

# Educational technologies for HIV prevention in black people: scope review

*Tecnologias educativas para prevenção do HIV em negros: revisão de escopo*

*Tecnologías educativas para la prevención del VIH en negros: revisión del alcance*

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## How to cite this article:

Mota NP, Maia JK, Abreu WJCP, Galvão MTG. Educational technologies for HIV prevention in black people: scope review. Rev Gaúcha Enferm. 2023;44:e20220093. doi: <https://doi.org/10.1590/1983-1447.2023.20220093.en>

## ABSTRACT

**Objective:** To map the educational technologies implemented for HIV prevention in black people.

**Method:** Scope review, performed according to the recommendations of The Joanna Briggs Institute, in Medline/PubMed, Embase, LILACS, CINAHL, Scopus, Cochrane and PsycINFO databases, using the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).

**Results:** There were 14 studies published between 1999 and 2020. The main health impacts for black people involved a reduction in rates of unprotected sex, greater use of condoms, a decrease in risky behaviors, a minimization of the number of partners, a greater request for HIV testing and an increase in the use of Pre-exposure prophylaxis (PrEP).

**Conclusion:** The educational technologies mapped were: workshops, courses, messages, dramatization, videos, application, pamphlet, media and radio campaigns, Facebook groups, website, computer programs and multimedia software.

**Keywords:** HIV. Minority health. Blacks. Educational technology. Health education.

## RESUMO

**Objetivo:** Mapear as tecnologias educativas implementadas para prevenção do HIV em negros.

**Método:** Revisão de escopo, realizada conforme as recomendações do *The Joanna Briggs Institute*, nas bases de dados Medline/PubMed, Embase, LILACS, CINAHL, Scopus, Cochrane e PsycINFO, utilizando-se do instrumento *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR).

**Resultados:** Encontraram-se 14 estudos publicados entre 1999 e 2020. Os principais impactos para saúde dos negros envolveram a redução das taxas de relações sexuais desprotegidas, o maior uso de preservativos, a diminuição de comportamentos de risco, a minimização do número de parceiros, a maior solicitação de testagens para HIV e o aumento do uso de Profilaxia Pré-exposição (PrEP).

**Conclusão:** As tecnologias educativas mapeadas foram: workshops, cursos, mensagens, dramatização, vídeos, aplicativo, panfleto, campanhas de mídia e de rádio, grupos de Facebook, site, programas de computadores e softwares multimídia.

**Palavras-chave:** HIV. Saúde das minorias. Negros. Tecnologia educacional. Educação em saúde.

## RESUMEN

**Objetivo:** Mapear las tecnologías educativas implementadas para la prevención del VIH en negros.

**Método:** Revisión de alcance, realizada de acuerdo con las recomendaciones de The Joanna Briggs Institute, en las bases de datos Medline/PubMed, Embase, LILACS, CINAHL, Scopus, Cochrane y PsycINFO, utilizando Preferred Reporting Items for Systematic reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR).

**Resultados:** Se publicaron 14 estudios entre 1999 y 2020. Los principales impactos en la salud de los negros involucraron una reducción en las tasas de sexo sin protección, mayor uso de condones, una disminución en los comportamientos de riesgo, una minimización del número de parejas, una mayor solicitud de pruebas de VIH y un aumento en el uso de Pre-exposición profilaxis (PrEP).

**Conclusión:** Las tecnologías educativas mapeadas fueron: talleres, cursos, mensajes, dramatización, videos, aplicación, folleto, campañas en medios y radio, grupos de Facebook, sitio web, programas informáticos y software multimedia.

**Palabras clave:** VIH. Salud de las minorías. Negros. Tecnología educacional. Educación en salud.

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## ■ INTRODUCTION

The transmissibility of the Human Immunodeficiency Virus (HIV) involves multiple factors and is not limited to sexual behavior. It is related to social, behavioral and structural factors that influence the incidence of cases<sup>(1)</sup>.

According to the literature, the black population is unequally affected by HIV, with higher prevalence and risk behaviors<sup>(2)</sup>.

