

## Quality of life during pregnancy and its influence on oral health: a systematic review.

Calidad de vida durante el embarazo y su influencia en la salud bucal: una revisión sistemática

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**Abstract:** Objective: To perform a systematic review of scientific literature on the impact of oral health on the quality of life of pregnant women. Methods: A systematic search following PRISMA guidelines was carried out and 16 specific articles/studies on the subject were selected. Results: Pregnant women's quality of life (QoL) is related to age, number of pregnancies, pain, difficulty eating and presence of dental caries. Quality of life was directly related to oral health. Conclusions: It was found that most studies associating QoL and oral health during pregnancy were cross-sectional and observational; therefore, for a better understanding of these impacts, performing longitudinal studies from the beginning of pregnancy until postpartum is necessary. The need for preventive oral health counseling and dental care assistance during pregnancy is highlighted.

**Keywords:** *Pregnancy; quality of life; oral health; dental caries; periodontal disease.*

**Resumen:** Objetivo: Realizar una revisión sistemática de la literatura científica sobre el impacto de la salud oral en la calidad de vida de las embarazadas. Métodos: Se lleva a cabo una búsqueda sistemática y se seleccionaron 16 artículos específicos sobre el tema, siguiendo las directrices PRISMA. Resultados: La calidad de vida (CdV) en la embarazada está relacionado con la edad, número de embarazos, dolor, dificultad para comer y presencia de caries. La calidad de vida se relacionó directamente con la salud oral. Conclusiones: A través de esta revisión se encontró que la mayoría de los estudios que relacionaban la CdV y la salud oral durante la gestación fueron de corte observacional transversal, por ello para una mejor comprensión de estos impactos, es necesario realizar estudios longitudinales desde el comienzo del embarazo hasta el posparto. Se destaca la necesidad de asesoramiento de salud oral preventiva y una ruta de atención dental durante el embarazo.

**Palabras Clave:** *El embarazo; calidad de vida; salud bucal; caries dental; enfermedad periodontal.*

### INTRODUCTION.

According to the *World Health Organization* (WHO), pregnancy is a normal biological process that consists of a nine-month stage in which the development of an embryo and a fetus takes place.<sup>1</sup> Generally, for most women this is a moment of great joy and fulfillment. Physiological changes that occur during pregnancy, which affect the biochemistry and anatomy of organs and systems, may aggravate pre-existing morbidities and produce symptoms that affect the quality of life of pregnant women.<sup>1,2</sup>

During pregnancy, hormones alter immune-receptivity and mediators of inflammatory response. These hormonal changes can generate

predispositions to certain disorders such as gingivitis, periodontitis, granuloma pregnancy, aphthous ulcers, temporomandibular joint (TMJ) problems, tooth mobility, halitosis, and xerostomia.

Other consequences include changes to dietary and oral hygiene habits that lead to an increase in dental caries, as well as nausea and vomiting that may result in erosion of the tooth enamel.<sup>2</sup> These conditions are highly prevalent and they have physical, economic, social and psychological repercussions. The influence of these alterations on the systemic health of both the mother and the fetus has been demonstrated. These changes in the oral cavity may have a negative impact on the quality of life (QoL) of pregnant women.<sup>2,3</sup>

According to the WHO, quality of life is an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their association to relevant features of their environment.<sup>4</sup>

The aim of measuring quality of life is to prioritize the allocation of resources to certain programs or to evaluate the effectiveness of specific treatments; consequently, which measuring scale is used is of great importance.<sup>5</sup> According to the literature, there are two types of measuring scales: generic and specific instruments. Generic instruments are designed to broadly measure oral-health related quality of life in various groups; these are frequently used when the purpose of the assessment is the comparison between groups or individuals with different oral health conditions. On the other hand, specific instruments are used to evaluate a certain condition with greater sensitivity, more able to detect clinically significant changes. As such, for studies related to the quality of life of pregnant women, it is advisable to use specific instruments such as the Oral Health Impact Profile (OHIP-49 and OHIP-14).<sup>4,5</sup>

The application of quality of life questionnaires to pregnant women allows health professionals to become aware and timely detect alterations in the oral cavity, thus avoiding waiting for the appearance of symptoms. The early evaluation of oral-health related quality of life

in pregnant women could help improve their general health status. Healthcare professionals can develop interventions to promote oral health-related quality of life (OHRQoL) in pregnant women and reduce alterations during pregnancy and childbirth, such as pre-eclampsia and premature birth.<sup>6</sup>

Therefore, the aim of this study was to conduct a systematic review of the scientific literature on the impact of oral health on the quality of life of pregnant women.

