

2023

Oral health practices during first 1000 days of life: Literature review

Kamila Sihuay-Torres

Escuela de Postgrado de la Facultad de Medicina, Maestría en Salud Pública. Universidad Nacional Mayor de San Marcos. Lima, Perú.

Ivo Luna-Mazzola

Sociedad Científica de estudiantes de Odontología, Universidad Nacional Mayor de San Marcos. Lima, Perú.

Rosa Lara-Verastegui

Sociedad Científica de estudiantes de Odontología, Universidad Nacional Mayor de San Marcos. Lima, Perú.

Lauro Marcoantonio Rivera Félix

Escuela de Postgrado de la Facultad de Medicina, Maestría en Salud Pública. Universidad Nacional Mayor de San Marcos. Lima, Perú.

Follow this and additional works at: <https://inicib.urp.edu.pe/rfmh>



Part of the [Health Information Technology Commons](#), [Medical Specialties Commons](#), and the [Public Health Commons](#)

Recommended Citation

Sihuay-Torres, Kamila; Luna-Mazzola, Ivo; Lara-Verastegui, Rosa; and Rivera Félix, Lauro Marcoantonio (2023) "Oral health practices during first 1000 days of life: Literature review," *Revista de la Facultad de Medicina Humana*: Vol. 23: Iss. 3, Article 19.

DOI: <https://doi.org/10.25176/RFMH.v23i3.4904>

Available at: <https://inicib.urp.edu.pe/rfmh/vol23/iss3/19>

This Article is brought to you for free and open access by INICIB-URP. It has been accepted for inclusion in Revista de la Facultad de Medicina Humana by an authorized editor of INICIB-URP.



ORAL HEALTH PRACTICES DURING THE FIRST 1000 DAYS OF LIFE: LITERATURE REVIEW

PRÁCTICAS DE SALUD BUCAL DURANTE LOS PRIMEROS 1000 DÍAS DE VIDA: REVISIÓN DE LA LITERATURA

Kamila Sihuy-Torres ¹, Ivo Luna-Mazzola ², Rosa Lara-Verastegui ², Lauro Marcoantonio Rivera Félix ¹

ABSTRACT

Objective: To conduct a bibliographic literature review on current good practices in oral health during the first 1000 days of life, encompassing the gestation period and the initial two years of the child. **Materials and methods:** A scientific literature review was conducted in February and March 2022, utilizing the Pubmed and Scopus databases. The inclusion criteria encompassed original articles and systematic reviews (with or without meta-analysis) published between 2016 and 2022. Search strategies incorporating English keywords derived from MeSH were employed. Additionally, the grey literature was reviewed to define some key concepts. **Results:** 72 scientific articles, and four references from the grey literature (one clinical practice guide and three reports) were selected. The identified themes were categorized as follows: good oral hygiene practices, good feeding practices for pregnant women and infants, parafunctional habits, and dental visits. Based on the findings, the key recommendations for promoting good oral health practices during this crucial period include the use of fluoride toothpaste for oral hygiene once teeth erupt, avoidance of free sugar consumption, encouragement of breastfeeding over bottle-feeding, and early dental visits before birth. **Conclusion:** Good oral health practices during the first 1000 days of life significantly impact the child's oral and general health, necessitating preventive measures starting from gestation, with a focus on oral hygiene and nutrition. The collaborative efforts of a multidisciplinary healthcare team during pregnancy and the initial two years of life are vital for enhancing both oral and general health outcomes for the population.

Keywords: Oral health promotion, Pediatric dentistry, Prenatal care, Preventive dentistry. (Source: MESH-NLM)

RESUMEN

Objetivo: Realizar una revisión bibliográfica de la literatura sobre las buenas prácticas en salud bucal, durante los primeros 1000 días de vida, el cual abarcó el periodo de gestación y los dos primeros años del niño. **Materiales y métodos:** Se realizó una revisión de la literatura científica desde febrero a marzo de 2022, para lo cual se utilizó las bases de datos Pubmed y Scopus. Los criterios de inclusión abarcaron artículos originales y revisiones sistemáticas (con o sin metanálisis) publicados entre 2016 y 2022. Se emplearon estrategias de búsqueda usando palabras clave, en inglés, derivadas del MeSH. Además, se revisó la literatura gris para definir algunos conceptos clave. **Resultados:** Se seleccionaron 72 artículos científicos y cuatro referencias de la literatura gris (una guía de práctica clínica y tres reportes). Los temas identificados se categorizaron en: buenas prácticas de higiene bucal, buenas prácticas de alimentación de la gestante y el infante, hábitos parafuncionales, y visitas al odontólogo. De acuerdo a los resultados, las recomendaciones clave para promover buenas prácticas de salud bucal durante este periodo crucial incluyen el uso de pasta dentífrica con flúor para la higiene dental una vez que erupcionan los dientes, evitar el consumo de azúcar libre, fomentar la lactancia materna en vez del uso del biberón y las visitas al odontólogo desde antes del nacimiento. **Conclusión:** Las buenas prácticas en salud bucal durante los primeros 1000 días de vida influyen significativamente en la salud oral y general del niño, por lo que es necesario adoptar medidas preventivas desde la gestación, enfocadas en la higiene oral y nutrición. La colaboración de un equipo de salud multidisciplinario, durante el embarazo y los dos primeros años de vida, es vital para mejorar la salud bucodental y general de la población.

