Oral Status of elderly patients in long stay centres: A systematic review

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Abstract

Background: Elderly patients who spend long periods hospitalized or those who are in a situation of institutionalization represent a risk group in this regard, as many of them suffer a degree of dependence and need help to perform the basic tasks of personal care. It is therefore important to learn more of the oral health status of this group of patients in order to make a proper assessment of the situation and to develop protocols for its management.The purpose of the study was to conduct a systematic review to ascertain the oral health status of elderly patients admitted to institutions or hospitalized for a long period of time.

Methods: a systematic review of the literature published in two different databases (PubMed, Embase and Cochrane Library) was carried out, with 12 different combinations of keywords based on the following selection criteria: studies published in the last 5 years, in English and/or Spanish and/or Portuguese, with samples of ≥30 patients, performed in patients older than 65 years, admitted to any type of institution and/or hospital center for at least 7 days and in which the state of hard and/or soft tissues of the oral cavity were evaluated in some way. The selected articles were subjected to a thorough analysis.

Results: The search strategy covered1 , 014 articles: 689 from Pubmed and 325 from Cochrane Library. After applying the eligibility criteria, fivearticles were selected for our review. The level of evidence of the articles was3, a sample of 773 patients most of them were women with an average age older than 70 years old.

Conclusions: the oral health of patients aged more than 65 is worse than that of the rest population. Long hospital stays or being institutionalized in a residence makes this group susceptible to a worsening of their oral health status. It is necessary to develop protocols for the oral health care of these patients, accompanied by training programs for the personnel responsible.

Key words: "elderly inpatients", "elderly hospitalized patients", "long term hospitalization", "long term inpatients", "oral health", "oral status".

Background

In light of the increase in life expectancy, aging is "on the verge of becoming one of the most significant social transformations of the twenty-first century" [1]. In Spain, people over 65 represent 19.2% of the total population [2] a figure that will reach 25.2% in 2033[3].

This makes it necessary to reconsider the way that we attend and treat elderly patients in our current society [4], not just those who have sufficient personal autonomy but also those that live in institutions and need some kind of specific care, estimated to be around 3% of the elderly [5, 6]. Despite this need, there are few studies that describe the situation in which this population group find themselves and which might contribute to improving improve the attention given to them and therefore, increase their quality of life.

For example, in Spain there are no studies regularly made at a national level, in which the physical, medical and psychological conditions of the institutionalized elderly population are evaluated [5].

The progress and improvements that have been made in dentistry, as well as new patterns of care and prevention, have meant that it is increasingly possible to reach old with a large number of teeth and in a better state of dentition than ever before [7, 8] although there is still a tendency for the elderly to be vulnerable to caries and periodontitis [8]. Oral pathologies can significantly affect health and general welfare of the population, and have impact on alterations in speech or poor pronunciation of certain words, or a deficient food intake, favoring malnutrition [9] because of due to problems with chewing or swallowing, as well as the negative effect that deficient oral health can have on facial aesthetics, affecting self-esteem and the psychosocial well-being of the individual [10, 11, 12]. Numerous studies have described the relationship between poor oral health and the emergence of systemic diseases, from heart disease or Diabetes Mellitus, to respiratory diseases, such as pneumonia [8, 10, 13, 14].

In the case of geriatric patients, we must also take into account the frequent coexistence of several diseases and disorders in the same patient. Comorbidity in this population group makes them especially susceptible and, therefore, very vulnerable to the emergence of oral pathologies, often as a result of the medication they may be taking, which increase the risk of tooth decay through alterations in saliva flow [10]. Suffering from some disorder can give rise to physical, cognitive or, even, motivational limitations, and can thus interfere with the development and habit of a good pattern of oral hygiene [11, 15, 16].

Added to the vulnerability of the oral health of geriatric patients, there are other factors that can limit necessary oral attention, such as the economic inability to assume the costs of treatment, reduced physical mobility, the lack of transport/caregivers/family members who can accompany them. In addition, as a result of their past work and social environment and their own idiosyncrasies, the person may lack the ability to recognize the need for an examination or dental treatment [10].

