95 AÑOS | FO Facultad de Odontología

Common risk and indicators of non-communicable diseases and oral health

Riesgo común e indicadores de Enfermedades no transmisibles y salud bucal

Risco e indicadores comuns de doenças não transmissíveis e saúde bucal

Abstract

Non-communicable diseases (NCDs) share risk factors for their development with oral pathologies and can be addressed jointly through the common risk approach. The aim of this work was to compare the definitions and indicators of oral health risk factors and NCDs in six selected Uruguayan epidemiological studies.

The risk factors surveyed, the way in which data were collected and the risk definitions for each one were systematized. It was found that the objective of each study was different, with discrepancies in the variables and indicators chosen as well as in their definition, operationalization and way of collecting data.

It would be important to have unified criteria and systematized and integrated information to make health decisions regarding the individual and collective approach to NCDs, as well as to include oral health when addressing NCDs.

Ramón Álvarez-Vaz [1]
Susana Lorenzo-Erro [2]
Fiorela Apelo [3]
Paula Moliterno [4]
Jaqueline Ponzo [5]

CORRESPONDENCE
Fiorela Apelo:
aleroif1851@gmail.com

1 Doctor en Cs Médicas, Prof.Agdo. Cátedra de Odontología social, Servicio de Epidemiología y Estadística, Facultad de Odontología, Universidad de la República. Email de correspondencia: ramon@odon.edu.uy.
2 Doctora en Cs Médicas, Prof. Agda. Cátedra de Odontología social, Servicio de Epidemiología y Estadística, Facultad de Odontología, Universidad de la República.
3 Magíster en Cs Odontológicas, Asist. Cátedra de Odontología social, Servicio de Epidemiología y Estadística, Facultad de Odontología, Universidad de la República.
4 Doctora en Cs Médicas. Prof. Agda. Dpto. Nutrición Clínica, Escuela de Nutrición, Universidad de la República.
5 Doctora en Medicina, Prof. Agda. Medicina Familiar y Comunitaria, Facultad de Medicina, Universidad de la República.

Resumen

Las enfermedades no transmisibles (ENT) comparten factores de riesgo para su desarrollo con las patologías bucales, estas pueden ser abordadas en forma conjunta desde el enfoque de riesgo común. El objetivo de este trabajo fue comparar como se definen los factores de riesgo y qué indicadores se usan para medir la salud bucal y enfermedades no transmisibles en seis trabajos epidemiológicos uruguayos seleccionados.

Se sistematizaron los factores de riesgo relevados, la forma en que se recogieron los datos y las definiciones de riesgo para cada uno. Se constató que el objetivo de cada estudio fue diferente, existiendo discrepancia en las variables y en los indicadores escogidos, así como en su definición, operacionalización y forma de recolectar los datos.

Sería importante contar con criterios unificados e información sistematizada e integrada para tomar decisiones sanitarias con respecto al abordaje individual y colectivo de las ENT, así como también incluir la salud bucal a la hora de abordar las ENT.

Resumo

As doenças não transmissíveis (DNTs) compartilham fatores de risco para sua ocorrência com as patologias bucais, que podem ser tratadas em conjunto por meio da abordagem de risco comum. O objetivo desse trabalho foi comparar como os fatores de risco são definidos e quais indicadores são usados para medir a saúde bucal e as doenças não transmissíveis em seis estudos epidemiológicos selecionados no Uruguai.

Os fatores de risco pesquisados, a forma como os dados foram coletados e as definições de risco para cada um deles foram sistematizados. Verificou-se que o objetivo de cada estudo era diferente, com discrepâncias nas variáveis e nos indicadores escolhidos, bem como em sua definição, operacionalização e na forma como os dados foram coletados.

Seria importante ter critérios unificados e informações sistematizadas e integradas para tomar decisões de saúde em relação à abordagem individual e coletiva das DNTs, bem como incluir a saúde bucal na abordagem das DNTs.

Palabras Clave: Enfermedades no Transmisibles, Factores de Riesgo, Salud bucal

Palavras-chave: Doenças não transmissíveis, Fatores de risco, Saúde bucal

Introducción

This work is the result of the project "Oral health as a right and prevention of Non-Communicable Diseases (NCDs) in a context of inequities. A comprehensive approach," funded by the interdisciplinary space of the University of the Republic in 2017. The team included members from the Faculty of Medicine, School of Nutrition, Faculty of Sciences, Faculty of Communication Sciences, Faculty of Economics and Administration, and Faculty of Dentistry.

