








Behavioral aspects and the risk of sexually transmitted infections in young people: a scoping review*

Aspectos comportamentais e risco de infecções sexualmente transmissíveis entre jovens: revisão de escopo

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ABSTRACT

Objective: to map behavioral aspects involved in the risk of sexually transmitted infections in young people. **Methods:** scoping review of the databases MEDLINE, lilacs, BDNF, SCOPUS, Web of Science, and gray literature, using the Rayyan software to select the material and, later, analyzing it through independent reviewers with active blinding. The final corpus was formed by 299 publications, which were submitted to qualitative-quantitative analysis. **Results:** we identified 43 behavioral aspects involved in the risk of young people acquiring sexually transmitted infections. Words that appeared more than 30 times determined the context and representativity of the corpus; the co-occurrence of significant words originated six colored word halos that represent the behavioral aspects inherent to sexually transmitted infections, both intrinsically and extrinsically. **Conclusion:** our findings mapped behavioral aspects that contribute synergistically to the vulnerability of youth to sexually transmitted infections. These aspects include inconsistent condom use, multiple sexual partners, legal/illegal drug use, early sexual initiation, and concomitant sexual partners. **Contributions to practice:** the identification of axes and scopes for interventions can give support and subsidize the elaboration of multifocal interventions. In addition to effective measures to prevent and promote health when it comes to sexually transmitted infections in the population investigated.

Descriptors: Behavior; Sexual Behavior; Adolescent; Young Adult; Sexually Transmitted Diseases.

RESUMO

Objetivo: mapear os aspectos comportamentais envolvidos no risco de infecções sexualmente transmissíveis entre jovens. **Métodos:** revisão de escopo com busca nas bases de dados: MEDLINE, LILACS, BDNF, SCOPUS, *Web of Science* e literatura cinza, utilizando o *software Rayyan* para seleção do material, seguida de análise por revisores independentes com cegamento ativado. O *corpus* final foi formado por 299 publicações, que foram submetidas à análise quali-quantitativa. **Resultados:** foram identificados 43 aspectos comportamentais envolvidos no risco de jovens adquirirem infecções sexualmente transmissíveis. Palavras com mais de 30 aparições determinaram o contexto e a representatividade do *corpus* textual; a coocorrência de palavras significativas originou seis *halos* coloridos de palavras que representam os aspectos comportamentais inerentes às infecções sexualmente transmissíveis, de modo intrínseco e extrínseco. **Conclusão:** os achados mapearam os aspectos comportamentais que contribuem sinergicamente para a conformação de vulnerabilidade de jovens a infecções sexualmente transmissíveis, dentre os quais, uso inconsistente de preservativos, múltiplas parcerias sexuais, consumo de drogas lícitas/ilícitas, iniciação sexual precoce e parcerias sexuais concomitantes. **Contribuições para a prática:** a identificação de eixos e âmbitos intervencionais apoia e subsidia formulações de intervenções multifocais e medidas efetivas para a prevenção e promoção da saúde acerca das infecções sexualmente transmissíveis na população investigada.

Descritores: Comportamento; Comportamento Sexual; Adolescente; Adulto Jovem; Infecções Sexualmente Transmissíveis.

Introduction

Although Sexually Transmitted Infections (STIs) are preventable and, in most cases, treatable, they continue to be a significant cause of morbidity around the globe. Some of them have existed for centuries and continue to be a public health issue due to vulnerabilities and unequal sanitary, social, political, and economic conditions of populations. The epidemiological expression of these STIs represents a substantial challenge for both the individuals affected and the health systems. This shows the need for a broad approach in the management and elaboration of public policies, as well as in the provision of professional care to the clinical management of data⁽¹⁻⁴⁾.