Despite the high prevalence of oral health problems in this group of patients, nowadays little or no importance is given to this issue [10]. That is why the WHO has advised on the need to increase awareness, on a social, cultural, and medical level, of oral health as a major component of overall health and quality of life [15], and strongly recommends that countries develop programmes to meet the needs of their elderly citizens and research into oral care in the elderly population, due to an increase in the overall incidence of non-transmissible diseases [17]. A WHO survey of oral health of elderly patients revealed that oral health programmes targeting this population group are very rare [17], which leads to dental intervention tending to be therapeutic rather than preventive, which would be the ideal. That is why hospitalizations or longer stays in care centers present a good opportunity for providing dental assistance that would otherwise not be offered [10].

Patients admitted to hospitals or living in residences are at risk of poor or deficient oral health, basically because of a loss of motor and cognitive skills. Diseases such as Parkinson's or Alzheimer's, or

neuromuscular disorders, are some of the reasons that many are no longer able to perform proper oral care tasks, due to loss of manual dexterity or perhaps because they do not remember how to brush their teeth or are not able to follow the instructions to do so themselves [11].

The removal of bacterial plaque, at least twice a day (morning and evening), is essential for maintaining oral health, especially in dependent older people. However, despite the important role that the staff attending these patients could play in maintaining and influencing their oral health, they do not know what care and oral hygiene protocols should be followed in hospitals, except those applied to patients who are at risk of pneumonia associated with mechanical ventilation [11].

Although oral pathology constitutes one of the most common chronic diseases and tone that is an important public health problem due to its prevalence and the expense of treatment [15], there is a general erroneous concept that oral hygiene and care are unimportant [11]. So much so that when many patients, for different reasons, reject oral care, staff simply accept the situation. However, the opting to refuse treatment is not tolerated in other interventions - for example, measuring the level of glucose in blood of a patient or their blood pressure. This situation is doubly severe in patients with dementia, who are reluctant to be cared for by third parties, since the person responsible for their care may be in a situation that does not allow them to offer the proper care either because the patient refuses or because they are overworked and decides not to assist them. For all of the above, these patients are at a higher risk than the rest of the elderly population [11], and can be considered extremely vulnerable.

Bilder et al. [15], described how poor oral health and limitations of access to oral care for adults in long-term care centers, as well as the lack of detailed guidelines, are a reflection of the insufficient scientific evidence concerning the support techniques for the provision of dental care [11], which does not help when attempts are made to reverse this situation. In fact, the problems of oral health, from dental caries to chewing problems or pain, constitute the most frequent treatment needs and least successful resolution in the population group consisting of older people and the disabled [15].

For all these reasons, we think that the lack of information, documentation, and prevention protocols in oral health in elderly patients, can have an impact on health, i.e., on the state of complete physical, mental and social well-being.

Our main objetive, then was to conduct a systematic review to ascertain the state of oral health in elderly patients who are admitted to some sort of institution or hospitalized for a long period of time, analyzing all those parameters which could reveal their current oral situation. Secondary objectives were to see whether the deterioration of oral health that these patients experience is conditioned by their situation of being in a hospital or residence; to see whether there is some type of standard protocol for the oral health care of these patients; compare the information obtained with published scientific literature, and in case of the absence of the same, to propose this line of research in order to establish a protocol for oral care focused on prevention in the elderly population, especially those in long stay facilities.

The literature search strategy followed in making this systematic review was in accordance with the PICOS framework [18]. The focus question was: How is oral health in institutionalized elderly patients?.

Methods

This review is registered in the PROSPERO database as (ID.155511), in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guideline [18].

Using components of the PICOS system, the aims of our systematic review were as follows

Population: Patients aged 65 and over admitted to hospital for periods of more than 7 days or residents in some type of institution.

Intervention: Oral health indexes (DMFT, treatment needs index,…), oral hygiene protocols

Comparison: Oral health status among patients who are institutionalized or not

Outcomes: Poorer results for the periodontal indexes in dementia patients

Study type: cohort, cross sectional, longitudinal, case-control studies

Institutional review board approval was not required for this review.