Palabras clave: Promoción de la salud oral, Odontología pediátrica, Atención prenatal, Odontología preventiva. (Fuente: DeCS-BIREME)

¹ Escuela de Postgrado de la Facultad de Medicina, Maestría en Salud Pública. Universidad Nacional Mayor de San Marcos. Lima, Perú.

² Sociedad Científica de estudiantes de Odontología, Universidad Nacional Mayor de San Marcos. Lima, Perú.

Cite as: Sihuy-Torres K, Luna-Mazzola I, Lara-Verastegui R, Rivera Félix LM. Oral health practices during the first 1000 days of life: literature review. Rev Fac Med Hum. 2023;23(3):148-155. doi:10.25176/RFMH.v23i3.4904

Journal home page: <http://revistas.urp.edu.pe/index.php/RFMH>

Article published by the Magazine of the Faculty of Human Medicine of the Ricardo Palma University. It is an open access article, distributed under the terms of the Creative Commons License: Creative Commons Attribution 4.0 International, CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>), that allows non-commercial use, distribution and reproduction in any medium, provided that the original work is duly cited. For commercial use, please contact revista.medicina@urp.pe





INTRODUCTION

The first 1000 days of life include 270 days of gestation and the infant's first two years. During this stage, the physical and mental development of the human being can be influenced by various environmental factors⁽¹⁾. For example, harmful habits regarding the consumption of sugar, tobacco, alcohol or exposure to some drugs during pregnancy can affect the risk of obesity, diabetes, dental caries and other chronic diseases in the future child⁽¹⁻³⁾. Due to this reason, several organizations or institutions describe this period as the window of opportunity to carry out preventive explosions that promote the health of the baby and the mother.

Within the dental area, care protocols for pregnant women and babies must include early detection and treatment of oral pathologies and guidance on proper oral hygiene and eating habits⁽⁴⁾. This is because many parents do not have adequate knowledge about good oral health care for their infants⁽⁵⁻⁷⁾. For this reason, primary care services are essential to guide the pregnant woman and the family nucleus on the proper management of oral health practices to preserve the child's health^(4,8,9).

This integrates the improvement of care and instruction protocols for pregnant women and mothers based on the biological, socioeconomic and cultural context, in which they are developed. For this reason, this literature review aims to provide an update based on scientific evidence on good oral health practices within the first 1000 days of life.

METHODOLOGY

A non-systematic bibliographic search was carried out to collect published scientific information concerning good oral health practices during the first 1000 days of life. The search for sources was carried out during February and March 2022 and included the Pubmed and Scopus databases. The temporality of the information sources was limited to the period 2016-2022; this in order to obtain current information.

Keywords or terms in English taken from the MeSH thesaurus were used, which were conjugated using the Boolean operators "AND" and "OR". The search strategies used were the following: "prenatal care" AND ("dentistry" OR "oral health") / ("pregnancy" OR "infant") AND ("oral hygiene" OR "toothbrushing" OR

"toothpaste") / ("pregnancy" OR "infant") AND ("prenatal nutrition" OR "child nutrition" OR "breast feeding") / ("pregnancy" OR "infant") AND "sugar intake" / "infant" AND ("sucking behavior" OR "nail biting") AND "dental occlusion" / ("pregnancy" OR "infant") AND ("dental care" OR "pediatric dentistry").

Original articles and systematic reviews with or without meta-analyses were included. Repeated articles and those that did not cover the proposed topic were excluded. After the exploration of the literature, its selection began with the analysis of titles and abstracts. It was taken into account that these sources of information covered some of the following aspects: child oral health practices, child oral hygiene, nutrition during the first thousand days of life, parafunctional habits, and visits to the dentist. Also, it was taken into account that the articles address the importance of this stage for neural and physical development.

Furthermore, the gray literature was reviewed using the database of the World Health Organization (WHO) and the Ministry of Health of Peru to define some key concepts and provide recommendations based on national and international reports. Thus, 72 scientific articles and four gray literature references (one clinical practice guideline and three WHO reports) were included.

Oral health practices during the first thousand days related to oral hygiene practices, diet, parafunctional habits, and visits to the dentist will be described below.

ORAL HEALTH PRACTICES DURING THE FIRST 1000 DAYS

Good oral health practices are defined as all those actions that promote optimal oral health and that could prevent diseases such as dental caries, gingivitis, periodontitis, malocclusions, among others. Likewise, these actions vary according to each age group. During the first 1000 days of life, these practices are related to oral hygiene habits, diet, parafunctional habits, and visits to the dentist.

Child oral hygiene

Fluoride toothpaste is one of the essential supplies for proper oral hygiene from the eruption of the first tooth. It should be noted that the fluoride concentration of the toothpaste will influence the prevention of dental caries.



