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Systematic Review of Video Education in Underrepresented Minority Cancer Survivors

KEY WORDS

Cancer disparities
Cancer survivors
Health communication
Health education
Minorities
Multimedia
Underrepresented populations
Video recordings

Background: Underrepresented minority (URM) cancer survivors experience disparities in mortality and quality of life, compared with non-Hispanic whites. Disparities are associated with poor social determinants of health, enhanced by mistrust of the healthcare system. Trust can be facilitated by provider-patient racial/ethnic concordance, yet URM survivors rarely experience concordance. Effective health communication is needed for this vulnerable population. **Objective:** The aim of this study was to systematically review evidence on the composition and utility of health education videos among adult URM survivors. **Methods:** Literature searches were conducted in Web of Science, Embase, PubMed, Cochrane, PsycInfo, and CINAHL databases. Articles that included adult URM cancer survivor samples and either described or tested a video intervention aimed to improve health outcomes were included. Two researchers independently screened articles for inclusion and quality appraisal and abstracted and synthesized relevant data to identify themes. **Results:** Eight articles, detailing 7 independent studies, met inclusion criteria. Quality appraisal of the included studies was fair to good. Six themes were identified: (1) video development with stakeholders, (2) focus on designing culturally appropriate videos, (3) in-clinic video delivery, (4) video intervention effects, (5) provider and URM survivors support video interventions, and (6) building trust through personal stories. **Conclusions:** Video interventions are well received by URM and improve outcomes yet are underutilized. More rigorous studies are warranted to develop best practices for video development and application. **Implications for Practice:** Videos serve as an easy, effective tool to achieve favorable outcomes in the care of URM survivors.

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The authors have no conflicts of interest to disclose.

This research was funded by the National Institute of Nursing Research (2T32NR007091 to Dr Hirschev) and a Coca Cola Critical Difference for Women Grant (Dr Nolan).

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.cancernursingonline.com).

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Accepted for publication February 24, 2020.

DOI: 10.1097/NCC.0000000000000829

There are approximately 15.5 million cancer survivors in the United States.¹ Among these survivors, underrepresented minority (URM) populations experience cancer disparities in mortality, quality of life, and cancer-related comorbidities. For example, African Americans and American Indian/Alaska-Natives have the highest rates of cancer related mortality, as compared with other racial/ethnic groups.² Cancer disparities are associated with social determinants of health, including low socioeconomic status and access to care,^{1,3} along with mistrust of the healthcare system.⁴ A critical step that nurses can take to address cancer disparities is to provide comprehensive, culturally appropriate, targeted healthcare to URM cancer survivors.

After a cancer diagnosis, many survivors are left reeling with challenges of life after cancer. Commonly referred to as health-related quality of life concerns, survivors navigate physical, psychological, social, and spiritual concerns.^{5,6} Cancer survivors have frequently reported unmet supportive care needs.⁷⁻¹¹ For example, McRoy et al⁸ found that written documents distributed to breast cancer survivors addressed only about one-third of their questions. A particular deficit in knowledge and increased need for information have been identified for posttreatment survivors, as compared with those undergoing active treatment.¹² Many survivors have found it valuable to apply pearls of wisdom gained from lived experiences of others and quality communication with healthcare team members.^{13,14} Without high-quality communication with providers, survivors may find themselves with unmet needs, which in turn can lead to declines in satisfaction with care, health, and health-related quality of life.^{15,16}

Health communication research is focused on identifying strategies to impact peoples' decisions and actions, to ultimately improve health. A branch of health communication centers on health education. The World Health Organization defines *health education* as "any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes."¹⁷ Health communication may be delivered through many mediums, including verbal, written, and technology-based strategies.