The evidence of a greater number of black people with HIV can be explained by the diversity of health determinants, which involves inequalities such as socioeconomic level, nutritional status, living and housing conditions and barriers for accessing healthcare services<sup>(3)</sup>.

In the United States, individuals who identify as black or African-American are at increased risk for HIV infection compared to other races and ethnicities<sup>(4)</sup>.

In Brazil, racial and gender inequalities have a direct impact on the discrimination of this population. Black people often adopt defensive behaviors because social insertion is characterized by processes of devaluation, invisibility of their needs in healthcare actions and programs, health promotion and disease prevention<sup>(5)</sup>.

Thus, further studies are needed to describe and evaluate HIV prevention interventions in this population, so that target behaviors or prevalent risk factors can be identified for the adoption of effective interventions<sup>(2)</sup>.

From 2007 to 2021, the HIV infection rate was higher in the black population, corresponding to 39.4% in white individuals and 51.7% in black individuals (black and brown)<sup>(6)</sup>.

Thus, since it is known that this population needs greater assistance, based on records of poor health conditions and limited access to services, care process autonomy must be enhanced and it is essential that health professionals are trained and become familiar with the situation of black individuals, listening to them and allowing them to express their doubts. Therefore, the education process is the best way to meet these needs<sup>(3,7-9)</sup>.

Technologies that facilitate the understanding of the teaching process and favor the improvement of care should be used to ensure a successful health education process<sup>(10)</sup>. The technologies that can be used by health professionals during the teaching-learning process include hard technologies (tools, standards and technological equipment); soft-hard technologies (knowledge structured as theories, care models, Nursing process); and soft technologies (establishment of relationships such as bonding, service management and welcoming)<sup>(11)</sup>.

The educational technology options allow the dissemination of essential information for health promotion, disease

prevention, self-care and treatment modalities. These technologies include printed educational materials (booklets, serial albums, leaflets, pamphlets, folders and similar materials), audiovisual resources (such as videos, use of radio and telephone), or those based on personal relationships, through advice, welcoming and dialogue<sup>(10)</sup>.

Thus, the relevance of the development and applicability of educational technologies for HIV prevention in black individuals is understood, and, therefore, it is necessary to provide more autonomy for them, so that they become health-transforming agents. Therefore, the present study aimed to map the educational technologies implemented for HIV prevention in black people.

## ■ METHOD

### Ethical aspects

Assessment and approval of this study by the local Research Ethics Committee is not required, as it does not involve human beings, pursuant to Brazilian Resolutions 466/12 and 510/16.

### Type of study

This is a scoping review, guided by the recommendations of the Joanna Briggs Institute (JBI), an international evidence-based health research organization aimed to map the main concepts of a given area and identify existing knowledge gaps in the literature (JBI)<sup>(12)</sup>.

### Methodological procedure

For this study, a structured research question was elaborated, based on the acronym PCC, in which P refers to the Problem (HIV prevention), C to the Concept (educational technologies) and C to the Context (black individuals). Thus, through this strategy, the following research question was raised: what are the educational/implemented technologies for HIV prevention in black people?

The inclusion criteria adopted comprised full-text original research articles, without restriction of language or publication date carried out with black individuals and focused on HIV prevention. Review studies, letters, editorials, books, abstracts published in annals, theses and dissertations were excluded.

Registration of the study protocol was performed in the Open Science Framework (OSF), with doi <https://doi.org/10.17605/OSF.IO/YG73F>.

## Data collection and organization

The first stage was carried out between December 2021 and January 2022, with a broad search through the journals portal of CAPES (Coordination for the Improvement of Higher Education Personnel), using the following databases: Medline/PubMed, Embase, LILACS, CINAHL, Scopus, Cochrane and PsycINFO. In each database, the controlled descriptors were delimited by terms such as Medical Subject Headings (MeSH) and keywords were defined. Initially, titles, keywords, descriptors and abstracts of studies and proximity with the object of the review were explored. Subsequently, the selected studies were read in full.