For this reason, it is recommended that the minimum amount be 1000 parts per million (ppm) of fluoride ion. In some systematic reviews, it has been found that smaller amounts do not help caries prevention and do not reduce the risk of fluorosis in comparison with those of more than 1000 ppm of fluoride^(11,12).

To prevent fluoride toxicity from consumption, during tooth brushing in children under two years of age, using only 0.1 ml of toothpaste per brushing is recommended, which is equivalent to the size of a grain of rice⁽¹⁰⁾. The frequency of brushing, in these children, would only be twice a day⁽¹³⁾. From the age of three or when the child already knows how to spit, it is recommended to use 0.25 ml, which is equivalent to the size of a pea⁽¹⁰⁾. Due to the pleasant taste of children's toothpastes, it could be thought that this could influence a higher intake at the time of brushing. However, a systematic review concluded that this is not the case⁽¹⁴⁾. It is important to emphasize that if the child consumes all the toothpaste at the time of brushing, this would not cause toxicity, since the amount used is minimal.

Nevertheless, another important input is the toothbrush. This should be soft bristles and the right size for the baby⁽¹⁰⁾. Regarding the type of toothbrush, there are manuals and electric ones. The first is more accessible due to the cost and if the mother is adequately oriented for its use, she will not have problems properly cleaning her baby's teeth. However, it has been found that electric toothbrushes remove plaque bacteria better in children since it is easier to manipulate⁽¹⁵⁾.

It should be noted that the durability time of the brush has a limit. Generally, it has been recommended to change the toothbrush every three months. However, this will depend on the integrity of your bristles and exposure to viruses, bacteria, and fungi. For this reason, some authors recommend changing it even after three or four weeks⁽¹⁶⁾. This is because the toothbrush is exposed to millions of bacteria that live in the oral cavity and in the environment in which they are stored⁽¹⁷⁻¹⁹⁾.

Thus, it is recommended to change it after contracting viral or bacterial infections that compromise the oral cavity (flu, COVID-19, herpes, among others). It should be noted that the use of the toothbrush is personal. Sharing the toothbrush with other people would cause cross-contamination with possible oral or upper respiratory tract infections.

Furthermore, it is important to be careful when storing the toothbrush, since humidity and bacteria from the environment could affect its safety. It is recommended to remove excess water from the brush after use and wait for it to dry before putting on the cap or storing it in a case to prevent the proliferation of fungi and bacteria. Also, it is recommended to disinfect it periodically with 0.12% chlorhexidine for 30 seconds^(17,18). Likewise, the brush should be placed in a clean environment for personal use, preferably outside the bathroom, especially away from the toilet and hand washing area⁽²⁰⁾.

Feeding during the first thousand days of life

Feeding of the pregnant woman

The pregnant woman's diet will be essential for the proper development of the fetus, including the formation of teeth. These begin to form between the third and sixth month of pregnancy, so any external factor could interfere with their development. Therefore, an adequate nutritional intake with vitamins A, C and D, proteins, calcium, and phosphorus is recommended. In addition, an association has been found between low levels of vitamin D and the risk of early childhood caries, so it is recommended to be aware of this in nutrition during pregnancy and from an early age of the infant⁽²¹⁾.

It has been shown that the infant's food preferences are influenced by the mother's diet during pregnancy and lactation⁽²²⁻²⁴⁾, therefore, a diet high in added sugars, on the mother's part, increases the risk of these preferences during childhood and, therefore, of bad eating habits. For this reason, pregnant and lactating women are recommended to have a varied diet of vegetables and fruits, and thus avoid added sugars. Likewise, it is recommended to include public policies that promote and protect breastfeeding, since many countries currently have inadequate policies that favor the economic interests of industries that promote child nutrition⁽²⁵⁾.

Breastfeeding

The WHO openly recommends breastfeeding as the exclusive feeding method during the first six months of life since it contains all the nutrients that the newborn needs for its development and growth. In addition, it is composed of immunoglobulins that protect the infant from allergies and infections⁽²⁶⁾.





Various factors, such as the mother's age, educational level, and lack of preparation and knowledge about it, influence breastfeeding^(27,28). In addition, it can be influenced by the use of the bottle ". Also, it has been found that premature weaning is associated with non-nutritive sucking habits, dental eruption before six months, and employability of the mother⁽²⁹⁾.

Exclusive breastfeeding for the first six months is known to help prevent dental malocclusions during childhood, especially anterior open bites⁽³⁰⁻³²⁾. In addition, it has been found that it helps prevent the bad habit of using a pacifier^(33,34). However, there is still controversy regarding the association between the prolongation of breastfeeding for more than 12 or 24 months with the presence of early childhood caries⁽³⁵⁻³⁸⁾. Nonetheless, most systematic reviews indicate that breastfeeding after two years does not increase the risk of early childhood caries; the risk is the consumption of added sugars when complementary feeding begins^(12,39). Some studies even indicate that breastfeeding would be a protective factor against dental caries and enamel defects^(40,41). It should be noted that from the appearance of the incisors, breastfeeding should be limited before going to sleep and brushing the teeth with fluoride toothpaste⁽⁴²⁾.