NCDs are closely linked to two interrelated phenomena known as the demographic transition and epidemiological transition, traditionally referred to as the demo-epidemiological transition [1]. In the context of this demo-epidemiological transition, an increase in the number of NCDs has been observed. Cardiovascular diseases (ischemic heart disease, heart failure, stroke), cancer, chronic respiratory diseases (chronic obstructive pulmonary disease, asthma), and diabetes are recognized as the main NCDs [2,3]. These diseases account for 41 million deaths each year, which is equivalent to 71% of global mortality. Among those aged 30-69, 15 million people die from NCDs annually. More than 85% of these "premature" deaths occur in low- and middle-income countries, constituting a significant public health problem in the Americas [4,5].

Harmful alcohol consumption, tobacco use, physical inactivity, and inadequate diet are common risk factors for all NCDs. These behavioral factors can directly or indirectly influence the development of metabolic risk factors such as obesity, arterial hypertension, dyslipidemia, and carbohydrate metabolism disorders (prediabetes) [6].

Evidence also indicates that the most frequent oral pathologies (caries and periodontitis) share common predisposing factors with NCDs, including inadequate diet, tobacco and alcohol consumption, lack of hygiene, stress, and a sedentary lifestyle [7]. Regarding diet, excessive intake of sugars (both frequency and quantity) is considered a risk factor for dental caries, diabetes, and obesity. As for smoking, it not only predisposes individuals to respiratory and cardiovascular diseases and cancer but also increases susceptibility to periodontal

disease and other oral mucosal lesions. Excessive alcohol consumption predisposes individuals to cardiovascular diseases and cancer, while also increasing the risk of accidents that can result in head injuries, potentially causing dental and mucosal lesions [7].

Jointly addressing the most frequent oral pathologies and other NCDs is aligned with the common risk approach. This approach enables the efficient and effective prevention of these highly prevalent pathologies, which are considered public health problems in developing countries, while optimizing resources [8,9].

The World Health Organization (WHO), through its manual "The WHO STEPwise approach to NCD risk factor surveillance" (STEPS), proposes the monitoring of the main risk factors for behavioral NCDs (tobacco use, harmful alcohol consumption, inadequate diet, and physical inactivity) and biological NCDs (overweight and obesity, high blood pressure, high glycemia, and high blood lipids) (10). NCD indicators are presented as a tool to measure the prevalence of these pathologies and their associated factors, and to enable comparisons between countries if the appropriate methodology is used.

This paper aims to systematize, compare, and analyze the way in which some NCD indicators are defined and reported in six selected Uruguayan epidemiological studies

Methodology:
WORK STRATEGY

The selection method for the articles was based on convenience; articles in which a member of the project that led to this publication participated as a researcher were considered. The selected studies shared some common characteristics: the study of risk factors for NCDs and the inclusion of adult populations.

Although the considered articles do not result from a systematic search of national epidemiological production, the two national surveys and the only longitudinal study on NCDs carried out in Uruguay are included, as well as the first national oral health survey (the only one conducted so far).

The indicators used in each study, the instruments, and the diagnostic criteria were analyzed. Considering the common risk factor approach, behavioral risk factors (fruit and vegetable consumption, smoking, alcohol consumption, physical activity) and associated metabolic conditions or risk factors (arterial hypertension, altered glycemia, elevated cholesterol, overweight and obesity, elevated waist circumference) were studied. Oral health conditions (caries, periodontal disease, and tooth loss) were also studied.

Results:
PRESENTATION OF THE STUDIES

The following studies were included after applying the selection criteria: Center of Excellence in Cardiovascular Health for South America (CESCAS I), 1st and 2nd national survey for risk factors of non-communicable diseases (ENFRENT), National Survey on Oral Health of Uruguayan Youth and Adults 2011 (RelNacSB), Health and Disease in Deprivation of Freedom (SEPL), Oral health and non-communicable diseases in patients of a university teaching center, Montevideo-Uruguay. Udelar parts 1 and 2 (SBYENT).

The 1st ENFRENT and 2nd ENFRENT are descriptive studies conducted by the Ministry of Public Health, utilizing the STEP methodology proposed by the WHO, and are part of a health surveillance strategy for the years 2006 and 2013. Each survey was carried out by a team hired for this purpose, which included medical, nutrition, and nursing professionals. They were trained for questionnaire administration and calibrated for anthropometric, clinical, and laboratory measurements [11,12].