A survey of the literary corpus to be analyzed was carried out by combining the following Mesh descriptors: "Minority Health"; "African Continental Ancestry Group"; "Teaching Materials"; "Technology"; "Educational Technology"; "Information Technology"; "Health Promotion"; "Health education"; "HIV".

In the second stage, several combinations were made based on the descriptors and keywords, in order to expand the searches. It should be noted that in the sensitization search, Boolean operators AND were used for simultaneous occurrence of subjects, and OR, for the occurrence of respective synonyms, as shown in Chart 1.

In the third stage, the references of the studies selected for full reading were explored, for the identification of the documents to be included in this scope review, and only one article was inserted.

To ensure the quality and transparency of the writing of this article, the guidelines contained in the Preferred Reporting Items for Systematic reviews and Meta Analyses extension for Scoping Reviews (PRISMA-ScR)<sup>(13)</sup> checklist were observed, as shown in Figure 1.

## Data analysis

The process for selection of studies and extraction of evidence from retrieved articles was carried out in a dual-independent manner, using the Rayyan selection platform. This selection involved reading titles and abstracts, followed by reading full-text articles and checking the reference list of each of the articles included. In the mapping, information was organized into two synoptic tables with the following variables: author and year, country, database, type of study, level of evidence, objective, type of technology, results/conclusions, target audience, themes, location and theoretical foundation.

The results were analyzed through the synthesis of primary studies and by comparisons regarding the main results that answer the review question, with evidence being classified according to the type of educational technology found in the studies: Soft technologies for HIV prevention in black individuals and Hard technologies for HIV prevention in black individuals.

The levels of evidence were determined as follows: I – evidence from a systematic review or meta-analysis of multiple