Among URM cancer survivors, health communication is especially important. As mentioned, these URM groups often face additional struggles compared with their non-Hispanic white counterparts. Traditionally, URM groups report less access to and knowledge of available survivorship resources, poorer health literacy, and general mistrust of the healthcare system. Trust is established through effective communication, which can be facilitated by provider-patient racial/ethnic concordance.^{4,18} Underrepresented minority survivors rarely experience provider-patient racial/ethnic concordance due to the shortage of URM providers.¹⁹ Thus, an additional barrier to effective communication exists among URM survivors. For immigrant URM groups, the barriers of learning a new healthcare system while potentially speaking English as a nonprimary language can be distressing. Unfortunately, healthcare providers sometimes feel ill-equipped and lack communicative expertise to address potentially sensitive concerns.²⁰ One strategy to optimize patient-provider communication with URM survivors has been the use of videos. By leveraging videos, nurses can share messages from individuals of various URM communities, such as those who speak the same language or those who are racially/ethnically concordant.

Underrepresented minority cancer survivors have been engaged to create video interventions, and video interventions have been used to provide health communication and improve health knowledge and outcomes among this population. However, a synthesis of this research is needed to identify how to best create and use video interventions among URM cancer survivors. Thus, the purpose of this review is to systematically identify and synthesize the evidence on the composition and utility of health education videos among adult URM cancer survivors. Specifically, this review was guided by 2 participant-intervention-comparison-outcome questions: (1) Among URM cancer survivors, what are the characteristics of video interventions created to improve health knowledge or outcomes? And (2) among URM cancer survivors, what health and knowledge related outcomes of video interventions have been tested?

■ Methods

This research was conducted according to PRISMA guidelines.²¹ See the Appendix for the PRISMA checklist. The study protocol is detailed below and is not published or registered elsewhere.

Search Strategy

Computerized searches were conducted by a medical librarian on October 4, 2018. Web of Science, Embase, PubMed, Cochrane, PsycInfo, and CINAHL databases were searched to capture relevant literature from a variety of disciplines. The literature search included Medical Subject Headings (MeSH), Emtree headings, and related text and keyword searches when appropriate, focusing on terms used to describe (a) racial/ethnic minority groups, (b) cancer survivors, and (c) video recordings. The exact search strategy for PubMed is detailed in Table 1. To capture all relevant research, no date restrictions were set. There were 3 criteria for inclusion. First, study participants had to be cancer survivors as defined by someone living with a cancer diagnosis, regardless of treatment status.²² Thus, studies that included survivors who had completed, who were currently undergoing, and who were awaiting treatment were included. Second, studies had to include a URM sample. In cases where the entire sample was not URM, and results were presented separately for URM participants, studies were included; if results were only aggregate, the study was excluded. Third, studies that described the development or testing of a video intervention that aimed to improve health knowledge or health outcomes were included. All study designs (ie, randomized trials, quasi-experimental, and descriptive) were included. When the video was a portion of a multicomponent intervention and the study included findings about the video alone, they were included. Excluded studies were those that (1) were not published in English, (2) used videos in mass media campaigns or telemedicine interventions, (3) were conducted outside of the United States, or (4) had a study sample of caregivers.

Article Selection

Search results were downloaded into Covidence, an online systematic review screening platform,²³ for independent review by 2 researchers