Supplementary feeding

The WHO recommends that complementary feeding start from six months of age⁽⁴³⁾. During this stage, the infant's body will be ready to eat food, and breast milk will not be enough to cover its nutritional requirements. It should be noted that complementary feeding does not seek to replace breastfeeding, but is a supplement that seeks to satisfy the progressive nutritional requirement for the physical and neural development of the child.

When complementary feeding begins, it is recommended to avoid added sugars until two years of age. The WHO defines free or added sugars as all monosaccharides and disaccharides that manufacturers, cooks, or the consumer himself adds to beverages and foods. In addition, free sugar is naturally present in fruit juices, syrups, honey, and others⁽⁴⁴⁾.

However, several studies have found that sugar consumption begins at a very early age^(45,46). This is influenced by the lack of access to breastfeeding during the first hours of life, by the age of the mother, her low level of education, and tobacco use⁽⁴⁵⁾. However, it has been found that most infant products worldwide, such as formula milk, have high concentrations of carbohydrates, sugar, and lactose, compared to breast milk⁽⁴⁷⁾.

Consuming sugary foods and beverages during the first year of life increases the risk of early childhood caries^(48,49), especially if the infant consumes these beverages at night before bedtime⁽⁵⁰⁾. In addition, it is one of the common risk factors for chronic non-communicable diseases such as diabetes and obesity⁽⁵¹⁻⁵⁴⁾. For this reason, the WHO recommends avoiding its consumption before two years of age, and after this stage, a daily intake of less than 25 grams (one level tablespoon) should be maintained⁽⁴⁴⁾. However, the high concentrations of sugar contained in children's products make this goal a difficult task.

Regardless of oral hygiene habits, eating patterns in children are determinant for developing dental caries⁽⁴⁹⁾. For this reason, diet is such an essential factor in maintaining oral health. In this way, the application of this knowledge should be promoted in search of comprehensive child care, actively guiding it and with a view to generating healthy eating habits.

Parafunctional habits

The term habit can be understood as a behavior or practice that has been acquired due to frequent and prolonged repetition over time. Inadequate oral habits, also called non-physiological or parafunctional, are those that, after constant repetition, are carried out unconsciously and do not have any specific function⁽⁵⁵⁾. Among these habits, the most frequent are finger sucking, bottle feeding, pacifier use, mouth breathing, atypical swallowing, and chewing on objects. However, essential prevalences have also favored tongue dysfunction, onychophagia, lip sucking, and



cheilophagia⁽⁵⁵⁾. It should be emphasized that, during the first two years of life, a diagnosis of atypical or infantile swallowing cannot be reached. In addition, onychophagia occurs in more advanced stages, such as preschool and early childhood⁽⁵⁶⁾. These habits are not related to sex or age, but it has been observed that there is a higher prevalence in preschoolers^(55,56).

During childhood, parafunctional habits can be classified into whether or not they are nutritious; the first refers to using the bottle, and the second, to using pacifiers and digital suction. The degree of repercussion that a habit has on the growth of the orofacial structures depends on the duration, intensity and frequency with which they occur. These refer to the age of onset, how marked it is, and how many times it is performed in certain periods of time⁽⁵⁷⁾.

Regarding the use of the bottle, it has been found that its constant use is related to the presence of anterior open bite, as well as with the pacifier⁽⁵⁸⁾. To prevent this, it has been found that children who are breastfed for more than six months are less likely to use a pacifier⁽⁵⁹⁾, therefore, the promotion of breastfeeding is emphasized to avoid this type of parafunctional habit. Regarding digital sucking, it has been found that children who present this habit for more than one year, have a greater risk of presenting a class II incisal and canine relationship, increased overjet and anterior open bite⁽⁵⁹⁾.

Nevertheless, infants who use a pacifier daily have a higher risk of presenting anterior open bite and a reduced overbite^(58,59). However, orthopedic pacifiers on the market could reduce this risk. This is because significant differences have been found regarding the prevalence of anterior open bite between children who use conventional pacifiers and orthopedic pacifiers⁽⁵⁷⁾. In addition, the use of the conventional pacifier is associated with the presence of posterior crossbite⁽⁵⁷⁾. However, it is recommended to avoid the constant use of any type of pacifier and promote exclusive breastfeeding during the first six months to prevent the baby from becoming attached to these habits.

It is very important to become aware of the prevention of these habits, since a high prevalence has been found in Latin America, Central America and the Caribbean, especially in countries such as Cuba, Venezuela, Mexico

and Colombia⁽⁵⁵⁾. In addition, they generate an unbalanced development of the muscular and skeletal components that make up the oral cavity, negatively impacting normal occlusal characteristics and, therefore, compromising the functionality of the stomatognathic system. This persistence makes the parafunctional habit generate a commitment in the whole system, which becomes a risk factor for malocclusions.