In the 1st ENFRENT, there were 2008 participants aged 25 to 64 years, with 66% being female. The risk factors explored were alcohol consumption, tobacco use, fruit and vegetable intake, physical activity, overweight/ obesity, arterial hypertension, cholesterolemia, and glycemia. Socioeconomic characteristics were not surveyed. The STEPs methodology was used for the survey, but difficulties were reported in applying steps 2 and 3 (physical measurements and laboratory blood tests, respectively), which were taken into account. In the 2nd ENFRENT, steps 1 (questionnaire on demographic and behavioral data) and 2 were conducted simultaneously, and step 3 was performed via digital puncture instead of venous puncture [11,12].

The 2nd ENFRENT included 2462 participants aged 15 to 64 years (63% female). The study examined risk factors such as alcohol consumption, tobacco use, fruit and vegetable intake, physical activity, overweight/obesity, arterial hypertension, cholesterolemia, and glycemia. Although in this study the socioeconomic conditions of the participants were surveyed through income, such data was not analyzed.

The study conducted by the Center of Excellence in Cardiovascular Health for South America (CESCAS) is a multicenter study of the Southern Cone of America (Argentina, Chile, and Uruguay). In Uruguay, the sample consisted of 1580 participants aged 35 to 74 years, 58% female, residing in Pando, Barros Blancos, and Nicolich. During 2010-2012, the first stage of recruitment and description of the cohort was carried out to determine the

prevalence and distribution of cardiovascular risk factors and chronic obstructive pulmonary disease (COPD). The following risk factors were included: fruit and vegetable consumption, tobacco use, alcohol consumption, physical activity, body mass index, abdominal perimeter, arterial hypertension, dyslipidemia, and glycemia. The socioeconomic level of the individuals was assessed using the adapted HCHS/SOL (The Hispanic Community Health Study/Study of Latinos Sociocultural Ancillary Study) instrument, along with their educational level. This study was conducted by the Faculty of Medicine, Udelar (Uruguay Team of the South American Center of Excellence for Cardiovascular Health) through a research team that included teachers, professionals, and medical and nutrition students [13].

In turn, the "First National Survey on Oral Health of Uruguayan Youth and Adults'' (RelNacSB), conducted in 2011, had a national scope and included a sample of 1,485 people (53% female). The fieldwork was carried out by a specially trained team that included teachers from the Faculty of Dentistry and advanced students. This research aimed to describe the most prevalent oral pathologies among young people [15-24], adults (35-44 and 65-74) in both the capital city and the interior of the country, and to examine how these oral pathologies related to sociocultural characteristics. The methodological foundation was the WHO manual for national oral health surveys (1997). Additionally, a questionnaire was administered in which participants self-reported some health conditions related to NCDs. The oral conditions studied were: caries, periodontal diseases, tooth loss, malocclusions, and mucosal lesions. The general health conditions were: arterial hypertension, glycemia, fruit and vegetable consumption, alcohol consumption, and tobacco use. The socioeconomic level of the individuals was studied based on the reduced socioeconomic level index (INSE), which includes the following variables: neighborhood in Montevideo/department of the rest of the country, number of income earners, number of people in the household, health care of the main income earner, educational level of the main income earner, domestic service, car, color TV, refrigerator with or without a freezer, and the number of bathrooms in the dwelling [14].

This systematization also included research conducted in 2015-2016 at the Faculty of Dentistry through the project "Oral Health and Non-Communicable Diseases: A Clinical-Epidemiological and Interdisciplinary Approach: First Stage." The project was developed by an interprofessional team from UdelaR composed of nursing, nutrition, and dentistry professionals who were trained for the study. The objective was to determine the prevalence of NCDs, their behavioral and metabolic risk factors, and their relationship with oral health in individuals seeking care. This was a descriptive, cross-sectional study with a sample of 602 individuals aged 15-64 years or older, of both sexes (59% female). The STEPS methodology (step 1) was used for NCDs, and for oral health, the WHO Oral Health Surveys: Basic Methods (1997) was applied. The following NCD risk factors were included: arterial hypertension, glycemia, overweight, obesity, abdominal perimeter, fruit and vegetable consumption, alcohol consumption, tobacco use, and physical activity. Oral health was studied in terms of caries, gum diseases, and tooth loss. The socioeconomic level was assessed through schooling, income, and type of health coverage [15].

Finally, research conducted in Uruguay that studied NCDs and oral health in the population deprived of freedom was included. The publication is titled "Health and Disease in Deprivation of Freedom" (SEPL). The survey was conducted in 2015 by specially trained health care staff of the prison system. It was a descriptive and cross-sectional study with a sample of 832 participants aged 15 to 55 years or older, of both sexes (12% female), from a sample frame of 37 penitentiary centers. The WHO STEPS methodology was used to monitor risk factors for chronic diseases, mental health, oral health, and injuries. The risk factors for NCDs studied included arterial hypertension, glycemia, cholesterolemia, overweight, obesity, fruit and vegetable consumption, alcohol consumption, tobacco use, and physical activity. Regarding oral health, the questionnaire included some of the questions proposed by the STEPS instrument in the oral health module on self-perception, which are linked to quality of life. Additionally, a self-administered, anonymous, and confidential questionnaire was included to inquire about alcohol and other psychoactive substance use, sexual practices, suicide risk, and barriers to accessing emergency care [16].

