stage 2.

	Author / Year	**Article Title**	**Reason for exclusion**
1	García / 2021	Validity and reliability of the Child Perceptions Questionnaire 11-14 for Colombian school children	modified CPQ11-14
2	Bekiroglu / 2017	Validity and reliability of Child Perception Questionnaire (CPQ 11–14) by Rasch Analysis in Turkish children	prospective study
3	Silva-Oliveira / 2018	Traumatic dental injuries in Brazilian children and oral health-related quality of life	short form of CPQ11-14
4	Lattanzi / 2020	The influence of the Brazilian school health program on the oral-health-related quality of life of adolescents	modified CPQ11-14

5	de Paula / 2013	The impact of socioenvironmental characteristics on domains of oral health-related quality of life in Brazilian schoolchildren	modified CPQ11-14
6	Feldens /2020	The effect of enamel fractures on oral health-related quality of life in adolescents	short form of CPQ11-14
7	Naseh / 2016	Students' orthodontic treatment needs and oral-health-related quality of life in Qazvin city, Iran	short form of CPQ11-14
8	Machry / 2018	School environment and individual factors influence oral health related quality of life in Brazilian children	short form of CPQ11-14
9	Kamyabi / 2023	Oral Health-Related Quality of Life among Children Aged 11-14 Years Old with and without Parental Care in South-East of Iran	modified CPQ11-14
10	de Paula / 2015	Oral Disorders, Socioenvironmental Factors and Subjective Perception Impact on Children's School Performance	modified CPQ11-14
11	Rajab / 2019	Impact of treated and untreated traumatic dental injuries on oral health-related quality of life among 12-year-old schoolchildren in Amman	short form of CPQ11-14
12	Machado / 2017	Impact of Partial-Mouth Periodontal Examination Protocols on the Association Between Gingival Bleeding and Oral Health–Related Quality of Life in Adolescents	objective out of scope
13	Dawoodbhoy / 2013	Impact of malocclusion on the quality of life of Saudi children	modified CPQ11-14
14	Balseca Ibarra / 2023	Impact of gingivitis on oral health-related quality of life in 12-year-old schoolchildren of Quito, Ecuador	short form of CPQ11-14
15	Carvalho da Silva / 2021	Impact of dental treatment and the severity of traumatic dental injuries on the quality of life of Brazilian schoolchildren	short form of CPQ11-14
16	Alsumait / 2015	Impact of dental health on children's oral health-related quality of life: a cross-sectional study	modified CPQ11-14
17	Pulache / 2016	Exploring the association between oral health problems and oral health-related quality of life in Peruvian 11- to 14-year-old children	modified CPQ11-14
18	Quezada-Conde / 2022	Does the school environment exert influence on quality of life related to traumatic dental injury in children?	short form of CPQ11-14
19	Merdad / 2017	Do children's previous dental experience and fear affect their perceived oral health-related quality of life (OHRQoL)?	modified CPQ11-14
20	Kassis / 2018	Cross-cultural adaptation and validation of the child perceptions questionnaire (CPQ₁₁₋₁₄) among children in Lebanon	modified CPQ11-14
21	Abanto / 2013	Cross-cultural adaptation and psychometric properties of the child perceptions questionnaire 11-14 (CPQ₁₁₋₁₄) for the peruvian spanish language	modified CPQ11-14
22	Kortelainen / 2016	Comparison of Oral Health-Related Quality of Life Among Schoolchildren With and Without Cleft Lip and/or Palate	modified CPQ11-14
23	da Rosa / 2016	Association of malocclusion, happiness, and oral health-related quality of life (OHRQoL) in	short form of CPQ11-14

		schoolchildren	
24	Singh / 2020	Association of gingivitis with children oral health-related quality of life in Lucknow: A cross-sectional study	unclear CPQ11-14
25	Tomazoni / 2014	Association of Gingivitis With Child Oral Health-Related Quality of Life	short form of CPQ11-14
26	Tugcu / 2022	Changes in oral health-related quality of life after treatment of molar incisor hypomineralisation using Glass Hybrid Restorations	Prospective study

Reasons for exclusion:

- modified CPQ11-14: 12
- prospective study: 2
- short form of CPQ11-14: 10
- no full text available: 3
- objective out of scope: 1
- unclear CPQ11-14: 1

Table S3: AXIS tool and criteria followed to assess RoB.

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)			
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?			

10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

Green means the study complied with the item, red or not stated means it does not comply.

Study that complies with 18-20 items: HIGH QUALITY

Study that complies with 16-17 items: MEDIUM QUALITY

Study that complies with < 16 items: LOW QUALITY

Table S4: AXIS tool Curto et al.

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		

5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?		NO	Sampling procedure was restricted to only one health center
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?		NO	
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Completion mode of CPQ11-14 not stated
Results				
12	Were the basic data adequately described?	YES		
13	Does the response rate raise concerns about non-response bias?			Response rate not stated
14	If appropriate, was information about non-responders described?		NO	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 15 items: Low quality.

Table S5: AXIS tool Jain et al.

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				

2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?		NO	Sampling procedure was restricted to only one geographical area
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?	YES		
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Sample's inclusion and exclusion criteria are not stated
Results				
12	Were the basic data adequately described?	yes		
13	Does the response rate raise concerns about non-response bias?		NO	
14	If appropriate, was information about non-responders described?		NO	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 17 items: Medium quality.

Table S6: AXIS tool Kavaliauskiene et al.

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?	YES		
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?	YES		
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Sample´s inclusion and exclusion criteria are not stated
Results				
12	Were the basic data adequately described?	YES		
13	Does the response rate raise concerns about non-response bias?		NO	
14	If appropriate, was information about non-responders described?		NO	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	

20	Was ethical approval or consent of participants attained?	YES		

Study complies with 18 items: High quality.

Table S7: AXIS tool Kumar et al.

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?		NO	
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?		NO	Sampling procedure was restricted to only one geographical area
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?		NO	
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Sample´s inclusion and exclusion criteria are not stated
Results				
12	Were the basic data adequately described?	YES		
13	Does the response rate raise concerns about non-response bias?		NO	
14	If appropriate, was information about non-responders described?		NO	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		

18	Were the limitations of the study discussed?		NO	
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 14 items: Low quality.

Table S8: AXIS tool Olivieri et al.

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?		NO	Sampling procedure was restricted to only one geographical area
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?	YES		
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Administration context of questionnaires and oral clinical examinations is not stated
Results				
12	Were the basic data adequately described?	YES		
13	Does the response rate raise concerns about non-response bias?		NO	
14	If appropriate, was information about non-responders described?	YES		

15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?	YES		This study was supported with a grant awarded by way of donation from a private company (Leone Spa, an Italian manufacturer of orthodontic products located in Sesto Fiorentino)
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 17 items: Medium quality.

Table S9: AXIS tool Shyam et al. (2020)

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?	YES		
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		
7	Were measures undertaken to address and categorise non-responders?		NO	
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		

10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?	YES		
Results				
12	Were the basic data adequately described?	YES		
13	Does the response rate raise concerns about non-response bias?			Response rate is not stated
14	If appropriate, was information about non-responders described?		No	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?	YES		
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 17 items: Medium quality.

Table S10: AXIS tool Shyam et al. (2019)

	Question	**Yes**	**No**	**Don't know/ Comment**
Introduction				
1	Were the aims/objectives of the study clear?	YES		
Methods				
2	Was the study design appropriate for the stated aim(s)?	YES		
3	Was the sample size justified?	YES		
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)	YES		
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?		NO	Sampling procedure was restricted to only one geographical area
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?	YES		

7	Were measures undertaken to address and categorise non-responders?		NO	
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?	YES		
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?	YES		
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)	YES		
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?		NO	Administration context not stated
Results				
12	Were the basic data adequately described?		NO	
13	Does the response rate raise concerns about non-response bias?			Response rate is not stated
14	If appropriate, was information about non-responders described?		NO	
15	Were the results internally consistent?	YES		
16	Were the results presented for all the analyses described in the methods?		NO	
Discussion				
17	Were the authors' discussions and conclusions justified by the results?	YES		
18	Were the limitations of the study discussed?	YES		
Other				
19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?		NO	
20	Was ethical approval or consent of participants attained?	YES		

Study complies with 13 items: Low quality.