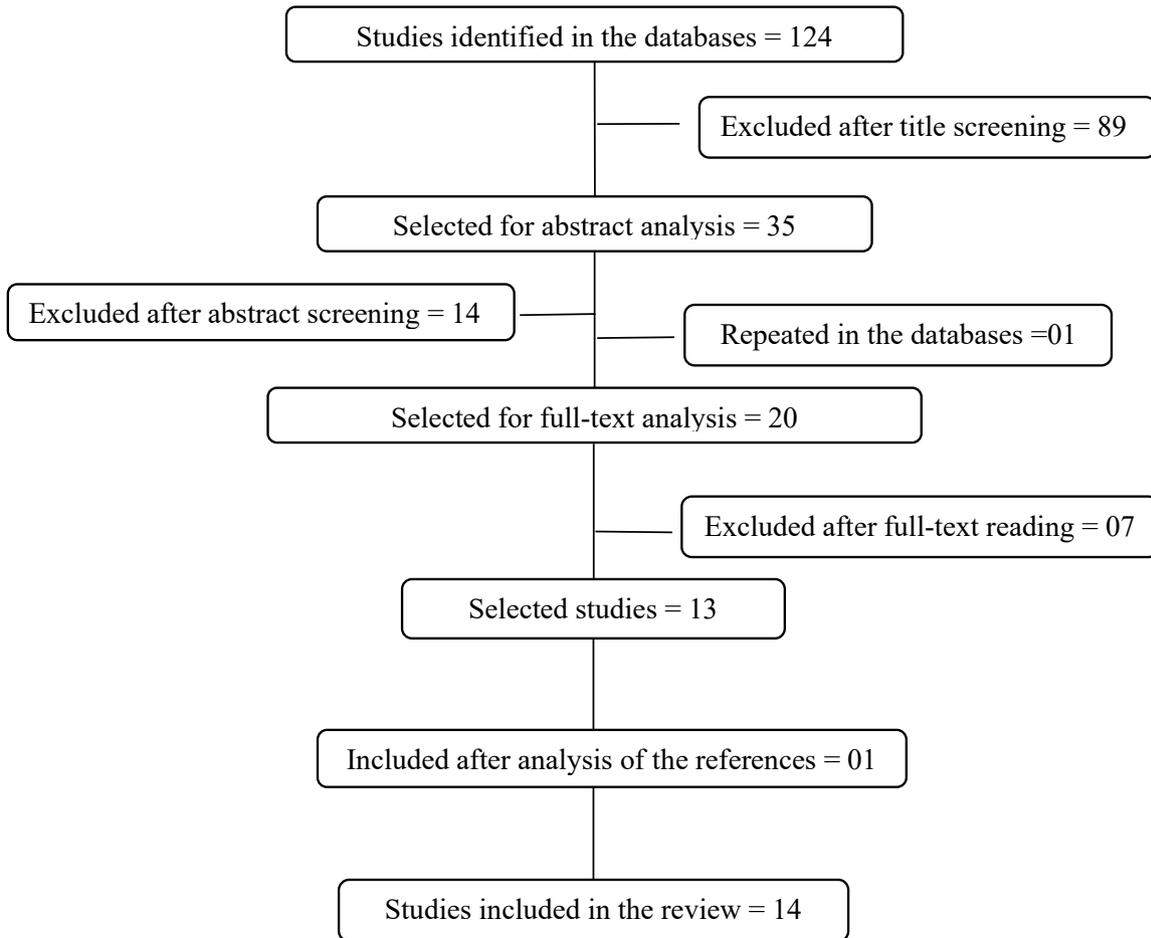
Database	Search strategies
COCHRANE PSYCINFO	("Minority Health" OR "African Continental Ancestry Group" OR "negroid race" OR "black person") AND (HIV OR "Human Immunodeficiency Virus" OR "Acquired immunodeficiency syndrome virus") AND (Technology OR "Educational technology") AND ("Health promotion" OR "health education")
CINAHL MEDLINE/PUNMED® EMBASE	("Minority Health" OR "African Continental Ancestry Group" OR "Negroid Race" OR black person) and ("Teaching Materials" OR Technology OR "Educational Technology" OR "Information Technology") and ("Health Promotion" OR "Health education") and (HIV OR "Human Immunodeficiency Virus" OR "Acquired Immunodeficiency Syndrome Virus")
SCOPUS LILACS	("Minority Health" OR "African Continental Ancestry Group" OR "Negroid Race" OR negro) and ("Teaching Materials" OR Technology OR "Educational Technology" OR "Information Technology") and (HIV OR "Human Immunodeficiency Virus" OR "Acquired Immunodeficiency Syndrome Virus")

**Chart 1** – Database search strategies related to the research. Fortaleza, Ceará, Brazil, 2022

Source: Elaborated by the authors, 2022.

randomized controlled clinical trials or from clinical guidelines, based on systematic reviews of randomized controlled trials; II – evidence from individual controlled and randomized studies; III – evidence from experimental studies without randomization; IV – evidence from cohort or case-control;

V – evidence from a systematic review of descriptive and qualitative studies; VI – evidence from a descriptive or qualitative study; VII – evidence obtained from the opinions of authorities or reports from expert committees<sup>(14)</sup>.



**Figure 1** – Flowchart of the distribution of the number of articles found, excluded and selected by databases, according to PRISMA-ScR<sup>(13)</sup> and JBI recommendations<sup>(12)</sup>. Fortaleza, Ceará, Brazil, 2022  
Source: Adaptation of PRISMA-ScR

■ **RESULTS**

Chart 2 shows the 14 selected studies that made up the final research sample. The articles were published between 1999 and 2020, and most of them (71.4%) were published between 2012 and 2019. Of the studies found, regarding

the type of study, six (42.8%) were qualitative studies, with evidence level 6; six (42.8%) were randomized clinical trials, corresponding to evidence level 2; and two (14.2%), of the quasi-experimental type, classified as evidence level 3. Most studies (13/92.8%) were published in the United States and one (7.1%) in Africa.