Some population groups stand out in regard to the prevalence of STIs. Young people, for example, show a higher prevalence than the general population, which has called attention to factors that can make them even more vulnerable⁽³⁾. In the last few years, there has been a decrease in the age of the onset of puberty, and sexual behaviors and characteristics are emerging increasingly earlier. This, associated with the lack of attitudes from parents and health teams in the approach to the sexual health of adolescents and young persons, tends to lead to risky sexual behavior, exposing these individuals to STIs⁽¹⁻⁴⁾.

There is no consensus in literature regarding the knowledge of youths regarding the transmission and prevention of STIs. However, despite the fact their knowledge is good/regular or great, their sexual behavior is still present in their daily lives^(1,5-6). This evidence corroborates the growing number of diagnoses found in the last few years among those below 24 years old, suggesting their behavior can influence, directly or indirectly, the occurrence or prevention of these infections⁽⁵⁻⁶⁾.

Starting with these considerations, this study aimed to map behavioral aspects involved in the risk of sexually transmitted infections in young people.

Methods

Design of the study

This was a scoping review with a mixed-method approach, conducted using the methodological structure suggested by the JBI⁽⁷⁾ and using the checklist Preferred Reporting Items for Systematic reviews and Meta-Analyses - Extension for Scoping Reviews (PRISMA-ScR)⁽⁸⁾. Before it was carried out, its protocol was published in the open, free, and international platform Open Software Foundation (OSF), which is associated with the non-profit organization Center for Open Science (COS). Its publication was under the identifier <https://doi.org/10.17605/OSF.IO/QHMCU>⁽⁹⁾.

This review was developed from June 2022 to February 2023 in five methodological steps, namely: the research question was determined; a survey of relevant studies was conducted; studies were selected according to inclusion and exclusion criteria; results were collected, summarized, and mapped; and, finally, results were presented and discussed⁽⁷⁻⁹⁾.

Determining the research question

To formulate the research question, we used the acronym PCC, where the Population (P) was young people; the Concept (C) was their risky behavior; and the Context (C) was the STIs. Keeping in mind that the age classification "young" can vary between countries and continents, the research question formulated was: "What behavioral aspects are involved in the risk of young people acquiring STIs?"

Inclusion criteria considered original publications that answered the research question, with no restriction regarding time, language, and methodological approach. Exclusion criteria considered: reviews, publications about the results of behavioral interventions that changed the reality analyzed, and those which were not in line with the PCC acronym used in this study, in addition to ongoing research.

Survey of relevant studies

The following databases were used as sources of potentially relevant documents: Medical Literature Analysis and Retrieval System Online (MEDLINE), via Pubmed; Latin American and Caribbean Literature in Health Sciences (LILACS) and Nursing Database (BDENF), via Virtual Health Library (VHL); SCOPUS, via Elsevier; and Web of Science, via Clarivate. Additionally, gray literature was investigated, with searches conducted in the Brazilian Digital Library of Thesis and Publications, from the World Health Organization and the Joint United Nations Program on HIV/AIDS (UNAIDS).

A high-sensitivity search strategy, built with the aid of a librarian, used terms from controlled vocabularies. To do so, we used terms from the databases Health Sciences Descriptors (DeCS), Medical Subject Headings (MeSH), and Emtree, in addition to the boolean operators AND and OR. This led to the creation of the following search equation: (“Behavior” OR “Sexual Behavior”) AND (“Adolescent” OR “Young Adult”) AND “Sexually Transmitted Diseases”. Furthermore, we selected filters such as “full text” and excluded revision articles in databases that allowed it, in order to focus on the goal of the study.

Selection according to inclusion and exclusion criteria

The Rayyan software, developed by the Qatar Computing Research Institute (QCRI), was used for the selection, triage, and removal of duplicates⁽¹⁰⁾. A peer review was conducted with the blinding option activated, to increase the consistency of this stage. Five reviewers (A, B, C, D, and E) examined the publications and discussed the results through the Rayyan software. In this process, two independent reviewers (A and B) evaluated the titles and abstracts of all publications found in sequence, in order to select articles that were compatible with the topic addressed. Disagreements were solved by a third reviewer (C), forming a preliminary sample.