Table S11: PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	5
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	8-16

Section and Topic	Item #	Checklist item	Location where item is reported
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	18
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	19-20
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	20-21
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	20—21
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	21
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	21
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	21-22
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	21-22
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	22
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	22
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	-
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	22
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	22
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	22
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	-
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	22
Reporting	14	Describe any methods used to assess risk of bias due to missing	-

Section and Topic	Item #	Checklist item	Location where item is reported
bias assessment		results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	-
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	23
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	50-58
Study characteristics	17	Cite each included study and present its characteristics.	24-28
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	29
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	26-28
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	29
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	29-31
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	29-31
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	-
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	-
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	-
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	32-36
	23b	Discuss any limitations of the evidence included in the review.	37
	23c	Discuss any limitations of the review processes used.	37
	23d	Discuss implications of the results for practice, policy, and future research.	37
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	-
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	-
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	-
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	-
Competing interests	26	Declare any competing interests of review authors.	-

Section and Topic	Item #	Checklist item	Location where item is reported
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	-

Systematic review

ORAL QUALITY OF LIFE IN ADOLESCENTS MEASURED WITH THE CPQ11-14 QUESTIONNAIRE: A SYSTEMATIC REVIEW

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Abstract

Background: Oral health related quality of life (OHRQOL) refers to, how the individual´s oral health impacts their quality of life in different dimensions like daily functioning, emotional wellbeing, social interaction, and overall life satisfaction. The Child perception Questionnaire (CPQ) has been widely used to measure OHRQOL in adolescents and has been validated in multiple contexts showing adequate psychometric properties. The aim was to identify cross-sectional studies carried out in the past 10 years on oral health related quality of life using the CPQ11-14 questionnaire in adolescents 11-14 years old and to perform a qualitative synthesis and assessment. **Material and Methods:** A literature search was carried out in the PubMed, Scopus, Lilacs, and Web of Science databases, with the search words “children”, “adolescents”, “scholar”, “CPQ11-14 questionnaire” and “oral quality of life”. The selection process followed the PRISMA statements and RoB was assessed with the AXIS tool. **Results:** Seven studies were included in the systematic review with an average low CPQ 11-14 score (22.23); the domain “Social well-being” was the most affected (score=7.02). The quality of the studies was mostly medium and low with a risk of bias higher than expected. Malocclusion showed a strong negative impact on OHRQOL, so does asthma while previous caries experience did not. The influence of age, gender and social classes was not conclusive. Global satisfaction with oral health showed a positive correlation with OHRQOL. **Conclusion:** The average CPQ11-14 score (22.23) reflects a low impact of oral health on quality of life in adolescents. Malocclusion was the only oral pathology showing a significant impact on OHRQOL, as well as dental fluorosis of moderate degree. Other factors’ influence was not conclusive. The high impact on “Social well-being” reveals the prominent role of oral health on interpersonal relations at this age. Knowledge of these factors will improve oral health care in adolescents.

Key words: Oral health related quality of life, CPQ11-14, Adolescents,

Introduction

Oral health related quality of life (OHRQOL) is a multidimensional construct which concerns the perception of the individual's impact of oral conditions including oral

diseases, treatments, and interventions, on his daily life and functioning (1,2). It includes factors such as comfort during eating, self-esteem, and satisfaction with oral health (3,4). OHRQOL is important because it allows to improve the decision making by also including the patients social and emotional experience and physical functionality for finding the most appropriate treatment goals and outcomes (1,5). OHRQOL started to appear in the 1970 as more evidence was found that oral diseases have an impact on social roles (1,6,7,8). In dental research OHRQOL plays an important role because it can link oral diseases to the impact that they have on daily life and to the general health of the individual. It also has a key function in measuring health disparities and access to care all over the world and improving oral health and the quality of life in different populations and minorities (1,3). To measure OHRQOL in children can be challenging because they change cognitively and physically a lot depending on the age of the child (1,9). Therefore, many instruments have been developed specially for children and adolescents in specific age groups, to be able to measure their OHRQOL depending on their unique factors (2,10). The Child perception Questionnaire (CPQ) is one of the most widely used instruments to measure the OHRQOL in children and adolescents (9,11,12,13). It was developed by Jokovic et al. in 2002 in Canada (9,10,13). The original CPQ11-14 questionnaire has 37 items divided into 4 dimensions (Oral health, Functional limitations, Emotional well-being, Social well-being) and a 5-point Likert scales response format (9,10,14,15,16). The highest score possible is 148 which means a poor OHRQOL and the lowest is 0 which implies an exceptionally good OHRQOL (9,11,14,15). The aim of this systematic review was to identify recent cross-sectional studies on oral health related quality of life using the CPQ11-14 questionnaire in adolescents at the age of 11 to 14 years and to perform a qualitative synthesis and evaluate them.

Material and Methods

This systematic review was done following the PRISMA statement 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analysis).

Identification of the PIO question

The search strategy was done following the PIO (Population, intervention, outcome) question strategy. The established PIO question for this systematic review was “How is oral quality of life in adolescents measured with the CPQ11-14 questionnaire?”.

- P (Population): adolescents 11-14 years old
- I (Intervention): administration of the questionnaire CPQ11-14
- O (outcome): assessment of the oral quality of life in adolescents

Eligibility criteria

The inclusion criteria were cross-sectional studies on adolescents 11 to 14 years of age using the validated CPQ11-14 questionnaire. It had to be published between 2013 and 2023, in the English language and with access to the original complete article.

The exclusion criteria were: Modified or not validated CPQ11-14 questionnaires.

Information sources and search strategy

An electronic systematic literature search was done in the databases PubMed, Web of Science, Scopus, and Lilacs on the 22nd of November 2023 to identify cross-sectional studies that used CPQ11-14 questionnaire for measuring the OHRQOL in 11 to 14 years old adolescents. The search strategy was formulated with the help of the PIO question strategy. The search words used were “children”, “adolescents”, “scholar”, “CPQ11-14 questionnaire” and “oral quality of life “. These search words were connected using the Boolean operators “AND” and “OR”. In all 4 databases the same filters were applied, which were publication date between 2013 and 2023, and language English. In the database Scopus, the filter “subject area dentistry” was also applied (Table 1) (A full description of the search strategies is shown in Figure 1).

Data extraction

The following data were extracted from the articles and collected in a table: The author's name, publication year and country of origin of the study, the study's aim, the sample selection method and sample size, the age range of the study sample and the sex in percentages. Also, the mode of completion of the questionnaire (self-administered or interviewed), administration context and the type of

intervention that they did on the study sample. The study's sample inclusion and exclusion criteria, the mean CPQ11-14 questionnaire results and the quality of the study (Table 2).

Risk of bias tool and quality assessment

To assess the risk of bias and the quality of the included studies, the Appraisal tool for Cross-Sectional Studies (AXIS tool) was used. The AXIS tool is made of 20 items with a “Yes”, “No” or “Do not know/comment” response option. For each study, a table was filled out answering the 20 items of the AXIS tool. It was decided to use these criteria: Studies that complied with 18-20 items were classified as “high quality”. Studies that complied with 16-17 items as “medium quality” and studies that complied with less than 16 items were classified as “low quality” (Table 3).

Results

Study selection

The electronic search identified 228 articles in total: 71 in PubMed, 115 in Scopus, 40 in Web of science and 2 in Lilacs. 85 duplicates were removed, and 143 articles remained for the screening of title and abstract. From these 143 articles 107 were excluded. 36 articles were sought for retrieval and 3 of them were not retrieved because no full text of the articles was available. 33 articles were assessed for eligibility and 26 were excluded. 7 studies remained to be included in the systematic review (Figure 2).

Study characteristics

Three studies did not mention their inclusion and exclusion criteria (16,17,18). One study had as inclusion criteria the birth year 1994 so they only obtained 14-year-old participants (19) and two studies excluded uncooperative children and children suffering from systematic diseases and other developmental anomalies (20,21). Another study included only 11–14-year-old children which were diagnosed at least one year before the study began with asthmatic pathology and excluded children with previous orthodontic treatment, caries or untreated periodontal pathology, craniofacial anomalies, temporomandibular joint

pathology, and cognitive disorders (22). Five studies assessed psychometric properties of the CPQ11-14 in different languages (16-20) and four of them showed good reliability and validity (16-19). The other study that assessed psychometric properties showed that the used CPQ11-14 questionnaire lacks discriminant validity (20). One study did not assess the psychometric properties but used a CPQ11-14 which already was validated (22) and another study used a CPQ11-14 questionnaire which showed poor discriminant validity (21) (Table 2).

Risk of bias and quality assessment

After filling in for each study the AXIS tool and applying the criteria for quality assessment (Table 3) the results are that one study is of high quality (16), three are of medium quality (17,19,21) and three are of low quality (18,20,22).

Qualitative synthesis

Population, Intervention and Outcome

The total number of participants among all seven studies was 6136 participants. All studies included both sexes with a total number of 2870 females and 3266 males, which is 46.77% females and 53.23% males of the sample size. Two studies used a population of diseased adolescents or with dental abnormalities as their sample (asthma, dental fluorosis) (21,22). Four studies did not exclude adolescents with any diseases or abnormality or did not mention it (16-19) and one study excluded adolescents with systemic diseases or other developmental anomalies (20).

Two studies used a two-stage cluster sampling technique as a selection method for their sample (16,17), two studies used a random cluster sampling technique (19,21), one study used a multistage cluster random sampling technique (20), one a multistage probability sampling method (18) and one study selected their sample through screening at a dental university clinic (22).