## MATERIALS AND METHODS.

The databases used to search for literature consisted of Scopus, Pubmed and Web of Science (WOS). For the correct use of the search terms, the 2018 edition of the Health Sciences Descriptors was used, available at <http://decs.bvs.br/E/homepagee.htm>.

The keywords used in Spanish were: *embarazo, calidad de vida relacionada con la salud oral, caries dental, enfermedad periodontal*. In English, these were: *pregnancy, quality of life related to oral health, dental caries, periodontal disease*.

Studies that measured quality of life during pregnancy with validated instruments were screened. These instruments include the Oral Health Impact Profile (OHIP-49 and OHIP-14), UK Oral Health related Quality of Life (OHQoL-UK-16), Oral Impacts on Daily Performance (OIDP-8), Health Questionnaire SF-36, Geriatric Oral Health Assessment Index (GOHAI) and Dental Impact on Daily Life (DIDL). Studies that included pregnant women who had been subjected to a specific treatment that could have altered the status of their oral cavity were excluded.

The present review was conducted following the 27 items of PRISMA<sup>7</sup> guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), that specify the requirements for each section (title, abstract, introduction, methods and results and discussion), as well as a four-phase flowchart detailing the inclusion or exclusion of each article.

The purpose of PRISMA methodology is to ensure that studies screened are analyzed exhaustively. The following PRISMA checklist was used to undertake this research: <http://prisma-statement.org/PRISMAStatement/Checklist>.

The search was carried out by two researchers

through reading, synthesis of information collected, and selection of articles whose content was considered highly relevant, specific and supported by scientific evidence.

Reviewers were previously calibrated, and a checklist was drawn up to evaluate the studies, which was compared at the end of the search. In total, 16 articles were selected for inclusion in the systematic review.

## RESULTS.

The obtained results are summarized in Figure 1: A total of 75 studies on the quality of life in pregnant women and its influence on oral health were found in the Scopus, Pubmed and Web of Science (WOS) databases. Two independent reviewers verified the available data and sixteen articles were selected. All selected articles were original studies.

## Characteristics and results of the studies.

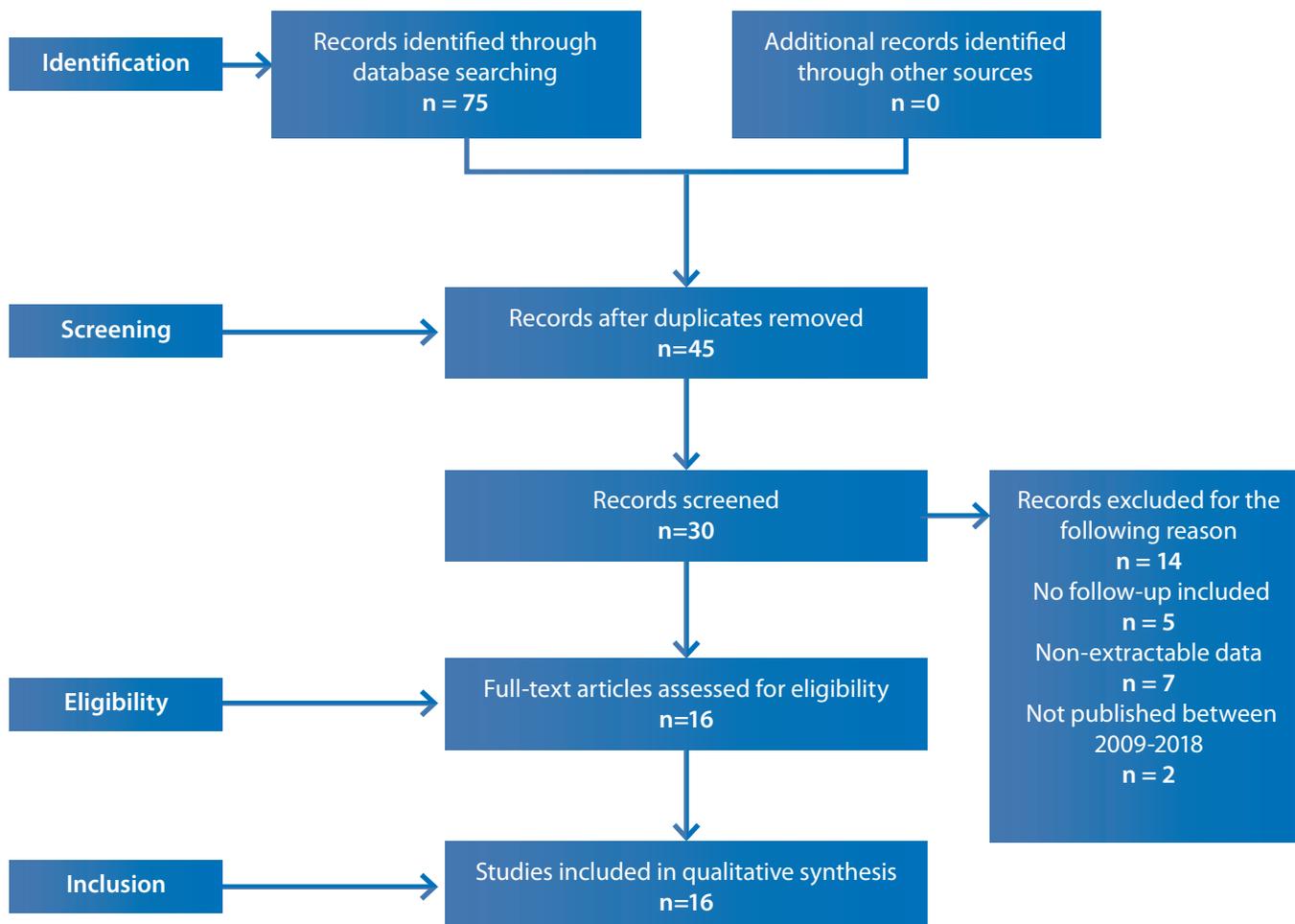
The size of the population sampled ranged between 90 and 1,094 women. Studies were conducted in Spain, Canada, United States, France, India, China, Brazil, Malaysia and Uganda.