Authors and years/ Countries/ Databases	Types of Study/ Levels of evidence	Objectives	Types of technology	Results/Conclusions
<b>Category 1: Soft-hard technologies for HIV prevention in black people</b>				
Marie, S.R., Mildred, K.F., Ronald, C.J., 2008 <sup>(15)</sup> EUA CINAHL	Quasi-experimental III	Describe a HIV prevention and risk reduction program using the online resources of the National Library of Medicine (NLM).	Course	The course promoted self-care; concerns about the health and well-being of others have increased; provided an opportunity to develop leadership and communication skills
Kalichman, S.C.; Weinhardt, L.; Benotsch, E.; Cherry, C., 2002 <sup>(16)</sup> EUA CINAHL	Qualitative VI	To describe the development and pilot test of a workshop intervention designed to eliminate the digital divide in the care of the Human Immunodeficiency Syndrome (AIDS).	Workshops	The test demonstrated feasibility, acceptability to end the digital divide in HIV/AIDS care. All participants had gains in knowledge related to information technology.
Wilson T.E. et al., 2019 <sup>(17)</sup> EUA Medline	Randomized clinical trial II	Test the effectiveness of Barbershop Talk With Brothers (BTWB)	Combination of educational messages, role-play activities and self-assessment activities.	Exposure to the intervention was associated with a higher probability of not having sex without a condom (64.4%) than participation in the control group. Exposure to the program reduced risk sexual behaviors.
<b>Category 2: Hard technologies for HIV prevention in black people</b>				
Chandler, R al., 2020 <sup>(18)</sup> EUA Medline	Qualitative VI	Understand black cisgender women's preferences regarding the functionality, format, and design of an HIV prevention mobile app and examine their willingness to use an HIV prevention app.	Mobile application	The results suggest that black cisgender women preferred an app that integrated HIV prevention and optimal sexual health promotion. Participants provided a variety of preferences, such as gender-centered preferences and cultural congruence of information and content, evidenced by visual resources, language, and other resources.

**Chart 2** – Summarization of articles included in the study. Fortaleza, Ceará, Brazil, 2022

Authors and years/ Countries/ Databases	Types of Study/ Levels of evidence	Objectives	Types of technology	Results/Conclusions
Mansergh, G. et al., 2019 <sup>(19)</sup> EUA Medline	Qualitative VI	Develop and evaluate messages on the effectiveness of Pre-Exposure Prophylaxis (PrEP) for Men who have sex with Black and Hispanic/Latino Men (MSM).	Texting and social media	Overall, 72% of them had similar intentions to use condoms after hearing messages about PrEP. Information about PrEP was new (63%) and reliable (80%), with no racial/ethnic differences ( $p>0.05$ ).
Blessing, M.; Abiodun.; S., 2018 <sup>(20)</sup> África do Sul Embase	Qualitative VI	Investigate and account for the resistance of young black people to HIV, through messages about AIDS in a television series.	Messages about AIDS in the television drama	The messages about HIV and AIDS in the series, based on scientific rationality, were subject to substantial resistance from young people, as they were opposed to the norms and cultures of young viewers.
Cates, J.R et al., 2015 <sup>(21)</sup> EUA Medline	Qualitative VI	Develop and test radio messages designed to raise awareness and concern about the effect of concurrency on HIV transmission in the black community.	Radio campaign	Analysis of the interviews indicated that men ( $n = 17$ ) and women ( $n = 24$ ) found the messages understandable, acceptable and relevant, with more than half indicating that they felt motivated to reduce their own risky behavior and/or discuss the competition with others.
DiClemente R.J., et al., 2013 <sup>(22)</sup> EUA Medline	Randomized clinical trial II	Develop and implement HIV risk reduction intervention for African American adolescent women.	AFIYA Digital Intervention (Computerized Program)	At the end of the three-month implementation period, AFIYA was found to be as or more innovative (72%) and equally or more engaging (54%) than existing HIV risk reduction programs.