Then, the material included in the preliminary search was sent to, by reviewers D and E, to read the full text, in order to determine whether it answered the research question. Conflicting positions were re-evaluated using the same strategy of the previous stage of selection. Thus, the final sample was formed.

Collection, summarizing, and mapping of data

The PRISMA-ScR was used to document the process of identification, triage, and inclusion of the studies. Thus, the variables were constructed in a single corpus of text⁽¹⁰⁾. It is noteworthy that we utilized the programming language of the software used for analysis, importing the full abstracts of the publications that form the final sample. We used the language Python and the R software, so the data could be later processed using the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ)⁽¹¹⁾.

The text analysis took place in the following stages: full reading and annotation of the articles in the final sample (n=299); textual statistics; and similarity analysis (co-occurrence). To analyze and map behavioral aspects, we annotated the publications and formed a database including their main characteristics and year of publication, considering the possibility that the same article could contribute for the analysis of different aspects.

To determine which words appeared more than 30 times, we inserted the corpus into IRAMUTEQ and created an illustration of this group of words in the form of a word cloud — a tool that groups and organizes words according to their frequency, in a simple lexical analysis. It is worth noting that we considered the standard of 30 occurrences of each word, as it represents approximately 10% of the final sample, increasing the reliability and representativity of the corpus, since the software standard is 10 occurrences⁽¹¹⁾.

In the similarity analysis, we applied the chi-squared test to verify the distribution of the corpus throughout the inferential lexical statistics. This test

evaluated the relationship between the result found and the one expected for the phenomenon, and can point at the works that better guide the central content being studied. Thus, 92 significant words were incorporated. After they were selected, sets of words were formed and illustrated by halos, which was done considering only adverbs and common nouns. Thus, it was possible to infer the structure of the construction of the text and the relatively important topics, considering the co-occurrence of the words. The exclusion

of verbs, even those that were significant for the test, merits emphasizing. It was done because, in most cases, they were actions related not to the phenomenon researched, but to the actions taken by the studies surveyed⁽¹¹⁾.

Results

The findings of this review were extracted from a sample of 299 publications (Figure 1).