Literature Search Strategy

Two independent reviewers (JARR and DMF.) conducted a strict electronic search of the PubMed/Medline, EMBASE and Cochrane Library databases to make sure that our references were solid and contrasted. Only articles published in English, Spanish or Portuguese within the 5 years period, January 1st 2014 to January 1st 2019. The terms used were "elderly inpatients", "elderly hospitalized patients", "long term hospitalization", "long term inpatients", "oral health", "oral status" and "oral pathology", using the Boolean connector "AND". A further manual search was conducted of the reference lists of relevant review studies. We reviewed all potential titles and abstracts, and complete texts, and selected those that met the criteria detailed below. Disagreements between researchers were settled by a third researcher (YMB). Cohen's kappa coefficient was used to evaluate the disagreement between the researchers.

Selection Criteria

According to the selection criteria, in this systematic review, the following inclusion and exclusion criteria were followed (Table 1).

Assessment Of Bias Within Studies

From each of the articles, information was extracted, such as the sample size, the study design, the intervention and the measures of the results. Articles are classified by reference to their level of scientific evidence according to the criteria described by Scottish Intercollegiate Guidelines Network (SIGN), which provides checklists to assess the quality of: systematic reviews & meta-analyses, RCTs, cohort studies, case-control studies, diagnostic studies, and economic studies. Each checklist is accompanied by notes to aid completion, and written responses to the individual questions are used, with users then assigning studies an overall rating according to specified criteria. The full set of checklists and detailed notes on their use are available from SIGN) [19].

Results

The search strategy covered 1,014 articles: 689 from Pubmed and 325 from Cochrane Library. After applying the eligibility criteria, five articles were selected for our review (Fig. 1).

Quality Assessment

According to these criteria, the articles selected for our systematic review had the following levels of evidence and degrees of recommendation (table 2).

Basic Results

Of the 5 studies selected for this systematic review, two were carried out in Europe [9, 20], two in Asia [21, 22], and one in Australia [23].

All the works have a very significant sample size: Poisson et al., [9] 159 patients, Gerritsen et al., [20] 355, Chen et al., [21] 120, and that smallest, Murray et al. [23] and Nakayama et al., [22] with 89 and 50 patients, respectively, making a total of 773 patients.

Although only two studies [20, 21] specified the age range of the patients, the average age of all participants in the studies was older than 70.

In three studies [9, 20, 21] the proportion of women in the sample was higher than that of men. If look at the total number of participants in the papers included in the review, the proportion of women who participated in the studies was higher (1:1.6 male to female ratio), which can be explained by the greater life expectancy that often accompanies the female sex.

The study of Gerritsen and co-workers [20], took as sample a group of elderly subjects from three retirement homes, while Chen et al. [21] studied subjects from a geriatric medical centre and Murray et al. [23] 3 rehabilitation centres for patients who had suffered a cerebrovascular accident (CVA). Poisson et al. and Nakayama et al. [9, 22] developed their studies in hospitals; while Poisson et al. (Poisson et al., 2014) worked in the geriatrics area of a hospital. Nakayama et al. [22] focused on patients suffering ALS

(Amyotrophic Lateral Sclerosis) with nasogastric and artificial respiration. None of the selected studies specify whether they were in public or private centers.

3.2. Causes Of Admission Of Patients

Except for Murray et al. [23] and Nakayama et al. (Nakayama et al., 2017), who worked with very specific types of patient (patients in rehabilitation after CVA and patients with ALS, respectively), none of the studies specified the reason for admission to the centres, although Gerritsen et al. [20] and Chen et al. [21] gave a general outline. In particular, Gerritsen et al. [20] specified that 47% were in the residence for somatic reasons and 53% for psychogeriatric reasons, while Chen et al. [21] pointed out that the main diagnoses at admission of their sample were pneumonia, sepsis, idiopathic fever and infection of the urinary tract.