All studies used the original CPQ 11-14 questionnaire and six studies also used oral clinical examinations to evaluate the oral health of the participants (17-22)**.** One study used only the CPQ11-14 questionnaire as an Intervention (16). The questionnaire was two times self-administered (17,21), one time administered in an interview mode (20) and four times it was not stated (1618,19,22). The

intervention was done in schools in four studies (16-18,21), one study did it in a dental clinic (22) and two studies did not mention where the intervention was carried out (19,20). The inclusion and exclusion criteria were clearly stated in three studies (20-22), one study did not clearly specify it (19) and three studies did not mention it (16-18).

The results are given as a mean overall CPQ11-14 score and by the different domains in each study. The overall CPQ 11-14 scores range from 9.73 to 46.69, with a total average of 22.23 for all 6136 participants. The domain “Oral symptom” has an average score of 5.5, the domain “Functional limitation” of 5.43, the domain “Emotional well-being” of 6.14 and the domain “Social well-being” of 7.02.

Factors affecting impact of oral health on oral quality of life in adolescents

One study showed that age had a significant impact on oral quality of life with 11-year-old adolescents having the worst CPQ11-14 score compared with the other age groups (22). Three studies showed statistically significant differences in the gender regarding OHRQOL, in where two of the studies showed that girls had a significant worse CPQ11-14 score than males (16,19) and one study showed that males had a significant worse CPQ11-14 score (21). Two studies showed that there was significant difference of OHRQOL in children according to their social classes, with a better CPQ11-14 score in higher social classes (16,19).

Two studies which measured the OHRQOL in a population with an underlying disease (asthma) (22) or dental abnormalities (fluorosis) (21) had the worst CPQ 11-14 score with 46.68 and 29.8. The other five studies which targeted the average 11- to 14-year-old school children without screening for specific diseases or dental abnormalities had better CPQ 11-14 scores with the best score of 9.73 and the worst of 21.6 (16-20).

Five studies which also measured their participants global satisfaction rating on perceived oral health, showed significant positive correlation between it and the overall CPQ score (16-20).

Five out of the seven studies showed that malocclusion had a significant impact on OHRQOL in children (16-19,22). One study could show that fluorosis has a statistically significant impact on OHRQOL (17), whether another study only could show significant impact of moderate to severe fluorosis and not mild fluorosis

(18). A third study could not show any significant impact of fluorosis on OHRQOL (21). Only one study could show that caries experience showed a significant negative impact on OHRQOL (16). Three other studies did not have any significant difference in CPQ11-14 score in the children with or without caries (20,18,19).

Discussion

On the methodology followed in the selected articles

With three studies not mentioning their inclusion/exclusion criteria and six studies not describing their methods sufficiently enough to be repeated, that raises concerns regarding transparency and thoroughness in the study design and give space for bias and limit the reproducibility and reliability of these studies. Antunes et al. (23) had in their systematic review in 6 out of the 19 included studies a lack of the inclusion/exclusion criteria. That shows there may be a lack of transparency in cross-sectional studies regarding the field of OHRQOL. Only two studies showed a lack in discriminant validity of the CPQ11-14 questionnaire, the other included studies showed that the CPQ11-14 questionnaire had good reliability and validity, which is in accordance with the findings in the studies from Abanto et al. (24), Kassis et al. (13) and García et al. (25). They all showed good psychometric properties.

That the assessment of the quality of the included studies showed only one study was of high quality, three of medium quality and the other three of low quality, raises concerns regarding the risk of bias and the credibility of the findings. Jawdekar et al. (26) used in their systematic review the same tool (AXIS tool) to evaluate the risk of bias and perform a quality assessment. They evaluated two studies to be at low risk for bias and four studies with moderate risk for bias, which is in general a better quality of studies than the studies of this systematic review. That might be due to differences in the interpretation and application of the AXIS tool or due to variations in study methodologies.

With a total number of 6136 participants among all the included studies together, the sample size in this systematic review was greater than in the systematic review by Jawdekar et al. (26). The greater sample size of this systematic review contributes to the generalization of the study findings. Also, with 46.77% females and 53.23% males, the gender distribution is balanced and allows to analyze

potential gender related factors. In the systematic review of Sun et al (27) most of the studies used a convenience sample, which limits the findings of the study and raises concerns on generalization of the results. In this systematic review all except one study used either a cluster sampling method or multistage probability sampling method, which reduces the probability of sampling bias and enhances the generalization of the study findings.

All included studies used as Intervention the original CPQ11-14 questionnaire and six studies also did oral clinical examinations to evaluate the oral health. Antunes et al (23) used in their systematic review the CPQ11-14 questionnaire and the Early Childhood Oral Health Impact Scale (ECOHIS). Sun et al (27) included in their systematic review all versions of CPQ8-10 and CP11-14, and Jawdekar et al. (26) included all versions of CPQ8-10, CPQ11-14 and P-CPQ. In this systematic review the included studies either self-administered or interviewed the questionnaire, but 4 times the studies did not mention how they administered the questionnaire. In comparison with Antunes et al (23), in their systematic review all studies mentioned the administration form, with most times used the self-administered method. On the contrary Sun et al. (27) and Jawdekar (26) did not even mention how the OHRQOL questionnaires were administered.

On results obtained in the selected studies

The overall CPQ11-14 score in this systematic review ranges from 9.73 to 46.69 with an average of 22.23. In a study conducted by Alsumait et al. (28) the average overall score of the CPQ11-14 were 20.72 and the study done by Abanto et al. (24) had an average score of 20.18. These scores are close to the score in this systematic review. Alsumait et al (28) explained the relative high score with a relatively high DMFT (decayed, missing, and filled teeth) score in their study sample. Also, this systematic review has a study sample including participants with pathological general and oral background (asthma and dental fluorosis) which explains the relative high score. In this systematic review the average score for the domain "**Oral symptom**" is 5.5, for "**Functional limitation**" is 5.43, for "**Emotional well-being**" is 6.14 and for "**Social well-being**" is 7.02. On the opposite Alsumait et al (28) found "**Emotional well-being**" was the dimension most affected. They explained that, with the high impact of missing teeth on the emotional wellbeing which leads to emotional stress, in their study.

Factors affecting impact of oral health on oral quality of life in adolescents

Regarding the impact associated to the age of the children, one study showed that 11 years old had a significant worse CPQ11-14 score than the older adolescents. On the opposite the study of Singh et al. (29) showed no significant association between quality of life and age. Regarding the impact associated to the gender of the adolescents, two studies showed that girls had a significant worse CPQ11-14 score and one study showed males had a significant worse score. Othor studies showed that girls have a worse OHRQOL compared with males. One study of them is done by Schuch et al. (30). Regarding the impact associated to social factors, two studies could show there was significant better OHRQOL in higher social classes compared with lower ones. This is in coherence with the study done by de Paula et al. (31).

Regarding the impact associated to previous oral diseases, five of the included studies showed that malocclusion had a significant impact on the OHRQOL in adolescents. This is in coherence with the findings of the study done by O'Brien et al. (32). Regarding the impact of dental fluorosis, the results of this systematic review are not clear. Regarding the impact associated to previous caries experience, only one study could show a statistical negative impact on the OHRQOL. Abanto et al. (24) and Alsumait et al. (28), showed statistical significance in untreated caries having a negative effect on the OHRQOL.

Regarding the impact associated to previous general diseases, two studies included in this systematic review used a sample with either an underlying disease (asthma) or with dental abnormality (fluorosis) and had the worst CPQ11-14 score compared to the other studies included in this systematic review and compared to the score of the study from Alsumait et. al (28). This shows that the pathological background plays a role in the oral quality of life.

Five studies were able to show significant positive correlation between the CPQ11-14 score and global satisfaction ratings. The same result had Shin et al. (33) in their study.

One of the limitations is that only transversal studies were included in this systematic review. Transversal studies don't show the cause-effect relation, they only show the association between variables. Also, that only the longer version

of the CPQ11-14 questionnaire was included, is a limitation. Excluding the shorter versions of the CPQ11-14 questionnaire might have led to missing other possible relevant studies. Also, the criteria selected by the author to apply the AXIS tool for assessing RoB might have been too restrictive. One included study has a founding source that might lead to a conflict of interest and that raises concerns regarding the credibility of the findings.

The average CPQ11-14 score of 22.23 can be considered low, with the domain “Social well-being” most affected. Most studies showed adequate psychometric properties, with good reliability and validity of the CPQ11-14 questionnaire. Malocclusion and asthma have a strong impact on OHRQOL, while dental fluorosis and caries do not. The influence of age, gender and social classes is not conclusive and Global satisfaction with oral health affects oral quality of life. The risk of bias in the identified cross-sectional studies is higher than expected though it could be due to the specific interpretation criteria selected by the author.

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Supplementary materials:

Table 1: Search strategy with MeSH terms.

Table 2: Data extraction

Table 3: AXIS tool and criteria followed to assess RoB.

Figure 1: Full description of the search strategies

Figure 2: Flow diagram filled in.