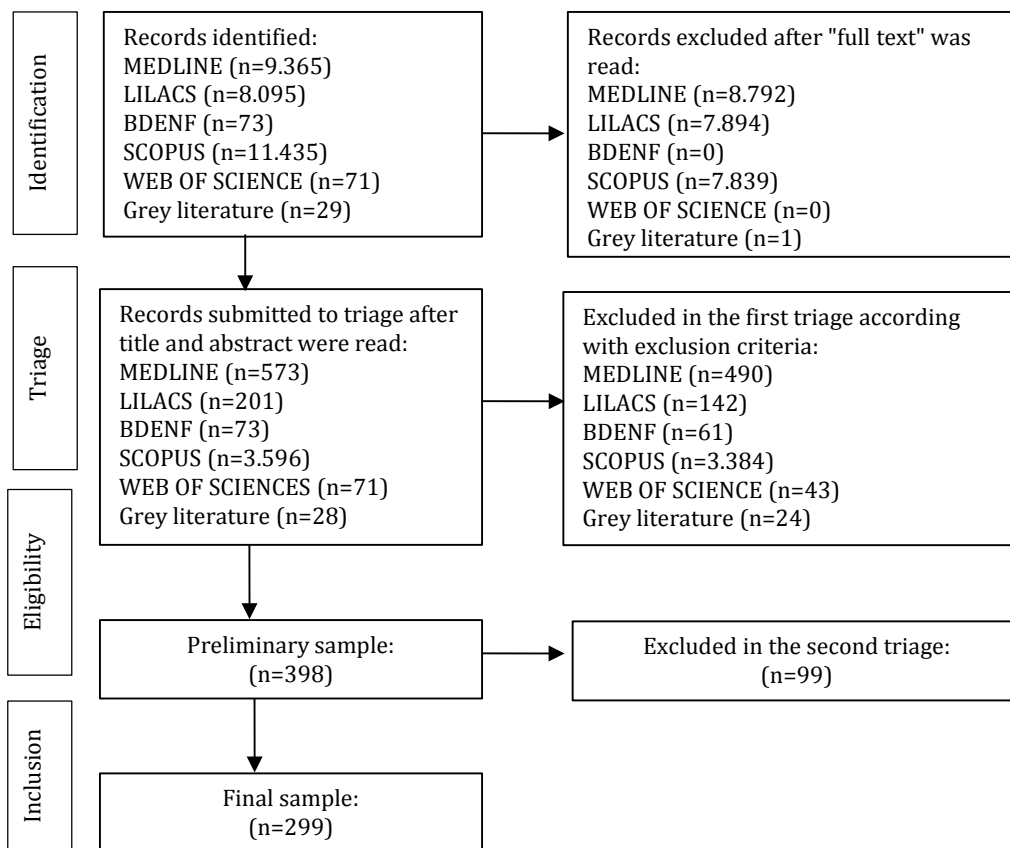


Figure 1 – PRISMA-ScR diagram of search and selection of articles. Fortaleza, CE, Brazil, 2024

In an analysis of the time of publication of the papers that investigated the risky sexual behavior of young people, the earliest publications were from 1995, where two studies were carried out with young university students and detected sexually risky behavior. This type of investigation continued to be carried out in the following years though, from 1996 to 2013, no year presented more than 10. 2014, on the other

hand, was a milestone for investigations on the topic, since it had more than twice the number of studies that took place in previous years. Additionally, the period from 2016 to 2021 presented the highest number of publications (n=186). The year of 2020 stood out, with the highest number of publications in the period (n=42) (Figure 2).