The intervention aimed at correcting these habits, with pathological repercussions, acquires more significant importance in early stages such as during the first 1000 days of life, when a definitive structural alteration has not yet been generated. In addition, since the exaggerated permanence of habits that involve the oral component gives them a negative character, it is relevant to understand that their correction, rather than through an abrupt restriction, must be addressed through a gradual behavioral redirection.

Visit to the dentist

Going to the dentist periodically, preventively, is another of the good practices in oral health, so it is recommended that these visits be even before birth^(8,9). In this way, intrauterine or prenatal dentistry has become highly relevant since it is a strategy to promote the oral health of the pregnant woman and the future child. Pregnancy is a favorable period for health education, not only through clinical monitoring, but also implies the possibility of promoting the incorporation of healthy habits.

From pregnancy, dental controls involve multidisciplinary work with gynecologists, pediatricians, obstetricians, and nutritionists, among others. For this reason, it is important that all health personnel are aware of the importance of referring the pregnant woman to the dentist^(8,9,60). However, there are some barriers such as the lack of knowledge about the importance of oral health during this stage by health personnel⁽⁶¹⁾.

The pregnant woman must be guided in the importance of having good eating habits and oral hygiene to prevent periodontal diseases, dental caries, and oral candidiasis, which are prevalent during pregnancy⁽⁶²⁻⁶⁴⁾. In addition, the mother will have better knowledge about child oral health, which will allow her to prevent frequent oral pathologies in her future child⁽⁶⁵⁻⁶⁷⁾.





Nonetheless, it should be noted that some studies have found that periodontal diseases in pregnant women are related to a greater risk of maternal and child complications. However, more studies are needed in this regard with a better methodology⁽⁶⁸⁻⁷²⁾.

From birth, the preventive actions carried out by the dentist in each of the controls are the dental clinical examination, which seeks to detect any sign or symptom in the baby, dental cleaning and application of fluoride varnish and education in personalized oral hygiene techniques. It is recommended that these controls be at birth and then every six months, which coincides with the dental eruption and development of the baby⁽¹⁰⁾. It should be noted that there are some oral manifestations that could interfere with the breastfeeding of the newborn and that are easily treatable; for example, the appearance of neonatal and natal teeth, ankyloglossia, short lingual frenulum, among others⁽⁷³⁻⁷⁵⁾. Detecting these problems in time and treating them will improve the feeding and quality of life of the newborn and the mother⁽⁷⁶⁾.

LIMITATIONS

Using keywords in English during the literature search could have excluded several relevant articles in other languages. In addition, due to limited access to other sources of information, only two databases were included in this study. It is important to note that this literature review was carried out during the first months of 2022, which implies that there could be relevant

articles published during the publication process. Also, it's relevant to highlight that this narrative review focused on the description of the findings of the existing literature and did not carry out a detailed qualitative evaluation of the published scientific articles. Consequently, general recommendations were based on that description and could benefit from more rigorous evaluation in future research.

CONCLUSIONS

The first 1000 days of life are a crucial stage in which preventive measures must be taken in search of the infant's good oral health. Prevention begins from gestation with adequate oral hygiene practices, nutrition, and dental check-ups. It is worth noting the importance of avoiding the consumption of free sugars in both pregnant women and infants, in addition to promoting breastfeeding. Regarding oral hygiene, tooth brushing with fluoride toothpaste should start from the eruption of the first tooth. This should be done twice a day using 0.1ml of toothpaste, equivalent to the size of a grain of rice. In addition, it is important to receive orientations and preventive controls by the dentist from before birth. This will also allow the detection and correction of possible parafunctional habits that may lead to structural and functional alterations of the minor's stomatognathic system.

Authorship contributions: KST: Conceptualización, redacción del manuscrito, asesoría metodológica, búsqueda de información, supervisión, redacción del borrador, redacción de la versión final, aprobación de la versión final. ILM: Redacción del manuscrito, búsqueda de información, redacción del borrador, redacción de la versión final, aprobación de la versión final. RLV: Redacción del manuscrito, búsqueda de información, redacción del borrador, redacción de la versión final, aprobación de la versión final. LMRF: Asesoría metodológica, supervisión, redacción de la versión final, aprobación de la versión final.

Financing: Self-financed.

Conflicts of interest: None of the authors has a conflict of interest in accordance with their declaration.

Received: May 13, 2022.

Approved: March 12, 2023.

Correspondence: Kamila Sihuay-Torres.

Address: Facultad de Medicina, Universidad Nacional Mayor de San Marcos. Av. Miguel Grau 755, Lima 15001, Perú.