Abbreviations:

AXIS tool = Appraisal tool for Cross-Sectional Studies

CPQ = Child perception Questionnaire

CPQ8-10 = Child perception Questionnaire for 8- to 10-year-old children

CPQ11-14 = Child perception Questionnaire for 11- to 14-year-old adolescents

DMFT = decayed, missing, and filled teeth

ECOHIS = Early Childhood Oral Health Impact Scale

OHRQOL = Oral health related quality of life

P-CPQ = Parental-Caregiver Child perception Questionnaire

PIO = Population Intervention Outcome

PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analysis

RoB = Risk of Bias

Table 1: Search strategy with MeSH terms.

PIO	P(population)		I(intervention)		O(outcome)
	adolescents 11-14 years old		administration of the questionnaire CPQ11-14		assessment of the oral quality of life in adolescents
search words/ search strategy	children OR adolescents OR scholar	AND	CPQ11-14 questionnaire	AND	oral quality of life

Table 2: Data extraction

Author / Year / Country	Study's aim	Sample selection method / Sample size (N)	Age range / Sex (%)	Completion mode of CPQ 11-14 questionnaire / Administration context	Type of intervention	Sample´s inclusion and exclusion criteria	Results (mean CPQ11-14 score)	Quality of study (AXIS tool)
Curto et al. / 2023 / Spain (35)	to analyze the need for orthodontic treatment in asthmatic children aged 11 to 14 years and to evaluate their OHRQOL	through dental screening program at the dental clinic of the university of Salamanca / N=140	11 to 14 years old / female: 52.1, male: 47.9	Completion mode not stated / Dental clinic of the University of Salamanca	Questionnaire, oral clinical examinations	Inclusion criteria: patients aged between 11-14 years, diagnosed at least one year before study began with asthmatic pathology according to the criteria established by the Spanish Society of Pediatrics. Exclusion criteria: previous orthodontic treatment, caries or untreated periodontal pathology, craniofacial anomalies (cleft lip or palate), temporomandibular joint pathology, cognitive disorders	46.69	Low quality
Jain et al. / 2020 / India (31)	to develop a cross-culturally adapted Hindi version of the CPQ11-14 and to assess its validity for use among Hindi-speaking Indian children	two-stage cluster random sampling technique / N= 1000	11 to 14 years old / female: 43.8, male: 56.2	self-administered / 8 schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17	Medium quality

Kavaliauskiene et al. / 2019 /Lithuania (30)	to validate a Lithuanian version of the full CPQ11-14 questionnaire with a random sample of children aged 11 to 14 years	two-stage cluster sampling technique / N= 307	11 to 14 years old / female: 58.3, male: 41.7	Completion mode not stated / school classrooms	Questionnaires	Sample´s inclusion and exclusion criteria not stated	9.73	High quality
Kumar et al. / 2016 / India (34)	to assess the validity and reliability of CPQ11-14 in Telugu speaking school children in Telangana (India)	multi-stage probability sampling method / N=1342	11 to 14 years old / female: 41, male: 59	Completion mode not stated / schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17.15	Low quality
Olivieri et al. / 2013 /Italy (36)	to develop an Italian version of the CPQ11-14 and to assess the instrument's validity in an Italian population of adolescents	random cluster sampling / N=561	14 years old / female: 48, male: 52	Completion mode not stated / Administration context not stated	Questionnaire, oral clinical examinations	Inclusion criteria: year of birth 1994, consent forms signed by parents	15.4	Medium quality
Shyam et al. / 2020 / India (33)	to assess the impact of dental fluorosis on the OHRQOL among 11 to 14 years old school children in endemic fluoride areas of Haryana (India)	Cluster random sampling technique and simple random sampling procedure / N=2200	11 to 14 years old / female: 54.7, male: 45.3	self-administered / school rooms	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	29.8	Medium quality

Shyam et al. / 2019 / India (32)	to evaluate the Hindi (Indian) version of the CPQ11-14 among 11-14 years old school children in Rohtak City, Haryana (India)	Multistage cluster random sampling technique / N=586	11 to 14 years old / female: 27, male: 73	Interview / Administration context not stated	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	21.6	Low quality

Table 3: AXIS tool and criteria followed to assess RoB.

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)			
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?			
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				

19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

Green means the study complied with the item, red or not stated means it does not comply.

Study that complies with 18-20 items: HIGH QUALITY

Study that complies with 16-17 items: MEDIUM QUALITY

Study that complies with < 16 items: LOW QUALITY

Figure 1: Full description of the search strategies

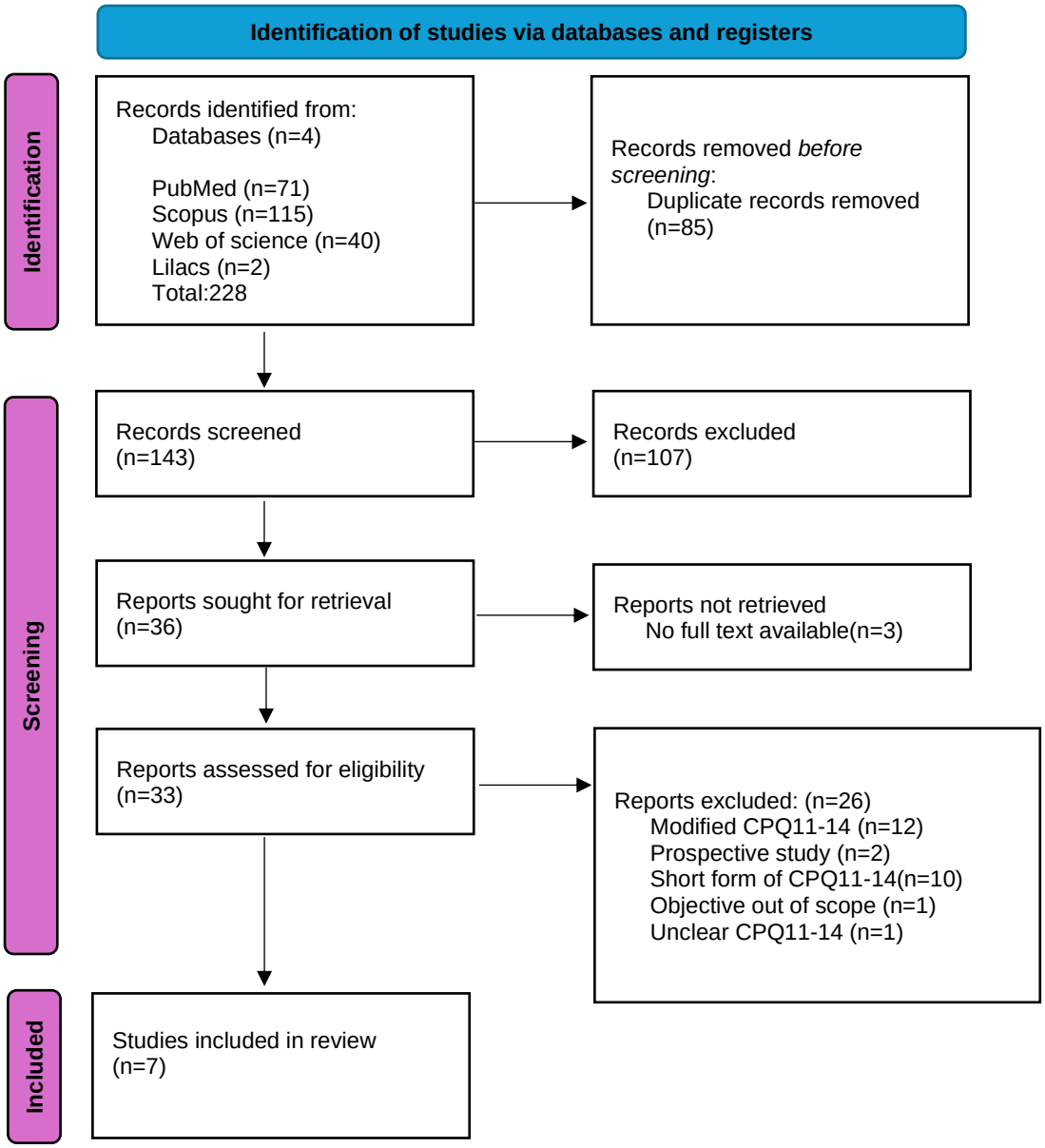
The search in PubMed using Mesh terms was the following: (("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields] OR ("adolescences"[All Fields] OR "adolescency"[All Fields] OR "adolescent"[MeSH Terms] OR "adolescent"[All Fields] OR "adolescence"[All Fields] OR "adolescents"[All Fields] OR "adolescent s"[All Fields]) OR ("scholar"[All Fields] OR "scholar s"[All Fields] OR "scholars"[All Fields])) AND ("cpq11-14"[All Fields] AND ("questionnair"[All Fields] OR "questionnaire s"[All Fields] OR "surveys and questionnaires"[MeSH Terms] OR ("surveys"[All Fields] AND "questionnaires"[All Fields]) OR "surveys and questionnaires"[All Fields] OR "questionnaire"[All Fields] OR "questionnaires"[All Fields])) AND (("mouth"[MeSH Terms] OR "mouth"[All Fields] OR "oral"[All Fields]) AND ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields]))) AND ((y_10[Filter]) AND (fft[Filter]) AND (english[Filter])).