ANALYSIS OF THE STUDIES

The studies are analyzed in table format. Table 1 presents the studies according to the risk factors studied and the oral health conditions surveyed. Data collection methods are described in two main groups: self-reported (survey) or measured (physical or laboratory); if a condition was not reported, it is stated as unreported.

Table 2 compares the reference values used for the classification of risk or health damage for behavioral risk factors, and Table 3 for metabolic risk factors. Table 4 compares the indicators used to address oral health conditions in each of the studies.

TABLE 1

Data collection methods for each risk factor in the selected studies. Uruguay 2006-2016

RISK FACTOR	1ra ENFRENT	2da ENFRENT	CESCAS	SBYENT	SEPL	RelNacSB
FRUIT AND VEGETABLE CONSUMPTION	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported
ALCOHOL CONSUMPTION	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported
TOBACCO USE	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported
PHYSICAL ACTIVITY	Self-reported	Self-reported	Self-reported	Self-reported	Self-reported	Unreported
BLOOD PRESSURE	Self-reported, Physical exam	Self-reported, Physical exam	Self-reported, Physical exam	Self-reported, Physical exam	Self-reported, Physical exam	Self-reported
GLYCEMIA	Self-reported, Laboratory	Self-reported, Laboratory	Self-reported, Laboratory	Self-reported, Laboratory	Self-reported, Laboratory	Self-reported
CHOLESTEROL	Laboratory	Laboratory	Self-reported, Laboratory	Unreported	Laboratory	Unreported
OVERWEIGHT/OBESITY	Physical exam	Physical exam	Physical exam	Physical exam	Physical exam	Unreported
ABDOMINAL OBESITY	Unreported	Physical exam	Physical exam	Physical exam	Unreported	Unreported
CARIES	Unreported	Unreported	Unreported	Physical exam	Unreported	Unreported
PERIODONTAL DISEASE	Unreported	Unreported	Unreported	Physical exam	Unreported	Physical exam
TOOTH LOSS	Unreported	Unreported	Unreported	Physical exam	Self-reported	Physical exam
TOOTH BRUSHING	Unreported	Unreported	Unreported	Self-reported	Self-reported	Self-reported
LAST DENTIST VISIT	Unreported	Unreported	Unreported	Self-reported	Self-reported	Self-reported
ORAL PAIN	Unreported	Unreported	Unreported	Unreported	Self-reported	Self-reported

Observations:

CESCAS: does not include specific data on oral health issues, but self-reports bleeding gums.
Physical exam: Refers to anthropometric measurements or clinical oral exams
Laboratory: Refers to laboratory tests
Self-reported: Self-reported conditio

TABLE 2.

Reference values used for the classification of risk or health damage for behavioral risk factors addressed in the selected studies. Uruguay 2006-2016

RISK FACTOR	INDICATOR	STUDY CONSIDERING IT
FRUIT AND VEGETABLE CONSUMPTION	Risk consumption: <5 servings daily	1st ENFRENT, 2nd ENFRENT, CESCAS I, RelNacSB, SBYENT
	Consumption frequency: Never, daily, 2 to 6 days a week, once a week	SEPL
ALCOHOL CONSUMPTION	Prevalence in the last 12 months	1st ENFRENT, RelNacSB
	Prevalence in the last month	1st ENFRENT, 2nd ENFRENT, SEPL
	Binge drinking: 5 drinks*(male) or 4 drinks (female) in approximately two hours more than once a month	1st ENFRENT, 2nd ENFRENT
	Daily consumption	CESCAS, RelNacSB, SEPL
	Consumes alcohol, no other specification	SEPL
	Number of days per week consuming alcohol	RelNacSB
	Frequency and number of drinks*: does not consume, very low, low, intermediate, high, very high	SBYENT
	Moderate consumption: up to 7 drinks** (women) or 14 drinks (men) per week	CESCAS I
	High consumption: 8 or more drinks (women), 15 or more drinks (men) per week	
	Never drinker	CESCAS I
	Former drinker (one year or more of abstinence)	CESCAS I
	Audit Scale	2nd ENFRENT
TOBACCO USE	Smoker (no other specification) (YES/NO)	RelNacSB, SEPL
	Daily smoker	1st ENFRENT, 2nd ENFRENT, CESCAS I, RelNacSB, SEPL
	Weekly smoker	1st ENFRENT, CESCAS I
	Number of daily cigarettes: ≤10 or >10 per day	RelNacSB
	Number of daily cigarettes	CESCAS
	Has smoked at least 100 cigarettes in their lifetime	CESCAS
	Age of initiation	1st ENFRENT, CESCAS I
	Former smoker	2nd ENFRENT, CESCAS I
	Passive smoker: days of exposure at home and work in the last 7 days	CESCAS I