Two of the studies [22, 23] did not specify the length of the stay in the institution, but, from the information provided in the articles we understand that all studied patients stayed for at least 7 days [21, 23], while the longest times were by those mentioned by Gerritsen et al. (Gerritsen et al., 2015) (more than two years). Therefore, the longest stays were those mentioned in the only study carried out in retirement homes.

Three of the 5 studies [9, 21, 23] specify at least part of the systemic pathology that participants had. The remaining two [20, 22] did not mention whether the patients in their studies suffered any other pathologies beyond those specified as the time of admission: somatic or psychogeriatric reasons in the case of Gerritsen et al. [20], and ALS in the case of Nakayama et al. [22]. In the study of Poisson et al. [9], 74.2% of the patients suffer from some sort of cognitive problem; Murray et al. [23] mentioned only comorbidities derived from the CVA suffered by patients (aphasia, apraxia, dependency...) and Chen et al. [21] describes the degree of dependence of their patients (total dependence (45%), severe (35%) and a slight (20%)), along with the more common pathologies such as Diabetes Mellitus (58.3% of patients) and high blood pressure (77.5%). However, the most striking thing in these studies was the number of patients who had some sort of cognitive problem or degree of dependence that made them vulnerable to not receiving good oral care (Table 3).

None of the studies evaluated the medication that the participants were taking, which could be associated with the state of their oral health. Nakayama et al. [22], who measured the salivation index of their participants, only took into account that none of the patients in the study were following any treatment that would affect their salivary flow (radiotherapy or botulinum toxin).

Oral Health And Hygiene

Regarding the oral health of the participants of the various studies, it is concluded that, despite using different rates of assessment, only Poisson et al. [9] and Nakayama et al. [22] used the DMFT index (Decayed, Missing, Filled Teeth). However, the vast majority of patients in all the studies have poor oral health and, although only Gerritsen et al. [20] specified so, we understand that they are also in great need of treatment.

As regards oral care measures, only one study [9] does not mention that subjects follow any kind of oral hygiene protocol. Gerritsen et al. [20], mention that patients in the caring homes have dental care 16 hours a week and 8 hours of oral hygiene. This is probably why new patients had greater need of treatment than long standing residents (although this relationship was only clear in the group of edentulous patients admitted for psychogeriatric reasons, possibly because having no teeth would make it quicker and easier care for them, while the same patients could receive special attention because of their mental condition). Nakayama et al. [22] describe the protocol followed by nurses twice a day, in which they paid attention to both the hard and soft tissues. However, we should not forget that, patients who participated in the study by these authors suffered from ALS, which, probably meant that they followed a special protocol – even though such care should be considered normal and minimum for anyone. Chen et al. [21] indicated that patients' oral hygiene is the responsibility of the nursing staff, but does not specify any guidelines or frequency of the same. What it does mention is the improvement shown with the intervention: hygiene measures twice a day (brushing and rinsing) for the three parameters which were taken into account (halitosis, plaque and state of mucous membranes), without significant differences between the three types of rinses used for the different groups (chlorhexidine, saline solution and boiled water), except in case of halitosis during examination on the 7th day, when the best result was seen in the group that used boiled water as a rinse.

In the case of Murray et al. [23] it seems that patients only receive brushing in the morning but that, due to the hygiene guidelines applied during the study (brushing with toothpaste after breakfast and dinner, and rinses with water after the main meal, with assistance of the staff if necessary), most of the patients with dysphagia improved their oral situation (patients without dysphagia also improved, but not significantly). In addition, the authors established a relationship between being independent and better oral situation. Therefore, there was an improvement in the oral health of patients in the two only studies which followed new oral hygiene guidelines during the study and reassessed the oral situation of patients [23].

Only the studies of Poisson et al. and Gerritsen et al. [9, 20] were supervised by dentists (Table 4).

In general, in the studies included in the systematic review [9, 20-3] we see that the attention that should be paid to hygiene and oral care of patients is simply not carried out and that by implementing measures which, at present, are considered basic to maintain good oral health, the staff of these facilities could improve oral conditions of much of this population group.

Discussion

There is no doubt that a good oral health status is crucial for maintaining good general health [8, 10, 13]. In the elderly, this relationship is much more palpable, since many tend to suffer from conditions that make them susceptible to poorer oral health [10, 11, 15].