**Chart 2** – Cont.

Authors and years/ Countries/ Databases	Types of Study/ Levels of evidence	Objectives	Types of technology	Results/Conclusions
Young, S.D et al., 2013 <sup>(23)</sup> EUA Medline	Randomized clinical trial II	Test the feasibility, acceptability, and effectiveness of using social networking sites (specifically Facebook) to conduct HIV testing among African American and Latino MSM.	Closed Facebook Groups	More intervention participants requested an HIV test kit than control participants.
Andrasik et al., 2012 <sup>(24)</sup> EUA Scopus	Qualitative VI	Design a simultaneous messaging campaign using a participatory, community-based research (CBPR) approach to inform the black community about the increased HIV risk associated with concurrent sexual partnerships.	Pamphlet and Website	Community members welcomed the opportunity to discuss sensitive topics and learn more about concurrency and HIV/AIDS. In some cases, individuals said they felt targeted by the campaign ads, due to the fact that the images in the ads only portrayed African-American and African-born black men and women, rather than individuals of other races and ethnicities.
Jones, R.; Lacroix, L.J., 2012 <sup>(25)</sup> EUA Medline	Randomized clinical trial II	Reducing the sexual risk of HIV in urban, predominantly African-American women through a series of 12 videos.	Video	Almost all 117 participants in the video-intervention group enjoyed watching the video on their cell phone (n = 113, 96.5%), considered it easy to access the video (n = 116, 99.1%), thought that using the cell phone for the project was easy (n = 113, 96.5%), said the video was sharp (n = 106, 90.6%) and the screen big enough to see the actors clearly (n = 114, 97, 4%).

Chart 2 – Cont.

Authors and years/ Countries/ Databases	Types of Study/ Levels of evidence	Objectives	Types of technology	Results/Conclusions
Hightow-Weidman, L.B., 2012 <sup>(26)</sup> EUA Medline	Randomized clinical trial II	Assess the feasibility and acceptability of delivering a new internet intervention designed for young black men who have sex with men	Site	Condom use increased significantly ( $p = 0.05$ ) among participants. There was a decrease in the number of male sexual partners in the last three months, over time, for all participants, with a mean of 3.49 at baseline and 2.23 at the three-month follow-up ( $p = 0.03$ ).
Klein, C.H., Card, J.J., 2011 <sup>(27)</sup> EUA Medline	Randomized clinical trial II	To assess the preliminary effectiveness of Multimedia Sisters Informing Healing Living Empowering (SiHLE) in increasing sexual protection against HIV in African-American women.	SiHLE (Multimedia software program)	Knowledge about HIV/STD among intervention participants increased from $M=5.08$ at baseline to $M=6.81$ at three-month follow-up. Control group participants also demonstrated a significant increase in HIV/STI knowledge from $M=5.29$ at baseline to $M=5.86$ at three-month follow-up.
Kalichman, A.C., Cherry, C.; Browne-Sperling, F., 1999 <sup>(28)</sup> EUA Embase	Quasi-experimental III	Test a cognitive behavioral HIV risk reduction intervention for heterosexually active African American men.	Educational video	Results showed lower rates of unprotected vaginal intercourse and higher rates of condom use at the three-month follow-up.

**Chart 2** – Cont.  
Source: Research data, 2022.

Regarding the educational strategies used in the studies, the following technologies were developed: workshops, courses, messages, dramatization, videos, application, pamphlet, media campaigns, radio campaign, Facebook groups, website, computers and multimedia software. The

final sample of the studies addressed audiences in different contexts, covering mostly adults as well as young people. The main themes involved were about condom use and risky sexual behavior. It is also worth mentioning the foundation of the studies through the use of theories, as shown in Chart 3.