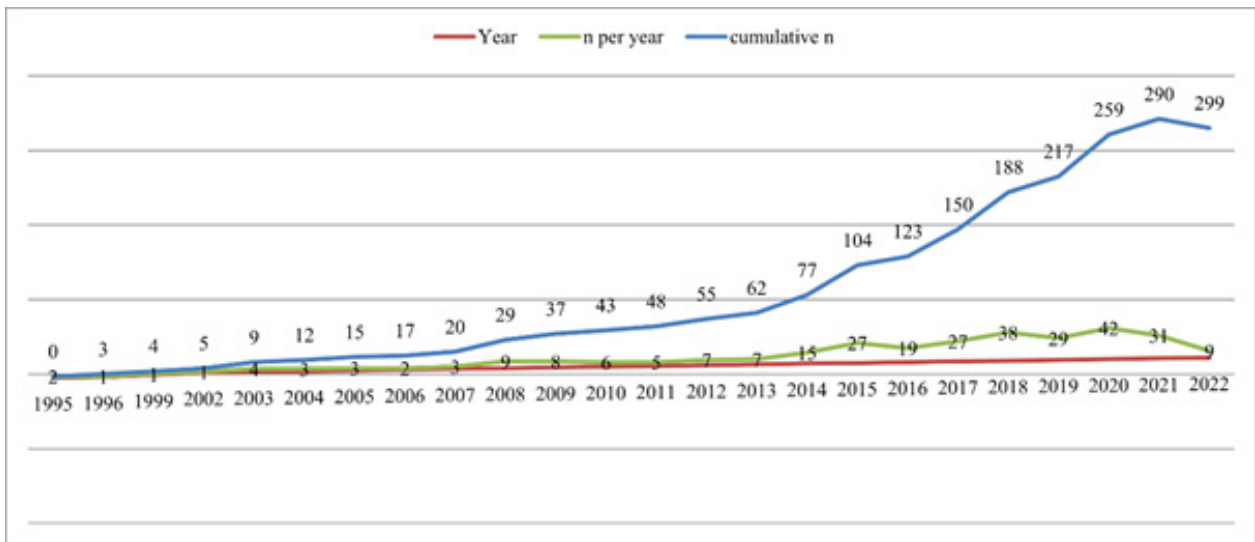


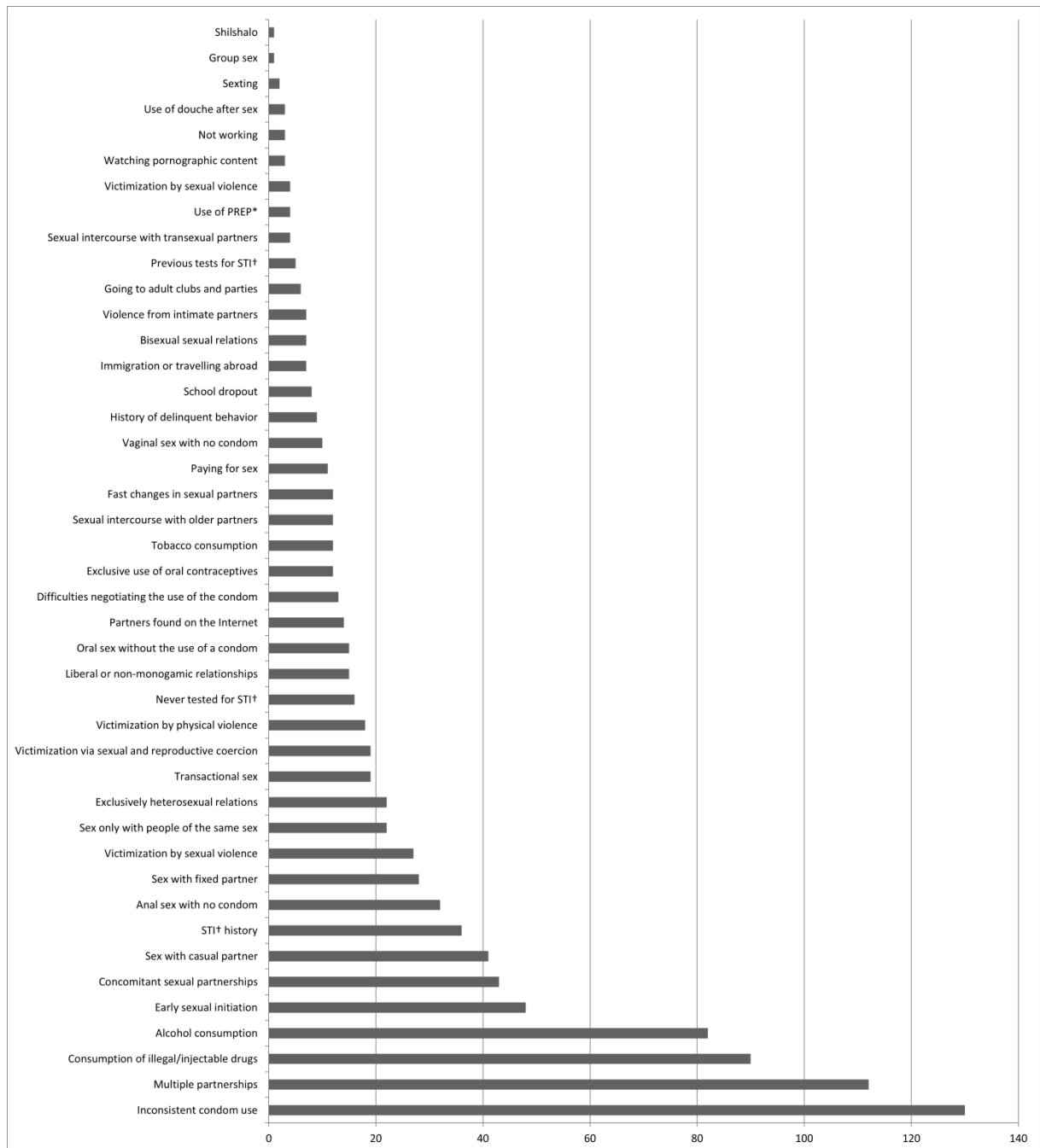
Figure 2 – Distribution of publications that address the study object per frequency: annual and cumulative (n=299). Fortaleza, CE, Brazil, 2024