The search in Scopus was the following: ALL (children OR adolescent OR scholar) AND ALL (cpq11-14 AND questionnaire) AND ALL (oral AND quality AND of AND life) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "DENT")) AND (LIMIT-TO (DOCTYPE , "ar")).

The search in Web of science was the following: ((((ALL=(children)) OR ALL=(adolescent)) OR ALL=(scholar)) AND ALL=(CPQ11-14 questionnaire)) AND ALL=(oral quality of life) and Article (Document Types) and English (Languages) and 2023 or 2022 or 2021 or 2017 or 2018 or 2019 or 2020 or 2016 or 2015 or 2014 or 2013 (Publication Years).

The search in Lilacs was the following: ((children) OR (adolescent) OR (scholar)) AND (cpq11-14 questionnaire) AND (oral quality of life) AND (fulltext:("1" OR "1" OR "1" OR "1" OR "1") AND db:("LILACS") AND la:("en")) AND (year_cluster:[2014 TO 2023]).

Figure 2: Flow diagram filled in.



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Revisión sistemática

CALIDAD DE VIDA ORAL EN ADOLESCENTES MEDIDA CON EL CUESTIONARIO CPQ11-14: UNA REVISIÓN SISTEMÁTICA

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Resumen

Antecedentes: La calidad de vida relacionada con la salud bucal (CVRSB) se refiere a cómo la salud oral del individuo afecta su calidad de vida en diferentes dimensiones como el funcionamiento diario, el bienestar emocional, la interacción social y la satisfacción general con la vida. El Child perception Questionnaie (CPQ) se ha utilizado ampliamente para medir la CVRSB en adolescentes y ha sido validado en múltiples contextos, mostrando propiedades psicométricas adecuadas. El objetivo fue identificar estudios transversales realizados en los últimos 10 años sobre calidad de vida relacionada con la salud oral utilizando el cuestionario CPQ11-14 en adolescentes de 11 a 14 años, y realizar una síntesis y evaluación cualitativa. **Material y Métodos**: Se realizó una búsqueda bibliográfica en las bases de datos PubMed, Scopus, Lilacs y Web of Science, con las palabras clave “children”, “adolescents”, “scholars”, “CPQ11-14 questionnaire” y “oral quality of life”. El proceso de selección siguió las declaraciones PRISMA y el sesgo de riesgo se evaluó con la herramienta AXIS. **Resultados**: Se incluyeron siete estudios en la revisión sistemática con un promedio bajo de puntaje CPQ 11-14 (22.23); el dominio "Bienestar social" fue el más afectado (puntaje = 7.02). La calidad de los estudios fue principalmente media y baja, con un riesgo de sesgo mayor de lo esperado. La maloclusión mostró un fuerte impacto negativo en la CVRSB, al igual que el asma, mientras que la experiencia previa de caries no lo hizo. La influencia de la edad, el género y las clases sociales no fue concluyente. La satisfacción global con la salud oral mostró una correlación positiva con la CVRSB. **Conclusiones**: El puntaje promedio de CPQ11-14 (22.23) refleja un bajo impacto de la salud oral en la calidad de vida de los adolescentes. La maloclusión fue la única patología oral que mostró un impacto significativo en la CVRSB, al igual que la fluorosis dental de grado moderado. La influencia de otros factores no fue concluyente. El alto impacto en el "Bienestar social" revela el papel prominente de la salud oral en las relaciones interpersonales en esta edad. El conocimiento de estos factores mejorará la atención de la salud oral en los adolescentes.

Palabras clave: Calidad de vida oral, CPQ11-14, Adolescentes.

Introducción

La calidad de vida relacionada con la salud bucal (CVRSB) es un constructo multidimensional que se refiere a la percepción del individuo sobre el impacto de las enfermedades orales bucales, incluyendo enfermedades bucales, tratamientos e intervenciones, en su vida diaria y funcionalidad (1,2). Incluye factores como el confort durante la alimentación, la autoestima y la satisfacción con la salud bucal (3,4). La CVRSB es importante porque permite mejorar la toma de decisiones clinicas al incluir también la experiencia social, emocional y la funcionalidad física de los pacientes para poder selecionar los objetivos y resultados del tratamiento más apropiados (1,5). La CVRSB comenzó a aparecer en la década de 1970 a medida que se constató mayor evidencia sobre el impacto de las enfermedades bucales en los roles sociales (1,6,7,8). En la investigación en salud oral, la CVRSB desempeña un papel importante porque permite vincular las enfermedades bucales con el impacto que tienen en la vida diaria y en la salud general del individuo. También tiene una función clave en la medición de las desigualdades en salud y el acceso a la atención odontológica en el mundo, así como en la mejora de la salud bucal y la calidad de vida en diferentes poblaciones y minorías (1,3). Medir la CVRSB en niños es un roto porque cambian cognitiva y físicamente notablemente dependiendo de la edad del niño (1,9). Por ese motivo, se han desarrollado numerosos instrumentos especialmente para niños y adolescentes en grupos de edad específicos, para poder medir su CVRSB según sus características específicas (2,10). El Child perception Questionnaire (CPQ) es uno de los instrumentos más ampliamente utilizados para medir la CVRSB en niños y adolescentes (9,11,12,13). Fue desarrollado por Jokovic y cols. en 2002 en Canadá (9,10,13). El cuestionario original CPQ11-14 tiene 37 ítems divididos en 4 dimensiones (Salud bucal, Limitaciones funcionales, Bienestar emocional, Bienestar social) y un formato de respuesta en escalas Likert de 5 puntos (9,10,14,15,16). La puntuación más alta posible es 148, lo que significa una deficiente CVRSB, y la más baja es 0, lo que implica una CVRSB excepcionalmente buena (9,11,14,15). El objetivo de esta revisión sistemática fue identificar estudios transversales recientes sobre calidad de vida relacionada con la salud bucal utilizando el cuestionario CPQ11-14 en adolescentes de 11 a 14 años y realizar una síntesis cualitativa y evaluación.

Material y Métodos

Esta revisión sistemática se realizó siguiendo la declaración PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analysis).

Identificación de la pregunta PIO

La estrategia de búsqueda se realizó siguiendo la estrategia de la pregunta PIO (Población, Intervención, Resultado). La pregunta PIO establecida para esta revisión sistemática fue "¿Cómo se mide la calidad de vida oral en adolescentes con el cuestionario CPQ11-14?".

- P (Población): adolescentes de 11 a 14 años
- I (Intervención): administración del cuestionario CPQ11-14
- O (Resultado): evaluación de la calidad de vida oral en adolescentes

Criterios de elegibilidad

Los criterios de inclusión fueron estudios transversales en adolescentes de 11 a 14 años que utilizaran el cuestionario validado CPQ11-14. Debían haber sido publicados entre 2013 y 2023, en inglés y con acceso al artículo completo original.

Los criterios de exclusión fueron: cuestionarios CPQ11-14 modificados o no validados.

Fuentes de información y estrategia de búsqueda

Se realizó una búsqueda electrónica sistemática en las bases de datos PubMed, Web of Science, Scopus y Lilacs el 22 de noviembre de 2023 para identificar estudios transversales que utilizaran el cuestionario CPQ11-14 para medir la CVRSB en adolescentes de 11 a 14 años. La estrategia de búsqueda se formuló con la ayuda de la estrategia de pregunta PIO. Las palabras de búsqueda utilizadas fueron “children”, “adolescents”, “scholar”, “CPQ11-14 questionnaire” y “oral quality of life”. Estas palabras clave se conectaron utilizando los operadores booleanos “AND” y “OR”. En las 4 bases de datos se aplicaron los mismos filtros, que eran fecha de publicación entre 2013 y 2023, e idioma inglés. En la base de datos Scopus, también se aplicó el filtro “subject area dentistry” (Tabla 1) (Una descripción completa de las estrategias de búsqueda se muestra en la Figura 1).

Extracción de datos

Se extrajeron los siguientes datos de los artículos y se recopilaron en una tabla: nombre del autor, año de publicación y país de origen del estudio, objetivo del estudio, método de selección de la muestra y tamaño de la muestra, rango de edad de la muestra del estudio y el sexo en porcentajes. Además, el modo de cumplimentación del cuestionario (autoadministrado o mediante entrevista), contexto de administración y tipo de intervención que realizaron en la muestra del estudio. Los criterios de inclusión y exclusión de la muestra del estudio, los resultados medios del cuestionario CPQ11-14 y la calidad del estudio (Tabla 2).