FACTOR DE RIESGO	INDICADOR	ESTUDIO QUE LO CONSIDERA
PHYSICAL ACTIVITY	Low (or insufficient) physical activity: <600 MET-minutes per week	1st ENFRENT, CESCAS I
	Medium (or sufficient) physical activity: ≥600 MET-min/week	1st ENFRENT, CESCAS
	Physical activity: ≥3000 MET-min/week	1st ENFRENT
	Physical activity: <150 min/week moderate intensity or 75 min/week vigorous intensity	2nd ENFRENT, SBYENT
	Average daily hours sitting or lying down	SEPL

* Data provided by the Epidemiology and Statistics Service of the Faculty of Dentistry of the University of the Republic:
Very low: 1 time a month or less, 1 or 2 drinks
Low: 1 time a month or less and 3 or more drinks; 2 to 4 times a month, 1 or 2 drinks
Intermediate: 2 to 4 times a month and 3 or 4 drinks
High: 2 to 4 times a month and 5 or more drinks; 2 or 3 times a week and up to 4 drinks
Very high: 2 or 3 times a week and 5 or more drinks; 4 to 6 times a week; daily.

** Drink: refers to the standard drink unit (SDU) established for measuring alcohol consumption by the National Institute on Alcohol Abuse and Alcoholism, United States [22]
In CESCAS, the operationalized was as follows:
Beer: 1 SDU = large glass (13 cm high containing approximately 340 ml) or can/bottle of 355 ml.
Wine: 1 SDU = small glass (approximately 100 ml) e.g. white, red, or rosé wine
White spirits: 1 SDU = one drink (approximately 45 ml) e.g. whiskey, vodka, tequila, rum, cognac, liqueur, or gin.

TABLE 3. Reference values used for the classification of risk or health damage for the metabolic conditions addressed in the selected studies. Uruguay 2006-2016.

RISK FACTORS AND METABOLIC CONDITIONS	INDICATOR	STUDY CONSIDERING IT
ARTERIAL HYPERTENSION	Clinical Examination: SBP ≥ 140 mmHg or DBP ≥ 90 mmHg	1st ENFRENT, 2nd ENFRENT, CESCAS, SBYENT, SEPL
ALTERED GLYCEMIA	Altered fasting glycemia: between 110 and 126 mg/dl	All except RelNacSB
	Diabetes: fasting glycemia ≥ 126 mg/dl	2nd ENFRENT, CESCAS, SEPL
	Diabetes: non-fasting blood glucose ≥ 200 mg/dl	SBYENT, SEPL
DYSLIPIDEMIA	Total cholesterol elevated ≥ 240 mg/dl	2nd ENFRENT, CESCAS, SEPL
	Total cholesterol ≥ 200 mg/dl	1st ENFRENT
	LDL cholesterol greater than 160 mg/dl	CESCAS
	HDL cholesterol less than 40 mg/dl	CESCAS
	Triglycerides ≥ 150 mg/dl	1st ENFRENT
	Triglycerides ≥ 200 mg/dl	CESCAS
OVERWEIGHT	Overweight: BMI ≥ 25 kg / m^2	All except RelNacSB (does not report this condition)
OBESITY	Obesity: BMI > 30 kg / m^2	All except RelNacSB (does not report this condition)
ABDOMINAL OBESITY	Altered waist circumference: male 102 cm, female 88 cm	2nd ENFRENT, CESCAS, SBYENT

Abbreviations: SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure), BMI (Body Mass Index), HDL (High-Density Lipoproteins), LDL (Low-Density Lipoproteins)

TABLE 4:
Indicators used to address oral health conditions in the selected studies. Uruguay 2006-2016