Most of the studies were descriptive and cross-sectional. Aspects analyzed included number of permanent teeth, use and type of dental prostheses, presence of untreated carious lesions, toothache, periodontal disease, bleeding when probing, dental calculus and periodontal pockets.

Regarding the tools used to assess the oral-health related quality of life, the OHIP-14, OHIP-49, CHMS (Canadian Health Measures Survey), Epidemiologic-Depression Level questionnaire and MOS (Maternal Oral Screening) were employed.

The OHIP-14 was the most frequently used

Figure 1. Flowchart of the information through the different phases of the systematic review.



**Table 1. Main Articles used to evaluate the impact of oral health on the quality of life of pregnant women.**

Authors	Year	Country	Objective	Sample	Material and methods	Conclusions
Musskopf <i>et al.</i> , <sup>9</sup>	2018	Brazil	To compare the oral health status and the quality of life in pregnant women who do and do not receive periodontal treatment	Group under study: 96 pregnant women. Control group: 114 pregnant women	Randomized controlled clinical trial	Control group had worse scores on the OHIP-14 compared to the group under study. Periodontal treatment in pregnant women reduces negative impacts on Quality of Life
Martinez-Beneyto <i>et al.</i> , <sup>10</sup>	2018	Spain	To compare the impact of oral health on the quality of life of a group of pregnant women enrolled in a preventive oral health program	Group under study: Control group: 113 non-pregnant women	Cross-sectional descriptive study	The quality of oral life of pregnant women seems to be positively influenced by the incorporation of preventive oral care programs during pregnancy
Garcia <i>et al.</i> , <sup>11</sup>	2017	Spain	To identify the oral-health related quality of life determinants in pregnant women	90 pregnant patients, of which 45 were immigrants	Cross-sectional descriptive study	The average OHIP-14 score was higher for immigrant pregnant women
Jessani <i>et al.</i> , <sup>12</sup>	2016	Canada	To determine the status and oral health needs of pregnant women	740 pregnant women	Cross-sectional descriptive study	Half of the pregnant women had not visited a dental professional during pregnancy
Geevarghese <i>et al.</i> , <sup>13</sup>	2017	India	To compare the oral-health related quality of life between pregnant women and non-pregnant women	Group under study: 150 pregnant women Control Group: 150 women	Cross-sectional descriptive study	This study shows that periodontal health and quality of life was worse in pregnant women
McNeil <i>et al.</i> , <sup>14</sup>	2016	United States	To determine the influence of depression on oral health in pregnant women	685 pregnant women	Cross-sectional descriptive study	Pregnant women with depression had worse oral health status
Moimaz <i>et al.</i> , <sup>15</sup>	2016	India	To evaluate oral health related to quality of life	119 women	Cross-sectional descriptive study	Quality of life was related to the age of the pregnant woman, number of pregnancies, need of dental prosthesis, presence of dental caries and lost teeth.
George <i>et al.</i> , <sup>16</sup>	2016	Australia	To evaluate the sensitivity and specificity of Maternal Oral Screening during pregnancy	211 pregnant women	Randomized controlled trial	Maternal Oral Screening has a high sensitivity, identifying 88-94% as well as OHIP-14
Lu <i>et al.</i> , <sup>17</sup>	2015	China	To describe Quality of Life in pregnant women and its relationship with periodontal conditions	512 pregnant women	Cross-sectional descriptive study	The results of this study showed that periodontal conditions were not associated with quality of life in pregnant women
Chung <i>et al.</i> , <sup>18</sup>	2013	China	To evaluate the clinical status of oral health of pregnant women in relation to socio-demographic factors	99 pregnant women	Cross-sectional descriptive study	Lower income was associated with an increased presence of untreated caries and poorer quality of life
Lamarca <i>et al.</i> , <sup>19</sup>	2012	Brazil	To evaluate the oral-health related quality of life among working women outside or inside the home	1403 women	Cohort study from pregnancy to postpartum	The likelihood of having an OHIP score was higher for women without paid work