Variables	Characterization of educational technologies
<b>Target audience</b>	Adults <sup>(16,17,18,19,21,23,24,28)</sup> , Youngsters <sup>(15,20,22,23,24,25,26,27)</sup>
<b>Themes</b>	Basic computer instructions and access to internet for HIV searches <sup>(15,16)</sup> ; to prevention <sup>(20,22,23,26,28)</sup> ; to multiple sexual partners <sup>(20,21)</sup> ; to support, treatment and rights <sup>(20)</sup> ; condom use <sup>(17,19,21,26,27,28)</sup> ; illness process <sup>(28)</sup> ; risky sexual behavior <sup>(17,18,22,23,26,27)</sup> ; PrEP <sup>(19)</sup> ; safe sex <sup>(22)</sup> ; mental health <sup>(26)</sup> ; to simultaneous partnerships <sup>(21,24)</sup> ; to HIV prevention; and optimal sexual health promotion <sup>(25)</sup> .
<b>Venues</b>	HIV treatment resource center <sup>(16)</sup> ; University <sup>(15)</sup> ; Television, penitentiaries and schools <sup>(20)</sup> ; health clinics <sup>(18,22,28)</sup> ; community service <sup>(18,25,26,28)</sup> ; barbershop <sup>(17)</sup> ; online advertisements/ social networks <sup>(19,23,26)</sup> ; HIV clinics <sup>(26)</sup> ; radio stations <sup>(21)</sup> ; interventions provided by computer <sup>(27)</sup> ; store <sup>(18)</sup> ; local community <sup>(24)</sup> .
<b>Theoretical foundation</b>	Information-motivation-behavioral skills (IMB) model of health behavior change <sup>(16,28)</sup> ; Social Cognitive Theory <sup>(17,25,27)</sup> ; Community and individual empowerment Theory and Health Promotion Theory <sup>(17)</sup> ; Theory of gender and power <sup>(27)</sup> ; Integrated Model of Theory of Behavior <sup>(26)</sup> ; Theory of rational action <sup>(21)</sup> ; Theory of power <sup>(18)</sup> .

**Chart 3** – Distribution of variables and the respective characteristics of educational technologies. Fortaleza, Ceará, Brazil, 2022  
Source: Research data, 2022.

## DISCUSSION

The available evidence mapped in this scope review was analyzed through reiterative readings for the elaboration of the categories, and regularity of the relevant information and complementarity were observed. This process determined the synthesis of knowledge in two categories: Soft technologies and Hard technologies for HIV prevention in black people.

### Soft-hard technologies for HIV prevention in black people

Analysis of the types of technologies used for HIV prevention in black people showed a lower contribution of soft-hard technologies, totaling three articles<sup>(15–17)</sup>, with little dissemination among the studies. Of these, two<sup>(16–17)</sup> were aimed at adults and one<sup>(15)</sup> at young individuals.

In the analyzed publications, it was found that the soft-hard technologies related to HIV prevention among black

individuals were aimed at the following themes: teaching process about information technology and internet access to carry out searches on HIV<sup>(15–16)</sup> and condom use and risky sexual behavior<sup>(17)</sup>.

The use of soft-hard educational technologies favors the health promotion process, because they are accessible for informing and raising the awareness of this population. In addition, it promotes the questioning, reflection and decision-making of the participants<sup>(29)</sup>.

Among the technologies analyzed, the following types were identified: courses, workshop and combination of educational messages, role-play activities and self-assessment activities. Such methods make it possible for the presentation of pre-acquired concepts and learning to facilitate the participation and involvement of the public, which facilitates the process of health promotion, as they become accessible for information and awareness regarding HIV prevention<sup>(30)</sup>.

The use of educational technologies in the context of nursing care is essential, since the foundation of nurses'

education is the health education process. Thus, through the use of technological strategies, information significantly impacts and improves the quality of life of the people assisted<sup>(10)</sup>.

### **Hard Technologies for HIV prevention in black people**

In this category, eleven studies used hard technologies for the purpose of HIV prevention in black people, including video<sup>(25,28)</sup>, messages/media campaigns on television and text<sup>(19-20)</sup>, radio campaigns<sup>(21)</sup>, digital interventions<sup>(22)</sup>, the closed Facebook group<sup>(23)</sup>, the website<sup>(24,26)</sup>, the multimedia software<sup>(27)</sup>, the application<sup>(18)</sup> and the pamphlet<sup>(24)</sup>.