ORAL PATHOLOGY	INDICATOR	STUDY APPLYING IT
CARIES	DMFT*	RelNacSB SBYENT
	DMFT>0	RelNacSB, SBYENT
	SIC**	RelNacSB
	D Component	RelNacSB, SBYENT
PERIODONTITIS	Periodontal disease: pocket > 4 mm and attachment loss > 3 mm	RelNacSB SBYENT
	Average of sextants affected by each condition	RelNacSB
TOOTH LOSS	Functional dentition: > 20 teeth	RelNacSB, SBYENT
	Severe loss: < 9 teeth present	RelNacSB
	Average of teeth present	SBYENT
	No teeth, 1 to 9, 10 to 19, 20 or more Doesn't know	SEPL
OTHER ORAL HEALTH-RELATED	Daily brushing	SEPL, SBYENT*** RelNacSB***
	Last visit to the dentist	SEPL, SBYENT*** RelNacSB**
	Oral pain	SEPL, RelNacSB***

*   DMFT (Decayed, Missing, and Filled Teeth) indicator used to survey dental caries.

** SIC (Significant Caries Index). Indicator used to represent the situation of the worst third in terms of the mean DMFT of the population.

***   Data provided by the Epidemiology and Statistics Service of the Faculty of Dentistry of the University of the Republic (yet to be published).

Discussion

In light of this work's objectives, the studies presented will be discussed in relation to each other and to the literature. Firstly, given that the objective of each selected study is different, so are the variables studied, the indicators chosen, and their definition, operationalization, and data collection. The greatest differences were found with the studies that were aimed exclusively at OH. This was to be expected given that indicators are dynamic instruments and must respond to the specific context in which they are used [17].

As for the methodology used, all the studies comprising this work employed the STEPs methodology proposed by the WHO. This has the advantage of allowing regional and international comparisons and contributing to health surveillance [10]. However, from a local perspective, employing internationally standardized criteria could hinder health planning according to the needs of the population involved [18].

Regarding the sociodemographic characteristics of the studies, it was found that all of them involved adult and older adult populations. In addition, in the 2nd EN-FRENT, RelNacSB, SBYENT, and SEPL, young people aged 15 years and older were included. The incorporation of the young population in these studies with a preventive approach stands out, given that it is necessary to address NCDs in this population group [19].

Still on the subject of sociodemographic characteristics, the gender dimension of the participants was recorded in all the studies. It was found that, except for the population deprived of liberty, there is a higher proportion of female participants. Although this does not in any way constitute a gender perspective, as gender and sex are not the same thing, the attempt to analyze NCDs with this dimension in mind is appreciated. It is key to incorporate the gender dimension when studying health-disease processes, given that there are matrix inequalities in their production and reproduction [20,21].

Understanding that the health-disease process of populations responds in a complex way to the productive model and the socioeconomic context of the population, besides gender-related variables, epidemiology should incorporate variables that make it possible to identify the socioeconomic level of the participants [21]. In the studies analyzed in this paper, it was found that not all the studies included this dimension, and in those that did, the educational level was used as an approximation to the socioeconomic level, albeit through different indicators.

These elements, both socioeconomic level and gender, should be considered not as isolated factors of influence but as integral parts of the social production and reproduction framework, to achieve a comprehensive understanding [21].

Considering the form of data collection and the composition of the work teams, it was observed that two methods were used to assemble the examining teams: in some cases, the examiners were part of the research team (or worked in that service, as in the case of the SEPL), while in others, specific personnel were hired for this task. There is no data available to evaluate the effectiveness and efficiency of the way the work teams were formed, but in all cases, the personnel were trained to carry out the activity, which increases data reliability [22].

Table 3 shows that for metabolic risk factors, the variables that presented the most standardized indicators were arterial hypertension and obesity (both abdominal and BMI). This finding makes sense because, as mentioned, the standardization of indicators is useful for public health actions. According to the WHO, hypertension and overweight/obesity are the metabolic risk factors with the greatest impact on deaths due to NCDs [4]. However, altered glycemia is also one of the most important risk factors for NCD deaths, and there is greater variability in the way it is reported.

It was found that not all the included studies have information on abdominal obesity, but they do have information on BMI (except for RelNacSB, which does not consider this risk factor). Studies suggest that to establish risk, it is necessary to have both BMI and abdominal obesity information [23].

Table 1 shows that oral health conditions were addressed in three (RelNacSB, SBYENT, and SEPL) out of the six studies, suggesting that oral health is not considered when designing studies on NCDs. There is a shortcoming in the fact that epidemiological studies on NCDs and risk factors do not include oral health, despite having risk factors in common. Additionally, there may be potential common interactions and pathophysiological processes, as well as overlapping behavioral factors, whose understanding would benefit from an integrated and interdisciplinary approach between NCDs and OH [7,15,24,25].