Vergnes <i>et al.</i> , <sup>20</sup>	2012	France	To evaluate the incidence of dental caries and the associated risk indicators	1094 women	Cross-sectional study obtained from multi-center case-control data	The number of decayed teeth was associated with indicators of age, educational level and inadequate prenatal care.
Yunita <i>et al.</i> , <sup>21</sup>	2011	Malaysia	To determine the oral-health related quality of life in pregnant women	100 pregnant women	Cross-sectional descriptive study	Quality of life was related to oral health in pregnant women
Shashidhar <i>et al.</i> , <sup>22</sup>	2009	India	To evaluate differences in oral health and perceived quality of life in pregnant women	259 pregnant women and 237 non-pregnant women	Cross-sectional descriptive study	Quality of Life was poorer among pregnant women with oral health conditions
Acharya <i>et al.</i> , <sup>23</sup>	2009	India	To evaluate oral health status in pregnant women and its relationship with quality of life	259 pregnant women	Cross-sectional descriptive study	Painful mouth and difficulty eating were reported to have the greatest impact on quality of life
Wandera <i>et al.</i> , <sup>24</sup>	2009	Uganda	To describe oral alterations and their influence on daily activities during pregnancy	713 pregnant women	Cross-sectional descriptive study	Pregnant women showed alterations in their daily activity related to oral health

instrument for the assessment of quality of life in pregnant women and its influence on oral health; study aims included seeking to provide answers on how natural teeth or dentures positively or negatively affect social, psychological and biological functions, as well as people's quality of life.<sup>8</sup> Table 1 displays the main articles used to evaluate the impact of oral health on the quality of life of pregnant women.

According to the consulted bibliography, periodontal treatment on pregnant women reduces the negative impacts on QoL, as the control group had worse scores in comparison to the study group. Furthermore, it is possible to observe that the average score of OHIP-14 was higher for pregnant women that were immigrants, had a low income, had no paid work, and dealt with postpartum depression.

## DISCUSSION.

Measuring quality of life has become an essential health component that is not only limited to evaluating morbidity and life expectancy. There are many tools to assess it, but there is also a lack of guidelines for evaluation of the pregnant and postpartum population. In this systematic review the quality of life of pregnant women was found to be related to their oral health.

Oral health problems are common during pregnancy, however, there is still controversy regarding individual characteristics or factors that can increase the number of such conditions during this period.

Taani *et al.*,<sup>25</sup> conducted a study aiming to establish the effects of sociodemographic variables (age, educational and professional level) on the periodontal status of pregnant and non-pregnant women, demonstrating that gingival inflammatory symptoms are aggravated during pregnancy. These are related to older age, a lower level of education, and unemployment; therefore, it is of utmost importance to carry out preventive programs targeting pregnant women.

Gaffield *et al.*,<sup>26</sup> carried out a continuous, population-based survey designed as part of the United States Pregnancy Risk Assessment Monitoring System (PRAMS) to obtain information related to oral health prior, during, and immediately after pregnancy. Results showed that most women did not seek oral care during pregnancy; and within those that reported the presence of dental problems, half did not receive dental care. A coordinated effort should establish guidelines to benefit maternal oral health and perinatal outcomes. Such program is active in Spain, although it is not used by all pregnant women due to insufficient information and a lack of referral from health professionals.