Since both national and international publications were included, those considered “young” varied from 12 to 29 years old. It was also found that, to recruit this target audience, most studies followed the trend of the studies published in 1995, since they also investigated young students of higher education institutions (n=75), followed by those who belonged to the groups: users of care services focused on sexual health (n=34), high school students (n=22), users of care services that are not specific for sexual health (health centers, Family Health Units, and emergency care services) (n=25), communities or neighborhoods/low-income areas (n=30), and young people linked to community organizations or from specific community settings (n=11).

Regarding the mapping of the behavioral aspects that influence the sexual risk of these youngsters, 43 were found (Figure 3).

Most publications pointed at the “inconsistent use of the condom” as a prevalent behavior in, at least, one third of the young people who integrated their samples (n=130), followed by multiple sexual partnerships (n=112), and the consumption of alcohol (n=82) and other drugs (n=90). There was a strong correlation between having multiple and concomitant partners (n=43).

Early sexual initiation or early coitarche was the fifth behavior most associated with risky sexual behavior among youths (n=48). 35 of these studies pointed at a mean age for early coitarche varying from 11 to 17.6. Thus, using an arithmetic mean model including all means, the mean age for early coitarche was 14.9 (approximately 15 years old). It is worth noting that early sexual initiation took place due to depressive feelings (n=16), sexual desire and impulse (n=9), sexual opportunity (n=3), social pressure (n=5), and passion (n=3).



*PREP: Pre-exposure prophylaxis; †STI: Sexually transmitted infections

Figure 3 – Mapping of behavioral aspects that influence the risk of STI infections in young people according to the documents analyzed (n=299). Fortaleza, CE, Brazil, 2024

Discussion

The phenomenon observed, considering the time of the publications, coincides with the World Health Declaration, which showed interest in studying and expanding the interventions and services to control and minimize the impact of STIs. This became known as the strategy 2016-2021, which was a part of the 90-90-90 compendium. Furthermore, STIs became recognized as a global public health problem, and the year 2030 was declared as the deadline for their control^(4,12). Despite this visibility and the programmatic effort to reduce the global burden from these infections, the incidence of these diseases in young people remains disproportionately high⁽¹³⁾.

In this context, the corpus includes specificities of phenomena that are intrinsic to the population studied, and involved in the conformation of behavioral vulnerabilities.

The co-occurrence tree presents, in its yellow halo (the central one), important connections between the words “sexual” and “behavior”, which reiterates that the main idea of our study object is in the scope of our corpus. By turning to the branch “risk”, a component of the red halo, we see that between the words “behavior”, “sexual”, “risk”, and “behavioral”, we can find the word “knowledge”. This refers to the evaluation of knowledge about STIs, an aspect that some of the studies analyzed. Some of them found that young people have good knowledge on the topic, while others stated that this knowledge is insufficient/deficient. Nonetheless, regardless of their level of knowledge about STI, studies that investigated the knowledge found that young people presented risky sexual behavior, meaning that professional interventions conducive to health education would be appropriate^(5,14-15).

In the yellow halo, we can see the word “age” associated to the word “young”, by going from the center to the branch that forms the green halo. Another element that called our attention was the direct co-occurrence of the words “student” and “partner”, which spread into the words “application”, “university”, and

“trust”. This clarifies one of the mechanisms of sexual risk by highlighting the search for sexual partners through the Internet, via applications, by young students/undergraduates, especially those who are not heterosexual. This calls attention to the fact that this population is unconcerned about having sexual intercourse with unknown persons, or those who they only met through the Internet⁽¹⁶⁻¹⁷⁾. By understanding the relevance of technology in the establishment of relationships in the population studied, the professional care should address multifocal health interventions that not only focus on young people, but also on their family and community, using technology itself as a vehicle for pertinent preventive practices.