E-mail: kamila.sihuay28@gmail.com



REFERENCES

1. Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, et al. Current and future burden of breast cancer: Global statistics for 2020 and 2040. *Breast*. 2022; 66:15-23. DOI: [10.1016/j.breast.2022.08.010](https://doi.org/10.1016/j.breast.2022.08.010)
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin*. 2021; 71(3):209-249. DOI: [10.3322/caac.21660](https://doi.org/10.3322/caac.21660)
3. Li N, Deng Y, Zhou L, Tian T, Yang S, Wu Y, et al. Global burden of breast cancer and attributable risk factors in 195 countries and territories, from 1990 to 2017: results from the Global Burden of Disease Study 2017. *J Hematol Oncol*. 2019; 12(1):140. DOI: [10.1186/s13045-019-0828-0](https://doi.org/10.1186/s13045-019-0828-0)
4. Pedersen RN, Esen BÖ, Mellemkjær L, Christiansen P, Ejlersen B, Lash TL, et al. The Incidence of Breast Cancer Recurrence 10-32 Years After Primary Diagnosis. *J Natl Cancer Inst*. 2022; 114(3):391-399. DOI: [10.1093/jnci/djab202](https://doi.org/10.1093/jnci/djab202)
5. Abubakar M, Sung H, Bcr D, Guida J, Tang TS, Pfeiffer RM, et al. Breast cancer risk factors, survival and recurrence, and tumor molecular subtype: analysis of 3012 women from an indigenous Asian population. *Breast Cancer Res*. 2018; 20(1):114. DOI: [10.1186/s13058-018-1033-8](https://doi.org/10.1186/s13058-018-1033-8)
6. Cusack L, Brennan M, Baber R, Boyle F. Menopausal symptoms in breast cancer survivors: management update. *Br J Gen Pract*. 2013; 63(606):51-2. DOI: [10.3399/bjgp13X660977](https://doi.org/10.3399/bjgp13X660977)
7. Rozenberg S, Di Pietrantonio V, Vandromme J, Gilles C. Menopausal hormone therapy and breast cancer risk. *Best Pract Res Clin Endocrinol Metab*. 2021; 35(6):101577. DOI: [10.1016/j.beem.2021.101577](https://doi.org/10.1016/j.beem.2021.101577)
8. DeBono NL, Robinson WR, Lund JL, Tse CK, Moorman PG, Olshan AF, et al. Race, Menopausal Hormone Therapy, and Invasive Breast Cancer in the Carolina Breast Cancer Study. *J Womens Health (Larchmt)*. 2018; 27(3):377-386. DOI: [10.1089/jwh.2016.6063](https://doi.org/10.1089/jwh.2016.6063)
9. Cold S, Cold F, Jensen MB, Cronin-Fenton D, Christiansen P, Ejlersen B. Systemic or Vaginal Hormone Therapy After Early Breast Cancer: A Danish Observational Cohort Study. *J Natl Cancer Inst*. 2022; 114(10):1347-1354. DOI: [10.1093/jnci/djac112](https://doi.org/10.1093/jnci/djac112)
10. Coles CE, Anderson BO, Cameron D, Cardoso F, Horton R, Knau FM, et al. The Lancet Breast Cancer Commission: tackling a global health, gender, and equity challenge. *Lancet*. 2022; 399(10330):1101-1103. DOI: [10.1016/S0140-6736\(22\)00184-2](https://doi.org/10.1016/S0140-6736(22)00184-2)
11. World Health Organization. The Global Breast Cancer Initiative: Empowering women, building capacity, providing care for all. (Consultado en enero 11 de 2023). Disponible en: <https://www.who.int/initiatives/global-breast-cancer-initiative>
12. Harborg S, Heide-Jørgensen U, Ahern TP, Ewertz M, Cronin-Fenton D, Borgquist S. Statin use and breast cancer recurrence in postmenopausal women treated with adjuvant aromatase inhibitors: a Danish population-based cohort study. *Breast Cancer Res Treat*. 2020; 183(1):153-160. DOI: [10.1007/s10549-020-05749-z](https://doi.org/10.1007/s10549-020-05749-z)
13. Ahern TP, Pedersen L, Tarp M, Cronin-Fenton DP, Garne JP, Silliman RA, et al. Statin prescriptions and breast cancer recurrence risk: a Danish nationwide prospective cohort study. *J Natl Cancer Inst*. 2011; 103(19):1461-8. DOI: [10.1093/jnci/djr291](https://doi.org/10.1093/jnci/djr291)
14. Fillon M. Breast cancer recurrence risk can remain for 10 to 32 years. *CA Cancer J Clin*. 2022; 72(3):197-199. DOI: [10.3322/caac.21724](https://doi.org/10.3322/caac.21724)
15. Lafourcade A, His M, Baglietto L, Boutron-Ruault MC, Dossus L, Rondeau V. Factors associated with breast cancer recurrences or mortality and dynamic prediction of death using history of cancer recurrences: the French E3N cohort. *BMC Cancer*. 2018; 18(1):171. DOI: [10.1186/s12885-018-4076-4](https://doi.org/10.1186/s12885-018-4076-4)
16. Mauny A, Faure S, Derbré S. Phytoestrogens and Breast Cancer: Should French Recommendations Evolve? *Cancers (Basel)*. 2022; 14(24):6163. DOI: [10.3390/cancers14246163](https://doi.org/10.3390/cancers14246163)
17. Pan H, Gray R, Braybrooke J, Davies C, Taylor C, McGale P, et al. 20-Year Risks of Breast-Cancer Recurrence after Stopping Endocrine Therapy at 5 Years. *N Engl J Med*. 2017; 377(19):1836-1846. DOI: [10.1056/NEJMoa1701830](https://doi.org/10.1056/NEJMoa1701830)
18. Sopik V, Sun P, Narod SA. Predictors of time to death after distant recurrence in breast cancer patients. *Breast Cancer Res Treat*. 2019; 173(2):465-474. DOI: [10.1007/s10549-018-5002-9](https://doi.org/10.1007/s10549-018-5002-9)
19. Heins MJ, de Ligt KM, Verloop J, Siesling S, Korevaar JC, PSCCR group. Adverse health effects after breast cancer up to 14 years after diagnosis. *Breast*. 2022; 61:22-28. DOI: [10.1016/j.breast.2021.12.001](https://doi.org/10.1016/j.breast.2021.12.001)
20. Hill DA, Horick NK, Isaacs C, Domchek SM, Tomlinson GE, Lowery JT, et al. Long-term risk of medical conditions associated with breast cancer treatment. *Breast Cancer Res Treat*. 2014; 145(1):233-43. DOI: [10.1007/s10549-014-2928-4](https://doi.org/10.1007/s10549-014-2928-4)