Shimazaki et al. [24], in a study carried out in 2001, concluded that older edentulous inpatients with no prosthesis, had a higher risk of mortality and deterioration of physical abilities than those elderly

inpatients with 20 or more teeth, confirming that the conservation of teeth as the years pass exerts a protective role in the general state of health. This same author, in 2009 [24,] studied the influence of oral health on febrile states in elderly inpatients during long hospital stays, indicating that poor dental and oral health was linked in dentate and edentulous patients with episodes of fever. In addition, many have described the relationship between poor oral health and the development of pneumonia by aspiration and respiratory infections in patients with assisted ventilation [16]. This suggests that, while dental conservation work can favour the maintenance of a good general state of health in old age, this does not apply if there is no previous attempt at maintaining oral health.

Hospitalization changes the routines of people, and may cause stress or anxiety because of the pain and discomfort that they may experience during an illness [25]. For this reason, being hospitalized is an added risk when it comes to good oral health [16], as it usually results in a decline in self-esteem, in which patients neglect care and personal hygiene, at that same time that they feel worried about their disease [16, 25]. This circumstance particularly affects those patients with a physical or cognitive limitation [12, 25, 26, 27], who are the most vulnerable in terms of developing problems or deterioration in terms of oral health, especially during a long hospital stay or a situation of institutionalization.

The studies that have attempted to relate the relation between hospitalization and oral health were largely developed in Intensive Care Units (ICU), which is insufficient since the vast majority of hospitalized patients do not attend this service [25]. In addition, Sousa et al. [25] and Gibney et al. [16] ,found that hospital admissions for short stays, in units that did not involve intensive care, negatively affected the oral health of patients, corroborating studies that had been conducted in these units, and pointing out the importance of studying this situation in other hospital services.

During the article selection process we were faced with the problem of the paucity of studies on institutionalized or long hospital stay elderly patients and their oral health, since many authors [10, 16, 28] studied emergency inpatients and those during short stays, indicating that they already had previous oral health as well as systemic problems. Other studies focused on dysphagia which this type of patient may frequently have, its risk factors and its relationship with malnutrition, but without analyzing the state of oral health [29-32], although this is important in the context of this disease. In our systematic review [9, 20, 21, 22], we were able to see that the vast majority of participants had poor oral health. Gerritsen et al. [20] established the need for treatment in 70% of the patients in their sample, although they had access to dental care which was provided by their institutions, which makes the lack of studies assessing the oral health in this situation or during long hospital stays even more incomprehensible.

As we have seen in two of the studies included in our review [21, 23], the implementation of protocols that comply with basic oral hygiene measures that are recommended for any patient these days leads to unquestionable improvements in the oral health of patients, as described in other studies in chronic care facilities and in areas of geriatric rehabilitation in which oral hygiene had been supported by dental professionals and/or nursing staff following a standardized protocol [28].

Health care personnel recognise the importance of hygiene and oral care [33]. However, they blamed long stay institutions and hospitals [34] for the lack of training, time and little cooperation of geriatric patients themselves [33]. Many studies already pointed out the difficulty posed by applying protocols of oral hygiene in institutions installations such as homes [20] since the health care workers responsible for the oral care of these patients, have little training (about protocols of oral hygiene, oral needs of elderly patients, risks and negative consequences of poor oral health) [15, 16], as well as the availability and access to material to carry out the task [11, 35]. In addition, it has been described that to improve care and oral care of these patients, a theoretical training programme would not be sufficient. In this sense, Gammack et al. [36], found that when hygienists, auxiliaries and nurses received training in the theoretical bases, using audiovisual aids and through models and fantomas about oral hygiene instead of in "real patients", the oral health conditions of dependent patients did not improve, presumably because of not receiving adequate training or information on correct techniques to deal with the reactions of patients who are opposed to such care [28]. However, some studies that have pointed out that the attitude with which the staff lend themselves to perform oral care makes the difference between a patient accepting, asking for or neglecting oral care [11]. Unfortunately, oral health is not a priority in situations of lengthy hospitalization or institutionalization [11, 37]. As we have seen in the results of the review, only one study [22] presented a detailed oral hygiene protocol to be applied twice a day, although since it is a protocol used in patients with ALS, we understand that it is a special feature because of the medical condition in question.