Instrumento para el análisis del riesgo de sesgo y evaluación de calidad

Para evaluar el riesgo de sesgo y la calidad de los estudios incluidos, se utilizó el instrumento de evaluación para estudios transversales AXIS. El instrumento AXIS consta de 20 ítems con opciones de respuesta “Sí”, “No” o “No sabe”. Para cada estudio, se completó una tabla respondiendo a los 20 ítems. Se decidió utilizar estos criterios: Los estudios que cumplieron con 18-20 ítems se clasificaron como “alta calidad”. Los estudios que cumplieron con 16-17 ítems como “calidad media” y los estudios que alcanzaron menos de 16 ítems se clasificaron como “baja calidad” (Tabla 3).

Resultados

Selección de estudios

La búsqueda electrónica identificó un total de 228 artículos: 71 en PubMed, 115 en Scopus, 40 en Web of Science y 2 en Lilacs. Se eliminaron 85 duplicados, y quedaron 143 artículos para la revisión de títulos y resúmenes. De ellos, se excluyeron 107. Se buscaron 36 artículos para su recuperación y 3 de ellos no se recuperaron porque no se disponía del texto completo. Se evaluaron 33 artículos para su elegibilidad y se excluyeron 26. Quedaron 7 estudios para ser incluídos en la revisión sistemática (Figura 2).

Características de los estudios

Tres estudios no mencionaron sus criterios de inclusión y exclusión (16,17,18). Un estudio tenía como criterio de inclusión el año de nacimiento 1994, por lo que

solo obtuvieron participantes de 14 años (19) y dos estudios excluyeron a niños no colaboradores y niños que padecían enfermedades sistémicas y otras alteraciones del desarrollo (20,21). Otro estudio incluyó solo a niños de 11 a 14 años que fueron diagnosticados al menos un año antes de que comenzara el estudio con patología asmática y excluyó a niños con tratamiento ortodóntico previo, caries o patología periodontal no tratada, anomalías craneofaciales, patología de la articulación temporomandibular y trastornos cognitivos (22). Cinco estudios evaluaron las propiedades psicométricas del CPQ11-14 en diferentes idiomas (16-20) y cuatro de ellos mostraron buena fiabilidad y validez (16-19). El otro estudio que evaluó las propiedades psicométricas mostró que el cuestionario CPQ11-14 utilizado carece de validez discriminativa (20). Un estudio no evaluó las propiedades psicométricas pero utilizó un CPQ11-14 que ya estaba validado (22) y otro estudio utilizó un cuestionario CPQ11-14 que mostró una validez discriminativa deficiente (21) (Tabla 2).

Riesgo de sesgo y evaluación de calidad

Después de completar el instrumento AXIS para cada estudio y aplicar los criterios de evaluación de calidad (Tabla 3), los resultados son que un estudio es de alta calidad (16), tres son de calidad media (17,19,21) y tres son de baja calidad (18,20,22).

Síntesis cualitativa

Población, Intervención y Resultado

El número total de participantes entre los siete estudios fue de 6136. Todos los estudios incluyeron ambos sexos, con un total de 2870 mujeres (46.77%) y 3266 hombres (53.23). Dos estudios utilizaron una población de adolescentes enfermos o con anomalías dentales como muestra (asma, fluorosis dental) (21,22). Cuatro estudios no excluyeron a adolescentes con alguna enfermedad o anomalía o no lo mencionaron (16-19) y un estudio excluyó a adolescentes con enfermedades sistémicas u otras anomalías del desarrollo (20).

Dos estudios utilizaron una técnica de muestreo por conglomerados en dos etapas como método de selección de la su muestra (16,17), dos estudios utilizaron una técnica de muestreo aleatorio por conglomerados (19,21), un estudio utilizó una técnica de muestreo aleatorio por conglomerados en múltiples

etapas (20), uno un método de muestreo probabilístico multietapa (18) y un estudio seleccionó su muestra a través de un cribado en una clínica universitaria de odontología (22).

Todos los estudios utilizaron el cuestionario CPQ 11-14 original y seis estudios también utilizaron exámenes clínicos bucales para evaluar la salud bucal de los participantes (17-22). Un estudio utilizó solo el cuestionario CPQ11-14 como intervención (16). El cuestionario fue autoadministrado dos veces (17,21), administrado una vez en modo de entrevista (20) y cuatro veces no se especificó (16-18,19,22). La intervención se realizó en escuelas en cuatro estudios (16-18,21), un estudio lo realizó en una clínica dental (22) y dos estudios no mencionaron dónde se llevó a cabo la intervención (19,20). Los criterios de inclusión y exclusión se establecieron claramente en tres estudios (20-22), un estudio no lo especificó claramente (19) y tres estudios no lo mencionaron (16-18).

Los resultados se reportaron como puntuacíon promedio global del CPQ11-14 y puntuación en los diferentes dominios en cada estudio. Las puntuaciones globales del CPQ 11-14 oscilaron entre 9.73 y 46.69, con un promedio total de 22.23 para los 6136 participantes. El dominio “Síntomas orales” obtuvo una puntuación promedio de 5.5, el dominio “Limitación funcional” de 5.43, el dominio “Bienestar emocional” de 6.14 y el dominio “Bienestar social” de 7.02.

Factores que afectan el impacto de la salud bucal en la calidad de vida en adolescentes

Un estudio mostró que la edad tuvo un impacto significativo en la calidad de vida bucal, con adolescentes de 11 años teniendo la peor puntuación de CPQ11-14 en comparación con otros grupos de edad (22). Tres estudios mostraron diferencias estadísticamente significativas en el género con respecto a la CVRSB, donde dos de los estudios mostraron que las niñas tenían una peor puntucaión de CPQ11-14 estadísticamente significativa que los varones (16,19) y un estudio mostró que los varones tenían una peor puntuación de CPQ11-14 (21). Dos estudios mostraron que había una diferencia significativa de CVRSB en niños según sus clases sociales, con una mejor puntuación de CPQ11-14 en clases sociales más altas (16,19).

Dos estudios que midieron la CVRSB en una población con una enfermedad subyacente (asma) (22) o anomalías dentales (fluorosis) (21) tuvieron la peor puntuación de CPQ 11-14 con 46.68 y 29.8. Los otros cinco estudios que se dirigieron a escolares de 11 a 14 años sin cribado para enfermedades específicas o anomalías dentales tuvieron mejores puntuaciones del CPQ 11-14, siendo la mejor puntuación de 9.73 y la peor de 21.6 (16-20).

Cinco estudios que también midieron la satisfacción global de los participantes con respecto a su salud bucal percibida, mostraron una correlación positiva significativa entre ella y la puntuación global del CPQ (16-20).

Cinco de los siete estudios mostraron que la maloclusión tuvo un impacto significativo en la CVRSB en los niños (16-19,22). Un estudio pudo mostrar que la fluorosis tiene un impacto estadísticamente significativo en la CVRSB (17), mientras que otro estudio solo pudo mostrar un impacto significativo de la fluorosis de moderada a grave y no de fluorosis leve (18). Un tercer estudio no pudo mostrar ningún impacto significativo de la fluorosis en la CVRSB (21). Solo un estudio pudo mostrar que la experiencia de caries tuvo un impacto negativo significativo en la CVRSB (16). Tres estudios no tuvieron ninguna diferencia significativa en la puntuación de CPQ11-14 en los niños con o sin caries (20,18,19).

Discusión

Sobre la metodología seguida en los artículos seleccionados

Con tres estudios que no mencionan sus criterios de inclusión/exclusión y seis estudios que no describen sus métodos lo suficientemente bien como para ser repetidos, esto plantea la preocupación sobre la transparencia y exhaustividad en el diseño del estudio y deja espacio para el sesgo y limita la reproducibilidad y fiabilidad de estos estudios. Antunes y cols. (23) encontraron en su revisión sistemática que 6 de los 19 estudios incluidos carecían de criterios de inclusión/exclusión. Esto indica que puede haber una falta de transparencia en los estudios transversales en el campo de la CVRSB. Solo dos estudios mostraron una falta de validez discriminante del cuestionario CPQ11-14, los demás estudios incluidos mostraron que el cuestionario CPQ11-14 tenía buena fiabilidad y validez, lo cual está de acuerdo con los hallazgos en los estudios de

Abanto y cols. (24), Kassis y cols. (13) y García y cols. (25). Todos mostraron buenas propiedades psicométricas.

El hecho de que la evaluación de la calidad de los estudios incluídos mostrara que solo un estudio era de alta calidad, tres de calidad media y los otros tres de baja calidad, plantea preocupaciones sobre el riesgo de sesgo y la credibilidad de los hallazgos. Jawdekar y cols. (26) utilizaron en su revisión sistemática el mismo instrumento (AXIS) para evaluar el riesgo de sesgo y realizar una evaluación de calidad. Evaluaron que dos estudios tenían un riesgo bajo de sesgo y cuatro estudios tenían un riesgo moderado de sesgo, lo cual es en general una mejor calidad de estudios que los estudios de esta revisión sistemática. Esto podría deberse a diferencias en la interpretación y aplicación de la herramienta AXIS o a variaciones en las metodologías de estudio.