Still in this context, the word “casual” was found to be close to the term “vulnerability”, suggesting that casual sexual relationships are more likely to result in the risk of acquiring an STI. This reiterates the notes made during the behavioral mapping^(12,18).

In the central axis, the word “multiple” ramifies into the words “initiation”, “early”, “exposure”, “abuse”, “gender”, “experience”, and “recent”. Therefore, these connections are associated with the explanations given for early sexual initiation — which was directly associated with the propensity for multiple sexual partnerships. exposure to abuse (sexual, physical, and emotional) was found to be one of the main factors that increase this propensity^(14,19-20). This was reiterated by the appearance of the words “beginning”, “relationship”, and “violence”, which branched out from the yellow axis.

Still regarding this analytical context, this study showed that genders presented different behaviors and experiences, since, among young people who started their sex life early, males tend to have more sexual partners than females⁽²¹⁻²²⁾. Another element that stood out is the presence of different lexical ramifications that address the same context. I.e., the appearance of different branches with the words “history” and “records”. Both these ramifications deal with previous STI diagnosis and consider subjective behavioral repetition mechanisms⁽²³⁻²⁴⁾.

It is well known that youths with previous adverse experiences in their childhood, especially those associated with sexual, physical, and/or emotional abuse, tend to present sexual risks when young. It was also observed that risky sexual behavior can be repeated^(19,25-27). Furthermore, parenting and family structure are recognized by scientific evidence as influences over the self-confidence and interrelational skills of young people, with repercussions in the dynamics of their sexual health⁽¹³⁾. Therefore, projects that can promote and protect health since childhood have the potential to minimize the burden of these infections in youth.

Additionally, we suggest that screening youths with previous STI records is useful for the formulation and implementation of individualized interventions in the field of sexual health, including their families, for the goal of creating interventions about the limitations of the support from adults^(13,25-26).

The yellow halo branches out into “alcohol” and “consumption”, that is, drinking is one of the main sexual risk behaviors that youths engage in when it comes to STIs, especially when unprotected sex is carried out while a young individual is under the influence. Additionally, when youths are under the influence of alcohol, they become less demanding when it comes to selecting their sexual partners^(20,22-23). This aspect is addressed further by the dark blue halo.

Starting from the center and moving towards the dark blue halo, the following sequence of words can be observed: “behavior”, “no”, “use”, “condom”, “frequency”, and “inconsistent”. This sequence refers to the main risky behavior for STIs. This suggests that there was an expressive number of youths who answered “sometimes” or “never” regarding condom use, and thus are under sexual risk.

The other words in the axis “use” (“drug” and “substance”) refer to the use of illegal drugs, especially in 16 and 17-year-old youths. These drugs include marijuana, poppers, cocaine, ecstasy, heroin, and methamphetamines. In this regard, the word may also be related to the practice of chemsex, that is, sexual

intercourse while under the influence of psychoactive drugs⁽²⁸⁻²⁹⁾. Thus, intersectorial interventions are necessary that contemplate health, education, and safety, focusing on identifying and conducting and preventive interventions related with dangerous and harmful consumption patterns of alcohol, integrating educational practices about the relationship between alcohol consumption and STIs, in addition to an effective implementation of policies to restrict the ability of young persons to purchase alcohol and the use of instruments to raise awareness, such as warnings in ads and recipients of alcoholic beverages⁽³⁰⁾.

Regarding the co-occurrence of “sexual” in the yellow halo and the pink halo, relevant words include “anal”, “unprotected”, and “vaginal”, which is associated to types of sexual practice that are carried out by youths without protection, especially regarding anal and vaginal sex. This shows there is scarce investigation of unprotected oral sex^(17,31). Therefore, this is an important interventional axis for the promotion of sexual health.