Regarding behavioral variables, as seen in Table 2, alcohol consumption and tobacco use are reported with the greatest variability, with eight and six different ways of measuring and reporting, respectively. Several indicators were also found for physical activity, and in some cases, it is assessed together with sedentary lifestyle. The literature on studies about risk factors for NCDs in the region reveals various ways of measuring these habit-related conditions [26,27].

From a conceptual standpoint, it is erroneous to consider behavioral variables solely as aspects linked to

individuals' willpower. These result from a set of dialectical processes, both protective and destructive, taking place across various dimensions. Thus, using a risk-based approach and relying independently on standardized variables and indicators, as per the STEPS methodology, hinders a holistic understanding and approach to health issues, including NCDs [7,8,21].

The primary limitation of this study is the restricted number of NCD studies included, which stemmed from the inclusion criteria set by the interdisciplinary group originating this article. A more comprehensive literature review with less restrictive inclusion criteria would be beneficial.

Conclusions

The variability in the definition and use of indicators expresses the challenge of agreeing on criteria for working with NCDs at the national level. It would be important to not only have unified criteria for data collection, but also systematized and integrated information. This would enable to develop -both from survey data (which should be systematic) and from specific research- the epidemiological surveillance of these pathologies, which includes their prevention and treatment. In this way, there would be better inputs to make health decisions regarding the individual and collective approach to NCDs.

Given that several oral pathologies are classified as NCDs and due to the public health significance of these conditions, it is advisable to include them in the design of epidemiological studies that address NCDs.

REFERENCES

1. Gómez RD. La transición en epidemiología y salud pública : ¿ explicación o condena ? Resumen Palabras clave. 2001;19.

2. Kuri-Morales PA. La transición en salud y su impacto en la demanda de servicios. Gac Med Mex. 2011;147(6):451–4.

3. Org anización Mundial de la Salud. Enfermedades no transmisibles [Internet]. 2021. Available from: https://www.who.int/es/news-room/fact-sheets/detail/noncommunicable-diseases

4. World Health Organization. Non-communicable diseases Key facts [Internet]. Fact sheets. 2018. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

5. Luciani S, Nederveen L, Martinez R, Caixeta R, Chavez C, Sandoval RC, et al. Noncommunicable diseases in the Americas: a review of the Pan American Health Organization's 25-year program of work. Revista Panamericana de Salud Publica/Pan American Journal of Public Health. 2023;47.

6. Hosseinpoor AR, Bergen N, Kunst A, Harper S, Guthold R, Rekve D, et al. Socioeconomic inequalities in risk factors for non communicable diseases in low-income and middle-income countries: results from the World Health Survey. BMC Public Health [Internet]. 2012;12(1):912. Available from: BMC Public Health

7. Sheiham A, Watt RG. The Common Risk Factor Approach: A rational basis for promoting oral health. Community Dent Oral Epidemiol. 2000;28(6):399–406.

8. Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: a global public health challenge. The Lancet [Internet]. 2019;394(10194):249–60. Available from: http://dx.doi.org/10.1016/S0140-6736(19)31146-8

9. Righolt AJ, Jevdjevic M, Marcenes W, Listl S. Global-, Regional-, and Country-Level Economic Impacts of Dental Diseases in 2015. J Dent Res. 2018;97(5):501–7.

10. OMS. Manual de vigilancia STEPS de la OMS. 2009;463.

11. Ministerio de Salud Pública. 1a Encuesta Nacional de Factores de Riesgo de Enfermedades Crónicas No Transmisibles. [Internet]. 2006. Available from: https://www.gub.uy/ministerio-salud-publica/comunicacion/publicaciones/primera-encuesta-nacional-de-factores-de-riesgo-de-enfermedades-cronicas

12. Ministerio de Salud Pública. 2° Encuesta nacional de factores de riesgo de enfermedades no transmisibles. [Internet]. 2013. Available from: http://www.who.int/chp/steps/2DA_ENCUESTA_NACIONAL_final_WEB22.pdf?ua=1

13. Rubinstein AL, Irazola VE, Calandrelli M, Elorriaga N, Gutierrez L, Lanas F, et al. Multiple cardiometabolic risk factors in the Southern Cone of Latin America: A population-based study in Argentina, Chile, and Uruguay. Int J Cardiol [Internet]. 2015;183(2015):82–8. Available from: http://dx.doi.org/10.1016/j.ijcard.2015.01.062

14. Lorenzo SM, Álvarez-Vaz R. Relevamiento Nacional de slud Bucal de jóvenes y adultos uruguayos 2011 [Internet]. 1st ed. Montevideo: Universidad de la República; 2018. Available from: https://www.colibri.udelar.edu.uy/jspui/bitstream/20.500.12008/18508/1/Lorenzo_Encuesta.pdf

15. Lorenzo-erro SM, Fabruccini A, Alvarez-Vaz, Ramón, Massa F. Salud Bucal y Enfermedades no transmisibles en pacientes de un centro de enseñanza universitaria, Montevideo-Uruguay. Parte 2. Odontoestomatologia. 2021;23(37):1–7.