21. Ramin C, May BJ, Roden RBS, Orellana MM, Hogan BC, McCullough MS, et al. Evaluation of osteopenia and osteoporosis in younger breast cancer survivors compared with cancer-free women: a prospective cohort study. *Breast Cancer Res*. 2018; 20(1):134. DOI: [10.1186/s13058-018-1061-4](https://doi.org/10.1186/s13058-018-1061-4)
22. Palmer SC, Stricker CT, DeMichele AM, Schapira M, Glanz K, Griggs JJ, et al. The use of a patient-reported outcome questionnaire to assess cancer survivorship concerns and psychosocial outcomes among recent survivors. *Support Care Cancer*. 2017; 25(8):2405-2412. DOI: [10.1007/s00520-017-3646-3](https://doi.org/10.1007/s00520-017-3646-3)
23. Li Q, Lin Y, Zhou H, Xu Y, Xu Y. Supportive care needs and associated factors among Chinese cancer survivors: a cross-sectional study. *Support Care Cancer*. 2019; 27(1):287-295. DOI: [10.1007/s00520-018-4315-x](https://doi.org/10.1007/s00520-018-4315-x)
24. Hamood R, Hamood H, Merhasin I, Keinan-Boker L. Hormone therapy and osteoporosis in breast cancer survivors: assessment of risk and adherence to screening recommendations. *Osteoporos Int*. 2019; 30(1):187-200. DOI: [10.1007/s00198-018-4758-4](https://doi.org/10.1007/s00198-018-4758-4)
25. Hamood R, Hamood H, Merhasin I, Keinan-Boker L. Diabetes After Hormone Therapy in Breast Cancer Survivors: A Case-Cohort Study. *J Clin Oncol*. 2018; 36(20):2061-2069. DOI: [10.1200/JCO.2017.76.3524](https://doi.org/10.1200/JCO.2017.76.3524)
26. Boszkiewicz K, Piwowar A, Petryszyn P. Aromatase Inhibitors and Risk of Metabolic and Cardiovascular Adverse Effects in Breast Cancer Patients—A Systematic Review and Meta-Analysis. *J Clin Med*. 2022; 11(11):3133. DOI: [10.3390/jcm11113133](https://doi.org/10.3390/jcm11113133)
27. Bromley SE, Matthews A, Smeeth L, Stanway S, Bhaskaran K. Risk of dementia among postmenopausal breast cancer survivors treated with aromatase inhibitors versus tamoxifen: a cohort study using primary care data from the UK. *J Cancer Surviv*. 2019 Aug; 13(4):632-640. DOI: [10.1007/s11764-019-00782-w](https://doi.org/10.1007/s11764-019-00782-w)
28. Jahan N, Cathcart-Rake EJ, Ruddy KJ. Late Breast Cancer Survivorship: Side Effects and Care Recommendations. *J Clin Oncol*. 2022; 40(15):1604-1610. DOI: [10.1200/JCO.22.00049](https://doi.org/10.1200/JCO.22.00049)
29. Cathcart-Rake EJ, Ruddy KJ. Vaginal Estrogen Therapy for the Genitourinary Symptoms of Menopause: Caution or Reassurance? *J Natl Cancer Inst*. 2022; 114(10):1315-1316. DOI: [10.1093/jnci/djac113](https://doi.org/10.1093/jnci/djac113)
30. Zuo SW, Wu H, Shen W. Vaginal estrogen and mammogram results: case series and review of literature on treatment of genitourinary syndrome of menopause (GSM) in breast cancer survivors. *Menopause*. 2018; 25(7):828-836. DOI: [10.1097/GME.0000000000001079](https://doi.org/10.1097/GME.0000000000001079)
31. Oyarzún MFG, Castelo-Branco C. Local hormone therapy for genitourinary syndrome of menopause in breast cancer patients: is it safe? *Gynecol Endocrinol*. 2017; 33(6):418-420. DOI: [10.1080/09513590.2017.1290076](https://doi.org/10.1080/09513590.2017.1290076)
32. Faubion SS, Larkin LC, Stuenkel CA, Bachmann GA, Chism LA, Kagan R, et al. Management of genitourinary syndrome of menopause in women with or at high risk for breast cancer: consensus recommendations from The North American Menopause Society and The International Society for the Study of Women's Sexual Health. *Menopause*. 2018; 25(6):596-608. DOI: [10.1097/GME.0000000000001121](https://doi.org/10.1097/GME.0000000000001121)
33. Jha S, Wyld L, Krishnaswamy PH. The Impact of Vaginal Laser Treatment for Genitourinary Syndrome of Menopause in Breast Cancer Survivors: A Systematic Review and Meta-analysis. *Clin Breast Cancer*. 2019; 19(4):e556-e562. DOI: [10.1016/j.clbc.2019.04.007](https://doi.org/10.1016/j.clbc.2019.04.007)
34. Quick AM, Zvinovski F, Hudson C, Hundley A, Evans C, Suresh A, et al. Fractional CO2 laser therapy for genitourinary syndrome of menopause for breast cancer survivors. *Support Care Cancer*. 2020; 28(8):3669-3677. DOI: [10.1007/s00520-019-05211-3](https://doi.org/10.1007/s00520-019-05211-3)
35. Sussman TA, Kruse ML, Thacker HL, Abraham J. Managing Genitourinary Syndrome of Menopause in Breast Cancer Survivors Receiving Endocrine Therapy. *J Oncol Pract*. 2019; 15(7):363-370. DOI: [10.1200/JOP.18.00710](https://doi.org/10.1200/JOP.18.00710)
36. Lubián López DM. Management of genitourinary syndrome of menopause in breast cancer survivors: An update. *World J Clin Oncol*. 2022; 13(2):71-100. DOI: [10.5306/wjco.v13.i2.71](https://doi.org/10.5306/wjco.v13.i2.71)
37. Crean-Tate KK, Faubion SS, Pederson HJ, Vencill JA, Batur P. Management of genitourinary syndrome of menopause in female cancer patients: a focus on vaginal hormonal therapy. *Am J Obstet Gynecol*. 2020; 222(2):103-113. DOI: [10.1016/j.ajog.2019.08.043](https://doi.org/10.1016/j.ajog.2019.08.043)
38. ACOG Committee Opinion No. 659: The Use of Vaginal Estrogen in Women With a History of Estrogen-Dependent Breast Cancer. *Obstet Gynecol*. 2016; 127(3):e93-e96. DOI: [10.1097/AOG.0000000000001351](https://doi.org/10.1097/AOG.0000000000001351)
39. Shah SC, Kayamba V, Peek RM Jr, Heimburger D. Cancer Control in Low- and Middle-Income Countries: Is It Time to Consider Screening? *J Glob Oncol*. 2019; 5:1-8. DOI: [10.1200/JGO.18.00200](https://doi.org/10.1200/JGO.18.00200)
40. Reyes-Monasterio A, Lozada-Martinez ID, Cabrera-Vargas LF, Narvaez-Rojas AR. Breast cancer care in Latin America: The ghost burden of a pandemic outbreak. *Int J Surg*. 2022; 104:106784. DOI: [10.1016/j.ijsu.2022.106784](https://doi.org/10.1016/j.ijsu.2022.106784)