The word “transactional” is also in the pink halo, in connection with the word “sex”. This connection refers to the expression “transactional sex”, which is the practice of sexual relationships in exchange for benefits. It is associated with multiple sexual partners and erratic condom use^(21,31). Literature also calls attention to the term “survival sex”, used in cases where transactional sex is done not as a profession, but to deal with financial or material needs arising from poor socioeconomic situations⁽³²⁾. This aspect must be the focus of intersectoral public policies, with a relevant participation of health.

Observing the red halo, we can see that, regardless of the perception of risk assumed by these youths — i.e., regardless of whether they feel vulnerable to acquiring STIs —, they still perform risky sexual behaviors^(6,15,18). Furthermore, the abbreviation “MSM” — men who have sex with men — was co-occurring with the context interpreted by the red halo^(16-17,24,27,33-34).

Regarding the green halo, the “heterosexual” sexual orientation was found to be more predominant in regard to risky sexual practices in “rural” and

“urban” areas, due to the inconsistencies in the use of condoms and the use of alcohol and illegal drugs, in addition to early sexual activities and multiple partners^(14,21,25,33). Also, attention was paid to the incidence and prevalence of chlamydia and gonorrhea in youths analyzed. Black youths were also represented in the studies, which can be perceived by the words “black” in the green halo and “afro” in the light-blue halo^(25,28,34).

In the light-blue halo, the words “infection”, “diagnosis”, “transmission”, and “prevention” were connected. The visual representation of these interconnected elements may be related to the findings of a research conducted in Asia, about students who had been diagnosed with STIs in the last 12 months, in addition to an inconsistent use of condoms⁽²²⁾. Thus, it is remarkably necessary to incorporate STI health education to improve health results, in addition to intervention strategies to increase the connection between youths and a precise diagnosis⁽³⁵⁻³⁶⁾.

The branch that connects the word “afro” to the word “STI”, despite being indicative of a small connection, is noteworthy. It should be highlighted that self-reported structural determinants of sexual health are associated with myriad risky sexual behaviors. In this regard, the vulnerability of female youths of African descent stands out, as they are disproportionately more affected in their sexual health, a disparity which includes the risk of STIs⁽³⁷⁾.

In short, it was found that sexual behavior does not exclude the context and the experience of youths regarding the risk of STIs. However, this study provided a landscape with the behavioral aspects that involve this vulnerability.

Study limitations

Despite methodological precautions, the limitations of this study included the expressive number of investigations in the topic and the different understandings of which age group the word “young” comprises among the countries which produced these studies.

Contributions to practice

Mapping youth behaviors allowed identifying the axis and the scope of interventions to support and subsidize the formulation of multifocal interventions and effective measures to prevent and promote health in sexually transmissible infections in the population investigated. Furthermore, it contributes for the scientific knowledge, especially concerning the promotion of sexual health and management or the structuring of national and international public policies.

Conclusion

This review mapped 43 behavioral aspects associated to the risk of young people acquiring sexually transmitted infections, among which stood out the inconsistent use of condoms, multiple sexual partners, legal or illegal drug consumption, early sexual initiations, and concomitant sexual partnerships. Furthermore, it was found that the co-occurrence of the elements listed contributes synergistically to the sexual risk of these youths, since it contextualizes a situation of vulnerability to infection. Therefore, the evidence found here provides a broad understanding of the behavioral aspects and the risk of sexually transmitted infections among youths. These include dimensions that can be subject to individualized professional interventions which, as such, would be more effective in dealing with the advance of sexually transmitted infections in the population studied.

Authors' contribution

Concept and design; analysis and interpretation of data; writing of the manuscript; critical revision; final approval of the version to be published; agreement to be responsible for all aspects of the manuscript related to the precision or integrity of any of its parts, so they can be investigated and dealt with adequately: Moreira WC. Analysis and interpretation of data; writing of the manuscript; critical revision; approval of the final version; agreement to be responsible for

all aspects of the manuscript: Nóbrega LMB, Silva JKB, Medeiros LB, Nogueira JA, Oriá MOB, Leadebal ODCP.

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