Con un número total de 6136 participantes entre todos los estudios incluidos juntos, el tamaño de la muestra en esta revisión sistemática fue mayor que en la revisión sistemática de Jawdekar y cols. (26). El mayor tamaño de muestra de esta revisión sistemática contribuye a la generalización de los hallazgos del estudio. Además, con un 46.77% de mujeres y un 53.23% de hombres, la distribución por género es equilibrada y permite analizar posibles factores relacionados con el género. En la revisión sistemática de Sun y cols. (27), la mayoría de los estudios utilizaron una muestra de conveniencia, lo que limita los hallazgos del estudio y plantea preocupaciones sobre la generalización de los resultados. En esta revisión sistemática, todos excepto un estudio utilizaron un método de muestreo por conglomerados o un método de muestreo probabilístico de etapas múltiples, lo que reduce la probabilidad de sesgo de muestreo y mejora la generalización de los hallazgos del estudio.

Todos los estudios incluídos utilizaron como intervención el cuestionario CPQ11-14 original y seis estudios también realizaron exámenes clínicos bucales para evaluar la salud bucal. Antunes y cols. (23) utilizaron en su revisión sistemática el cuestionario CPQ11-14 y la Early Childhood Oral Health Impact Scale (ECOHIS). Sun y cols. (27) incluyeron en su revisión sistemática todas las versiones de CPQ8-10 y CP11-14, y Jawdekar y cols. (26) incluyeron todas las versiones de CPQ8-10, CPQ11-14 y P-CPQ. En esta revisión sistemática, los estudios incluídos autoadministraron o entrevistaron el cuestionario, pero en 4 ocasiones los estudios no mencionaron la forma de administración. En

comparación con Antunes y cols. (23), en su revisión sistemática todos los estudios mencionaron la forma de administración, y la mayoría de las veces se utilizó el método autoadministrado. Por el contrario, Sun y cols. (27) y Jawdekar y cols. (26) ni siquiera mencionaron cómo se administraron los cuestionarios de CVRSB.

Sobre los resultados obtenidos en los estudios seleccionados

La puntuación general del CPQ11-14 en esta revisión sistemática varía de 9.73 a 46.69 con un promedio de 22.23. En un estudio realizado por Alsumait y cols. (28), la puntuación general promedio del CPQ11-14 fue de 20.72 y el estudio realizado por Abanto y cols. (24) obtuvo un valor de 20.18, valores cercanos a el de esta revisión sistemática. Alsumait y cols. (28) explicaron su resultado con un valor DMFT (decayed, missing, and filled teeth) relativamente alto en su muestra. Además, esta revisión sistemática tiene una muestra que incluye participantes con antecedentes generales y orales patológicos (asma y fluorosis dental), lo que explica la puntuación relativamente alta. En esta revisión sistemática, el dominio “Síntomas orales” obtuvo un promedio de 5.5, para “Limitación funcional” fue de 5.43, para “Bienestar emocional” de 6.14 y para “Bienestar social” de 7.02. Por el contrario, Alsumait y cols. (28) encontraron que “Bienestar emocional” era la dimensión más afectada. Explicaron que el alto impacto de los dientes ausentes conduce a un estrés emocional en su estudio.

Factores que afectan el impacto de la salud bucal en la calidad de vida oral de los adolescentes

Respecto al impacto asociado a la edad de los niños, un estudio mostró que los niños de 11 años tenían una puntuación CPQ11-14 significativamente peor que los adolescentes mayores. Por el contrario, el estudio de Singh y cols. (29) no mostró una asociación significativa entre la calidad de vida y la edad. Respecto al impacto asociado al género de los adolescentes, dos estudios mostraron que las niñas tenían una puntuación CPQ11-14 significativamente peor y un estudio mostró lo mismo en los varones. Otros estudios reportaron que las niñas tienen una peor CVRSB en comparación con los varones. Uno de ellos es el realizado por Schuch y cols. (30). Respecto al impacto asociado a factores sociales, dos estudios pudieron mostrar que había una mejor CVRSB significativa en clases

sociales más altas en comparación con las más bajas. Esto está en coherencia con el estudio realizado por de Paula y cols. (31).

En relación al impacto asociado a enfermedades orales previas, cinco de los estudios incluídos mostraron que la maloclusión tenía un impacto significativo en la CVRSB en los adolescentes. Esto concuerda con los hallazgos del estudio de O'Brien y cols. (32). En relación al impacto de la fluorosis dental, los resultados de esta revisión sistemática no son claros. Respecto al impacto asociado a experiencia previa de caries, solo un estudio pudo mostrar un impacto negativo estadísticamente significativo en la CVRSB. Abanto y cols. (24) y Alsumait y cols. (28) mostraron una significancia estadística en caries no tratadas que tienen un efecto negativo en la CVRSB.

En relación al impacto asociado a enfermedades generales previas, dos estudios incluídos en esta revisión sistemática utilizaron una muestra con una enfermedad subyacente (asma) o con anormalidad dental (fluorosis) y tuvieron la peor puntuación CPQ11-14 en comparación con los otros estudios incluidos en esta revisión sistemática y en comparación con el estudio de Alsumait y cols. (28). Esto muestra que el antecedente patológico juega un papel en la calidad de vida oral.

Cinco estudios pudieron mostrar una correlación positiva significativa entre la puntuación del CPQ11-14 y la valoración de satisfacción global. El mismo resultado lo obtuvo Shin y cols. (33) en su estudio.

Una de las limitaciones es que solo se incluyeron estudios transversales en esta revisión sistemática. Los estudios transversales no muestran la relación causa-efecto, sino solo la asociación entre variables. Además, que solo se incluyera la versión más larga del cuestionario CPQ11-14 es una limitación. Excluir las versiones más cortas del cuestionario CPQ11-14 podría haber llevado a perder otros posibles estudios relevantes. Además, los criterios seleccionados por el autor para aplicar el instrumento AXIS para evaluar el RdS podrían haber sido demasiado restrictivos. Un estudio incluído tiene una fuente de financiación que podría llevar a un conflicto de intereses y eso plantea preocupaciones sobre la credibilidad de los hallazgos.

La puntuación promedio del CPQ11-14 de 22.23 se puede considerar baja, siendo el dominio “Bienestar social” el más afectado. La mayoría de los estudios mostraron propiedades psicométricas adecuadas, con buena fiabilidad y validez del cuestionario CPQ11-14. La maloclusión y el asma tienen un fuerte impacto en la CVRSB, mientras que la fluorosis dental y las caries no lo tienen. La influencia de la edad, el género y la clase social no es concluyente y la satisfacción global con la salud oral afecta la calidad de vida oral. El riesgo de sesgo en los estudios transversales identificados es mayor de lo esperado, aunque podría deberse a los criterios de interpretación específicos seleccionados por el autor.

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Abreviaturas:

AXIS = Appraisal tool for Cross-Sectional Studies

CPQ = Child perception Questionnaire

CPQ8-10 = Child perception Questionnaire para niños de 8 a 10 años

CPQ11-14 = Child perception Questionnaire para niños de 11 a 14 años

CVRSB = calidad de vida relacionada con la salud bucal

DMFT = decayed, missing, and filled teeth

ECOHIS = Early Childhood Oral Health Impact Scale

P-CPQ = Parental-Caregiver Child perception Questionnaire

PIO = Población, Intervención, Resultado

PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analysis

RdS = Riesgo de Sesgos

Materiales suplementarios:

Tabla 1: Estrategia de búsqueda con términos MeSH.

Tabla 2: Extracción de datos.

Tabla 3: Instrumento AXIS y criterios seguidos para evaluar el sesgo.

Figura 1: Descripción completa de las estrategias de búsqueda.

Figura 2: Diagrama de flujo completado.

Tabla 1: Estrategia de búsqueda con términos MeSH.

PIO	P(population)		I(intervention)		O(outcome)
	adolescents 11-14 years old		administration of the questionnaire CPQ11-14		assessment of the oral quality of life in adolescents
search words/ search strategy	children OR adolescents OR scholar	AND	CPQ11-14 questionnaire	AND	oral quality of life

Tabla 2: Extracción de datos.