16. Levcovitz E, Fernández M, Rodriguez R, Benia W. Salud y enfermedad en privación de libertad [Internet]. Montevideo; 2016. Available from: https://www.paho.org/uru/index.php?option=com_docman&view=download&alias=491-diagnostico-epidemiologico-folleto-com-1&category_slug=publications&Itemid=307

17. Organización Panamericana de la Salud. Indicadores de salud. Aspectos conceptuales y operativos [Internet]. Washington; 2018. Available from: http://iris.paho.org.

18. Spinelli H. El interés del desinterés en la epidemiología de servicios y sistemas de salud. Salud Colect. 2023;19:e4365.

19. Beatriz Flores Oteroa, Jesús Aceituno Duqueb. Planes de prevención de enfermedades crónicas no transmisibles en niños y adolescentes. Pediatría Atención primaria [Internet]. 2021 [cited 2024 Jan 31];23(1):143–53. Available from: https://scielo.isciii.es/scielo.php?pid=S1139-76322021000200006&script=sci_arttext

20. Álvarez-Díaz JA. The necessary gender perspective for the analysis of health problems. Cirugia y Cirujanos (English Edition). 2020;88(3):383–8.

21. Breilh J. La determinación social de la salud como herramienta de transformación hacia una nueva salud pública (salud colectiva). Fac Nac Salud Pública [Internet]. 2013;31(1):13–27. Available from: http://www.observatoriorh. org/sites/observatoriorh.org.saludinternacionalelsalvador/files/webfiles/fulltext/determinacion_social_salud.pdf

22. World Health Organization. Oral Health Surveys. Basic methods. 5th ed. Vol. 5. Switzerland: World Health Organization; 2013. 1–59 p.

23. Bueno Brito C, Cesar Brito Delgado H, Josefina Delgado Delgado D, Gabriela Dávila Hernández D, Petatan Mendoza S, Eduardo Pérez Castro L, et al. Anthropometric and biochemical risk predictors for non-transmissible diseases in nursing students.

24. Lorenzo-Erro SM, Alvarez-Vaz Ramón, Skapino E, Massa F, Moliterno P, Fabruccini A, et al. Salud Bucal y Enfermedades no transmisibles en pacientes de un centro de enseñanza universitaria, Montevideo-Uruguay. Parte 1. Odontoestomatologia. 2020;22(36):55–64.

25. Baeza M, Jara G, Morales A, Polanco J, Sáenz G, Espinoza I, et al. Las Políticas de Salud Oral en el contexto de las enfermedades no transmisibles: Un desafío pendiente en Chile. International journal of interdisciplinary dentistry. 2021 Apr;14(1):28–31.

26. de Oliveira Meller F, dos Santos LP, Miranda VIA, Tomasi CD, Soratto J, Quadra MR, et al. Inequalities in risk behaviors for chronic noncommunicable diseases: Vigitel, 2019. Cad Saude Publica. 2022;38(6).

27. Silva DR, Barboza LL, Baldew SS, Anza-Ramirez C, Ramírez-Vélez R, Schuch FB, et al. Measurement of physical activity and sedentary behavior in national health surveys, South America. Revista Panamericana de Salud Publica/Pan American Journal of Public Health. 2022;46:1–9.

Conflict of Interest Statement

The authors declare no conflict of interest in the publication of the article.

Funding Source

Authorship Contribution and Collaboration Statement

FIRST AND LAST NAME	ACADEMIC COLLABORATION													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ramón Álvarez-Vaz			x		x	x			x		x	x	x	x
Fiorela Apelo Lozano				x		x			x	x			x	x
Susana Lorenzo-Erro	x	x		x		x	x	x	x		x	x		
Paula Moliterno				x		x							x	
Jaqueline Ponzo		x		x		x	x						x	x

1.	Project Administration	8.	Methodology
2.	Funding Acquisition	9.	Resources
3.	Formal Analysis	10.	Writing-Original Draft Preparation
4.	Conceptualization	11.	Software
5.	Data Curation	12.	Supervision
6.	Writing - Review & Editing	13.	Validation
7.	Research	14.	Visualization