Thus, an effort to develop and disseminate electronic educational technologies aimed at HIV prevention in black people is perceived. Such awakening to the use of information and communication technologies is essential, as it favors accessibility, dissemination of knowledge, attractiveness and quick access to information<sup>(31)</sup>.

The development of some educational technologies that use a methodological design such as randomized trials was identified in the analysis of the studies, demonstrating the high methodological rigor used in the development of educational technologies for black individuals. Such studies are essential for health systems and nursing practice, due to their ability to reveal the cause and effect of different interventions<sup>(32)</sup>.

Moreover, the technologies were guided by theoretical references, which facilitates the use of ideas that provide the achievement of the expected educational objective<sup>(33)</sup>. Theoretical foundation varied depending on the area of knowledge. This is probably due to the issue of interdisciplinarity in health care, which expands the fields of foundation. Therefore, the participation and appreciation of nursing science is necessary, through the recognition and application of theories, in the development of educational technologies for black individuals.

Regarding the use of technologies, two studies<sup>(25,28)</sup> used video as a health education tool for the population studied, presenting the following themes: HIV prevention, the illness process and the ideal promotion of sexual health.

This type of hard technology can be used in different contexts of care, such as primary, secondary and tertiary. It is also a sophisticated and playful teaching-learning method, whose dissemination of information occurs by capturing the public's attention, as well as by arousing curiosity<sup>(34)</sup>.

Although the video is a viable technology for the health education process, few studies developed this type

of technology for black individuals. Therefore, it is urgent that researchers develop this technology and invest in the construction and evaluation of the effects of educational videos for HIV prevention in black people.

Analysis of the studies also revealed that the development of technologies, such as applications, videos, websites and Facebook, whose access would be possible through the use of mobile devices, making dissemination, reading and portability possible. This aspect makes viable and maximizes opportunities for interaction and access to information, both for the target audience (black people) and for health professionals<sup>(31)</sup>.

The other technologies found in primary studies concerned messages disseminated through campaigns on television, radio and computer/multimedia programs. These types of technologies are relevant in the context of health education, since the interaction between health professionals and the target audience and other parties involved can consolidate the teaching-learning process, as well as the power to choose the technology most suitable to the social reality of black people<sup>(32)</sup>.

Another educational technology for HIV prevention in black individuals mapped was printed material (pamphlet). This type of technology is easily accessible and also allows individuals to have co-responsibility and autonomy for their own health<sup>(32)</sup>.

The use of the various hard technologies for HIV prevention in black individuals that were mapped should not be limited only to care procedures. They should rather allow for closer relationships and humanized and effective care in health education.

Despite the aforementioned, a limitation of this study is the fact that most studies describe the reality of the United States, which has particularities regarding Health Care for the black population that are different from the Brazilian reality.

### **CONCLUSION**

Scientific evidence has demonstrated that the educational technologies built and used (workshops, courses, messages, dramatization, videos, application, pamphlet, media campaigns, radio campaign, Facebook groups, website, computer programs and multimedia software) in interventions with the black population had positive impacts for black individuals, and the consolidation of their autonomy was shown in most studies.

Moreover, the use of educational technologies was essential for reducing the rates of unprotected sex, increasing

the use of condoms, minimizing risk behaviors, reducing the number of partners and increasing the request for testing for HIV and increasing the use of PrEP.

The contribution of the study is the mapping of information about educational technologies implemented to prevent HIV in black people, given the higher prevalence and risk behavior for HIV in this population. Therefore, the present study allows the synthesis of the relevant literature, as well as the identification of unmet needs.

Contributions can be made at the national level for different professionals in the field of knowledge, particularly collaborations and innovations for nursing care. But, equally important, additional research is needed to expand knowledge of this broad area of interest.

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■ **Acknowledgments:**

This study was funded by the following funding bodies: National Council for Scientific and Technological Development (CNPq) and Coordination for the Improvement of Higher Education Personnel (CAPES).

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Received: 05.18.2022

Approved: 08.24.2022

**Associate editor:**

Cíntia Nasi

**Editor-in-chief:**

Maria da Graça Oliveira Crossetti