In Spain, according to surveys carried out on oral health in 2015, those aged aged 65 (20% of the sample) are the people who least worry about their oral health, least visit the dentist [38] and who have the lowest rate of restoration: 12.3% comparing with in 12 year old children (60%) and adults aged from 35 to 44 (65.5%) [39]. Despite this situation, and of how it was previously described, the number of complications and problems that can arise in this population group due to deficient oral health (causing a deterioration in public health), in Spain, contrary to what happens with children, there are no programmes dedicated to the elderly, even if they are a group at risk for the development of oral pathologies. In the published scientific literature, but not within our inclusion and exclusion selection criteria, we only found one study dedicated to the development of a geriatric dental care programme (PADGE, in its Spanish acronym) [40] developed in the Public University of Navarra. However, as in many cases the proposed programme remained just a proposal, and to this day remains to be implemented even at a regional level, and this in a Autonomous Community regarded as being a leader in preventive oral health programs. It seems that the relevant authorities do not deem necessary the logistic and economic effort that such a programme would involve.

Population aging, the bad dental situation in which this group of people over 65 often find themselves, the lack of studies and the quality of the existing ones (the studies included in our systematic review had a level of evidence 3 and grade of recommendation D, according to the SIGN criteria) on long term stays in hospitals and other institutions, the lack of protocols in nursing homes and hospitals for promoting good oral hygiene and health care, make this issue a very important line of study for future efforts. For

this reason, and due to the lack of time available for the development of the present overview, we think and we have reason to expand the study, in order to develop a universal protocol for dental care in institutionalized patients.

Conclusions

The oral health of elderly patients aged over 65 years, whether hospitalized for long periods of time or living in institutions, is deficient, and there is a clear lack of well-designed studies that assess the oral status of this group.

In addition, protocols are lacking for the application of appropriate oral care guidelines in institutionalized patients Programs are needed to train caregivers (nurses, nursing assistant, etc.) of the different centers in the techniques to be used and to increase their awareness of oral care problems, while increasing the time dedicated to individual patients in this respect.

Abbreviations

WHO
World Health Organization
DMFT
Decayed, Missing, filled teeth
JAR
Juan Antonio Ruiz Roca
DMT
Dora Martin Fuentes
YMB
Yolanda Martínez Beneyto
REOS
Ricardo Elías Oñate Sanchez
SIGN
Scottish Intercollegiate Guidelines Network
RCT´S
Ramdomized Controlled Trials
CVA
Cerebro vascular accident
ALS
Amyotrophic Lateral Sclerosis
ICU
Intensive Care Units
PADGE
Geriatric Dental Care Program.

Declarations

Consent for publication: The authors warrant that the article titled: "*Oral status of elderly patients in long stay centers: A systematic review.*", has been submitted solely to BMC Oral Health and that is not currently under consideration for publication in another journal. The submitted work, is original. All of the named authors have been involved in the work leading to the publication of the paper and have read the paper before it submission for publication.

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Conflict of interest statement: We declare that we have no proprietary, financial, professional or other personal interest of any nature or kind any product, service and/or company that could be construed as influencing the position presented in, or the review of, the manuscript entitled *"Oral status of elderly patients in long stay centers: A systematic review."*

Authors´contributions: J.A.R.R. and D.M.F. conducted the systematic literature search and carried out study selection, in cases of disagreement, the two authors consulted Y.M.B. who helped them arrive at a consensus. J.A.R.R. and R.E.O.S. extracted data from the articles included in the review and assessed the quality of the studies. J.A.R.R., Y.M.B. and R.E.O.S wrote the main manuscript text. J.A.R.R. and D.M.F. prepared the figure and tables. All authors review the manuscript

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Tables

Due to technical limitations, Tables 1-3 are provided in the Supplementary Files section.