41. Reyes A, Torregrosa L, Lozada-Martinez ID, Cabrera-Vargas LF, Nunez-Ordenez N, Martinez Ibata TF. Breast cancer mortality research in Latin America: A gap needed to be filled. *Am J Surg.* 2023;50002-9610(23)00009-0. DOI: [10.1016/j.amsurg.2023.01.010](https://doi.org/10.1016/j.amsurg.2023.01.010)

42. Lozada-Martinez ID, Suarez-Causado A, Solana-Tinoco JB. Ethnicity, genetic variants, risk factors and cholelithiasis: The need for eco-epidemiological studies and genomic analysis in Latin American surgery. *Int J Surg.* 2022; 99:106589. DOI: [10.1016/j.ijsu.2022.106589](https://doi.org/10.1016/j.ijsu.2022.106589)

43. Robinson KA, Brunnhuber K, Ciliska D, Juhl CB, Christensen R, Lund H, et al. Evidence-Based Research Series-Paper 1: What Evidence-Based Research is and why is it important? *J Clin Epidemiol.* 2021; 129:151-157. DOI: [10.1016/j.jclinepi.2020.07.020](https://doi.org/10.1016/j.jclinepi.2020.07.020)

44. Lozada Martinez ID, Moscote Salazar LR. Alfabetización científica: actividad indispensable para mejorar la comunicación en salud en la población general. *Rev Cuba Inf Cienc Salud.* 2021;32(1):e1725.