A survey was conducted by Thomas *et al.*,<sup>27</sup> on patients from the postnatal ward of the Women's and Children's Hospital, Adelaide, Australia, designed to assess their knowledge, attitudes and practices related to periodontal health. Poor periodontal health proved to be more prevalent among women with lower educational

level and lower socioeconomic status. It was concluded that intensive healthcare education during pregnancy could improve quality of life, since during pregnancy a woman is most susceptible to adopt changes that may contribute to improve her health.

Azofeifa *et al.*,<sup>28</sup> assessed the answers of a self-reported questionnaire on oral health in pregnant and non-pregnant women of childbearing age (between 15 and 44 years old). Results indicate that oral health status and the use of dental services were related, that is, the less frequently the participants visited the dentist, the more dental conditions they had. These results highlight the need to broaden the use of dental services among women of childbearing age, especially when they are young. Prenatal visits could be used as an opportunity to encourage women to seek preventive dental care during pregnancy.

Cornejo *et al.*,<sup>29</sup> conducted a study aiming to elucidate whether there was a relationship between oral health and quality of life during pregnancy. The most frequent negative impacts were psychological distress and limited functionality. However, they did not find a statistically significant association between oral health status and quality of life. The reason for this result could be that their study was carried out on socially disadvantaged communities from the city of Buenos Aires, Argentina. Oral-health related quality of life did not properly reflect oral health status; however, it proved to be an intervening variable related to the demand for dental services.

Lu *et al.*,<sup>17</sup> described the quality of life of pregnant women and its relationship with periodontal conditions. In this study the conclusion was that pregnant women in different trimesters have a similar impact of oral health status on quality of life. Furthermore, a woman's age and absence of teeth proved to be factors associated to this conclusion.

Wandera *et al.*,<sup>24</sup> used the OIDP questionnaire on pregnant women from Uganda's urban and rural areas. The impact on eating difficulty was more prevalent on women with a history of multiple pregnancies. In addition, toothaches and bleeding gums had a negative impact on the quality of life of young pregnant women.

One of the most rapidly widespread oral health

impact questionnaires in recent years is the OHIP-14, as can be evidenced through its use in most of the studies mentioned in this review. This questionnaire is highly preferred due to the validity and reliability of the results obtained.

#### **Strengths and limitations of the study.**

This systematic review of literature synthesizes available information on the oral-health related quality of life of pregnant women. Since only articles written in English or Spanish were included in the research, limitations are present; the most prominent one is related to data generalization. Within the selected studies, few were multicentric and only one used information from a widespread national survey.

#### **CONCLUSION.**

In recent years, there has been an increase in the interest of maintaining good oral health during pregnancy. Oral health is an important component of an individual's general well being, and therefore, pregnancy is a critical period for the evaluation of personal health care, since it can have an impact on the pregnant woman as well as on the developing fetus. Because of this, in recent years the need has arisen to assess the oral-health related quality of life in pregnant women.

Results of this review showed that most studies that associated quality of life and oral health were cross-sectional and observational, therefore, for a better understanding of these impacts, performing longitudinal studies from the beginning of pregnancy until postpartum is necessary. Likewise, studies related to clinical interventions and health education throughout pregnancy are recommended to evaluate whether these therapies improve the quality of life and oral health of pregnant women.

Health-related quality of life refers to an individual's subjective evaluation of the physical, mental and social dimensions of their well-being. Women's subjective perception of their quality of life related to health is an essential indicator of the quality and effectiveness of interventions regarding maternal and infant health.

Given the diversity of factors associated with quality of life, the need for preventive oral health counseling and a correct referral procedure in dental care during

pregnancy is highlighted. Midwives can play a key role in promoting pregnant women's proper dental care and assessing their oral health condition with easy-to-perform questionnaires such as the OHIP-14. Once results are ready, pregnant women can be referred to the dentist so that a more in-depth assessment may be performed in order to prevent complications during pregnancy and childbirth. Health professionals must work together to properly measure the quality of life of pregnant women and assess the impact of prevalent parameters.<sup>30,31</sup>

Numerous studies have shown a connection between oral diseases and premature birth, low infant weight, maternal hypertension and gestational diabetes.<sup>29</sup> All pregnant women should receive appropriate dental care education, as well as a comprehensive evaluation of their oral health status. There are professionals dedicated to the assessment of pregnant women's oral health, however, their services are often not sought out due to a lack of knowledge and information.

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