Figures
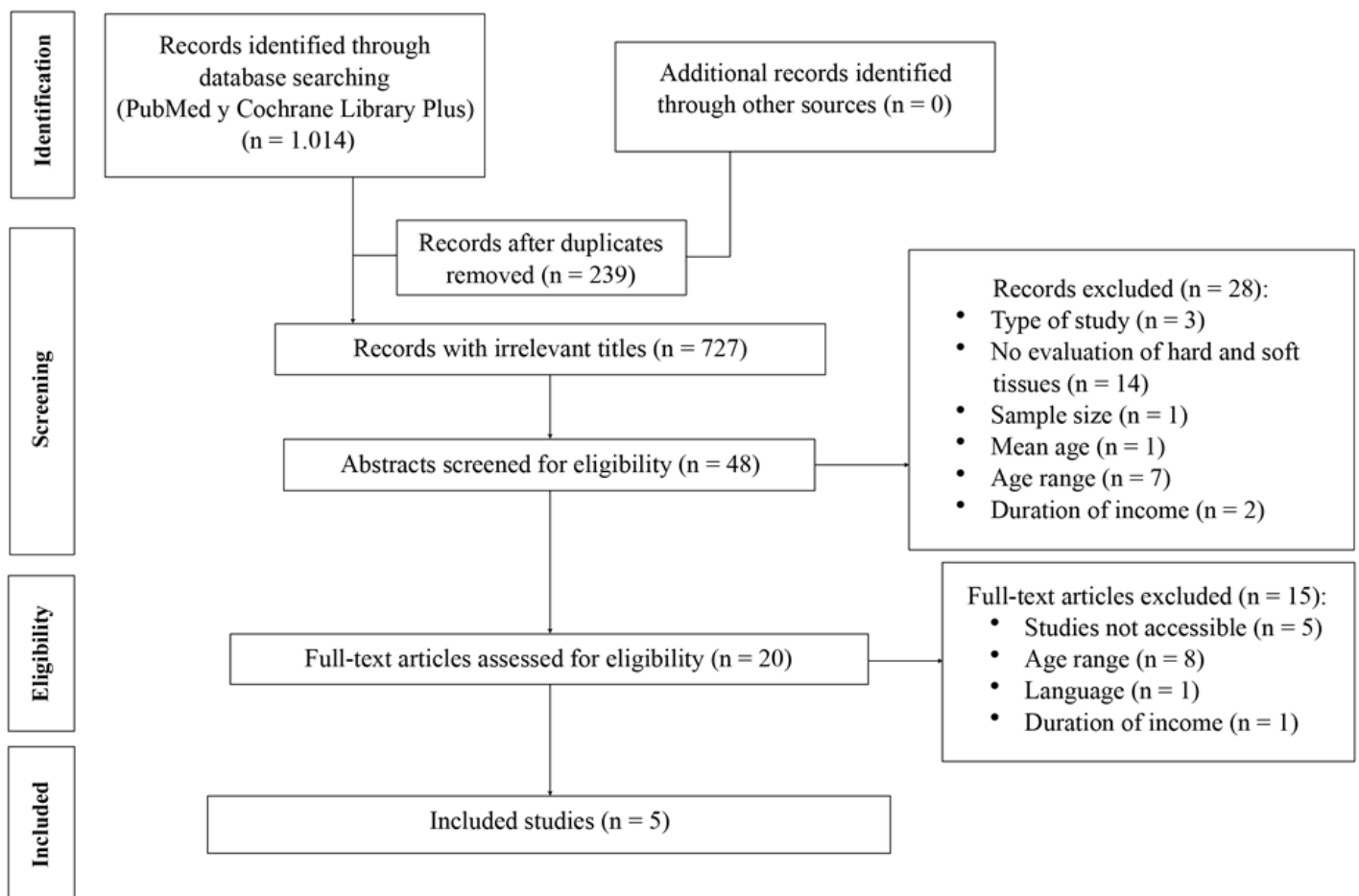
Figure 1

Flow diagram of the search processes and results.