Author / Year / Country	Study's aim	Sample selection method / Sample size (N)	Age range / Sex (%)	Completion mode of CPQ 11-14 questionnaire / Administration context	Type of intervention	Sample´s inclusion and exclusion criteria	Results (mean CPQ11-14 score)	Quality of study (AXIS tool)
Curto et al. / 2023 / Spain (35)	to analyze the need for orthodontic treatment in asthmatic children aged 11 to 14 years and to evaluate their OHRQOL	through dental screening program at the dental clinic of the university of Salamanca / N=140	11 to 14 years old / female: 52.1, male: 47.9	Completion mode not stated / Dental clinic of the University of Salamanca	Questionnaire, oral clinical examinations	Inclusion criteria: patients aged between 11-14 years, diagnosed at least one year before study began with asthmatic pathology according to the criteria established by the Spanish Society of Pediatrics. Exclusion criteria: previous orthodontic treatment, caries or untreated periodontal pathology, craniofacial anomalies (cleft lip or palate), temporomandibular joint pathology, cognitive disorders	46.69	Low quality
Jain et al. / 2020 / India (31)	to develop a cross-culturally adapted Hindi version of the CPQ11-14 and to assess its validity for use among Hindi-speaking Indian children	two-stage cluster random sampling technique / N= 1000	11 to 14 years old / female: 43.8, male: 56.2	self-administered / 8 schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17	Medium quality

Kavaliauskiene et al. / 2019 /Lithuania (30)	to validate a Lithuanian version of the full CPQ11-14 questionnaire with a random sample of children aged 11 to 14 years	two-stage cluster sampling technique / N= 307	11 to 14 years old / female: 58.3, male: 41.7	Completion mode not stated / school classrooms	Questionnaires	Sample´s inclusion and exclusion criteria not stated	9.73	High quality
Kumar et al. / 2016 / India (34)	to assess the validity and reliability of CPQ11-14 in Telugu speaking school children in Telangana (India)	multi-stage probability sampling method / N=1342	11 to 14 years old / female: 41, male: 59	Completion mode not stated / schools	Questionnaire, oral clinical examinations	Sample´s inclusion and exclusion criteria not stated	17.15	Low quality
Olivieri et al. / 2013 /Italy (36)	to develop an Italian version of the CPQ11-14 and to assess the instrument's validity in an Italian population of adolescents	random cluster sampling / N=561	14 years old / female: 48, male: 52	Completion mode not stated / Administration context not stated	Questionnaire, oral clinical examinations	Inclusion criteria: year of birth 1994, consent forms signed by parents	15.4	Medium quality
Shyam et al. / 2020 / India (33)	to assess the impact of dental fluorosis on the OHRQOL among 11 to 14 years old school children in endemic fluoride areas of Haryana (India)	Cluster random sampling technique and simple random sampling procedure / N=2200	11 to 14 years old / female: 54.7, male: 45.3	self-administered / school rooms	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	29.8	Medium quality

Shyam et al. / 2019 / India (32)	to evaluate the Hindi (Indian) version of the CPQ11-14 among 11-14 years old school children in Rohtak City, Haryana (India)	Multistage cluster random sampling technique / N=586	11 to 14 years old / female: 27, male: 73	Interview / Administration context not stated	Questionnaire, oral clinical examinations	Exclusion criteria: children without parental informed consent, uncooperative children, children suffering from systemic diseases and other developmental anomalies	21.6	Low quality

Tabla 3: Herramienta AXIS y criterios seguidos para evaluar el sesgo.

	Question	Yes	No	Don't know/ Comment
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who theresearch was about?)			
5	Was the sample frame taken from an appropriate population base so that itclosely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that wererepresentative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aimsof the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or publishedpreviously?			
10	Is it clear what was used to determined statistical significance and/orprecision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described toenable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				

19	Were there any funding sources or conflicts of interest that may affect theauthors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

Green means the study complied with the item, red or not stated means it does not comply.

Study that complies with 18-20 items: HIGH QUALITY

Study that complies with 16-17 items: MEDIUM QUALITY

Study that complies with < 16 items: LOW QUALITY

Figura 1: Descripción completa de las estrategias de búsqueda.

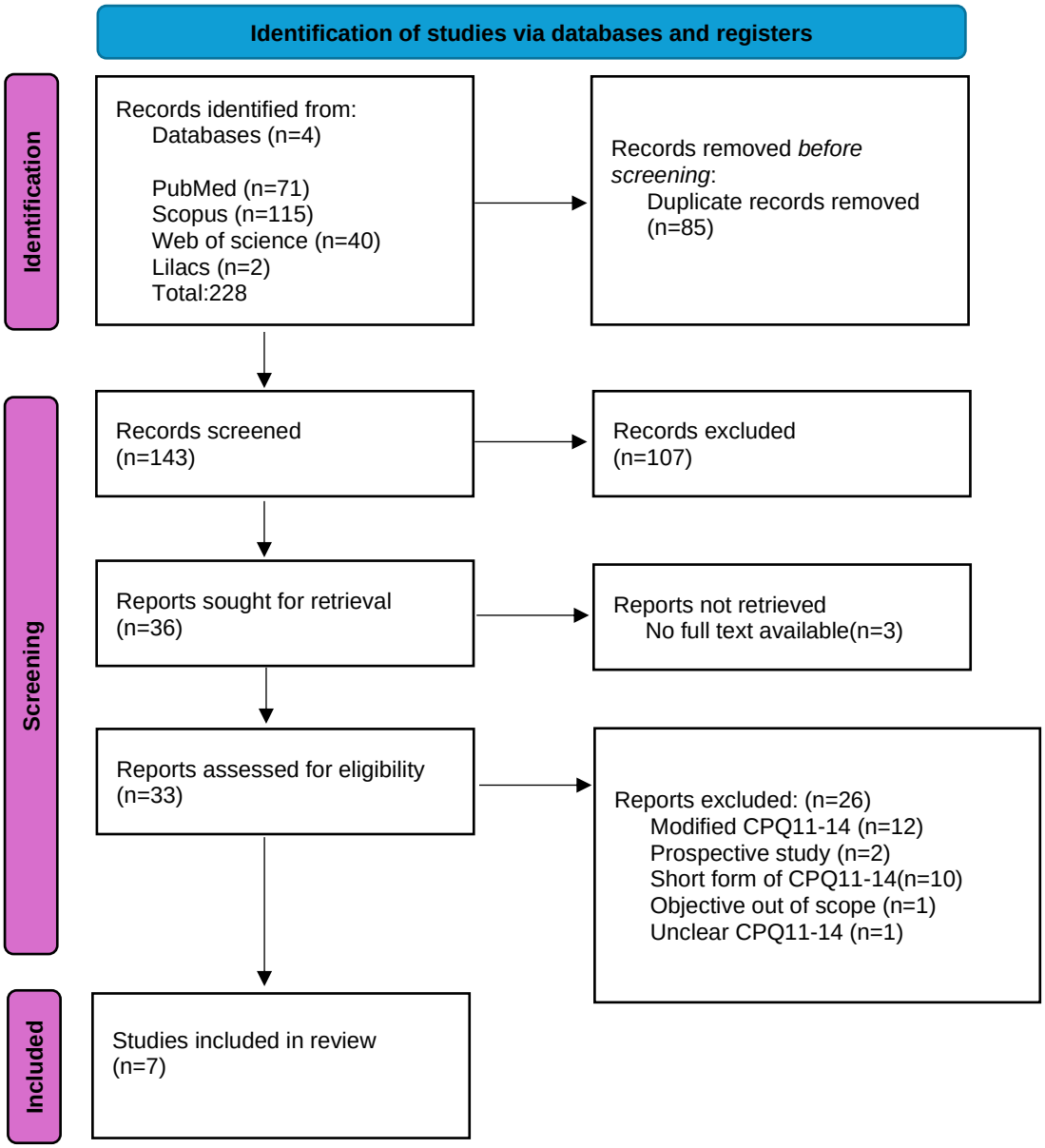
The search in PubMed using Mesh terms was the following: (("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields] OR ("adolescences"[All Fields] OR "adolescency"[All Fields] OR "adolescent"[MeSH Terms] OR "adolescent"[All Fields] OR "adolescence"[All Fields] OR "adolescents"[All Fields] OR "adolescent s"[All Fields]) OR ("scholar"[All Fields] OR "scholar s"[All Fields] OR "scholars"[All Fields])) AND ("cpq11-14"[All Fields] AND ("questionnair"[All Fields] OR "questionnaire s"[All Fields] OR "surveys and questionnaires"[MeSH Terms] OR ("surveys"[All Fields] AND "questionnaires"[All Fields]) OR "surveys and questionnaires"[All Fields] OR "questionnaire"[All Fields] OR "questionnaires"[All Fields])) AND (("mouth"[MeSH Terms] OR "mouth"[All Fields] OR "oral"[All Fields]) AND ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields]))) AND ((y_10[Filter]) AND (fft[Filter]) AND (english[Filter])).

The search in Scopus was the following: ALL (children OR adolescent OR scholar) AND ALL (cpq11-14 AND questionnaire) AND ALL (oral AND quality AND of AND life) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "DENT")) AND (LIMIT-TO (DOCTYPE , "ar")).

The search in Web of science was the following: ((((ALL=(children)) OR ALL=(adolescent)) OR ALL=(scholar)) AND ALL=(CPQ11-14 questionnaire)) AND ALL=(oral quality of life) and Article (Document Types) and English (Languages) and 2023 or 2022 or 2021 or 2017 or 2018 or 2019 or 2020 or 2016 or 2015 or 2014 or 2013 (Publication Years).

The search in Lilacs was the following: ((children) OR (adolescent) OR (scholar)) AND (cpq11-14 questionnaire) AND (oral quality of life) AND (fulltext:("1" OR "1" OR "1" OR "1" OR "1") AND db:("LILACS") AND la:("en")) AND (year_cluster:[2014 TO 2023]).

Figura 2: Diagrama de flujo completado.



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71