**Table 1 • Search Strategy**

PubMed: October 4, 2018

Search	Query	Results
No. 1—minority group	("healthcare disparities"[mesh] OR "health status disparities"[mesh] OR "population groups"[mesh] OR "ethnic groups"[mesh] OR "ethnic groups"[tiab] OR "minority groups"[mesh] OR minority[tiab] OR minorities[tiab] OR "minority health"[mesh] OR "racial/ethnic minority"[tiab] OR "racial/ethnic minorities"[tiab] OR "racial/ethnic disparities"[tiab] OR "racial/ethnic disparity"[tiab] OR "vulnerable populations"[mesh] OR "vulnerable populations"[tiab] OR "vulnerable population"[tiab] OR "cultural characteristics"[mesh] OR "cross-cultural comparison"[mesh] OR ethnology[mesh] OR "Hispanic Americans"[mesh] OR hispanic[tiab] OR hispanics[tiab] OR Latino[tiab] OR Latinos[tiab] OR Latina [tiab] OR Latinas[tiab] OR Latinx[tiab] OR "African Americans"[mesh] OR "African Americans"[tiab] OR "African American"[tiab] OR black[tiab] OR blacks[tiab])	499 274
No. 2—cancer	(adenocarcinoma*[tiab] OR cancer*[tiab] OR carcinoma*[tiab] OR leukemia*[tiab] OR malignan*[tiab] OR metast*[tiab] OR melanoma*[tiab] OR neoplas*[tiab] OR neoplasms[mesh] OR sarcoma*[tiab] OR tumor[tiab] OR tumors[tiab] OR tumor[tiab] OR tumors[tiab])	3 958 465
No. 3—video/multimedia	("video recording"[mesh] OR videorecording[tiab] OR video[tiab] OR videos[tiab] OR videotape[tiab] OR videotapes[tiab] OR audiovisual[tiab] OR audiovisuals[tiab] OR media[tiab] OR multimedia[tiab] OR multimedia[mesh]) #1 AND #2 AND #3	352 428 708

(TSN and RH). Articles that did not meet exclusion criteria were excluded. Articles that met inclusion criteria moved on for full-text review, which was again conducted independently by 2 researchers (TSN and RH). During the full review, reference lists were screened to identify relevant articles for inclusion. At each stage, discrepancies between reviewers were resolved through discussion.

Data Analyses

Following the Matrix method,²⁴ data were abstracted from included articles and placed into matrices for evaluation, independently by 2 researchers (TSN and RH). Again, discrepancies were resolved through discussion. Data were extracted and placed into matrices with category headings that consisted of study characteristics, sample characteristics, intervention development process, video characteristics, outcomes reported, and results. Next, meaning units were identified across categories to generate themes that recurred with regularity.²⁵ Themes were discussed and generated through the lens of this research team, which includes a health sciences librarian who specializes in cancer information and systematic searching and 3 nurse scientists who collectively have nearly 30 years of oncology nursing experience. One is a nurse practitioner, 1 is an oncology certified nurse, and 1 is a behavioral nurse scientist focused on designing and testing culturally targeted interventions.

Bias Assessment

Articles selected for inclusion were then critically appraised for strength of evidence using the Joanna Briggs Institute criteria for qualitative research²⁶ and the National Heart, Lung, and Blood Institute Study Quality Assessment Tools criteria for quantitative research.²⁷ The Joanna Briggs criteria consists of 10 questions that guide a researcher to determine if further information is needed or if a qualitative study should be included or excluded in a review. The National Heart, Lung, and Blood Institute tools consist of

a series of 8 to 10 questions that guide a researcher to score the quality rating of a quantitative study as good, fair, or poor. The appropriate respective tool was used to assess bias of each study included in this review. This process was done independently by 2 researchers (TSN and RH), who resolved discrepancies through discussion.

Results

Search Results

The initial search resulted in 3553 articles. Deduplication removed 1040 articles, leaving 2513 articles for titles and abstracts for screening. Ninety-seven articles met criteria for full-text review. Reasons for exclusion at this stage included (a) was a conference abstract (n = 35); (b) video outcome was clinical trial enrollment, not health knowledge or outcomes (n = 17); (c) no video intervention (n = 16); (d) wrong study sample (n = 10); (e) wrong study outcomes (n = 4); (f) duplicate (n = 2); and (g) not in English (n = 1). Ultimately, 8 manuscripts, including 7 independent studies, met the criteria for inclusion in this review, as detailed in the Figure. Publication dates of the included studies ranged from 1982 to 2017.

Study Sample Characteristics

Across all studies, the total samples size of this synthesis included 352 cancer survivors. The mean (SD) age of participants across the 7 studies was 54 (2) years (range, 50–57 years). Studies identified participants as African American or black, Hispanic, and American Indian or Navajo. Four studies included both men and women and 3 included only women. Most (n = 5) included a sample with a variety of cancer diagnoses and 2 included only breast cancer survivors. The locations of these studies were geographically dispersed, including Texas, Arizona, Illinois, Pennsylvania,

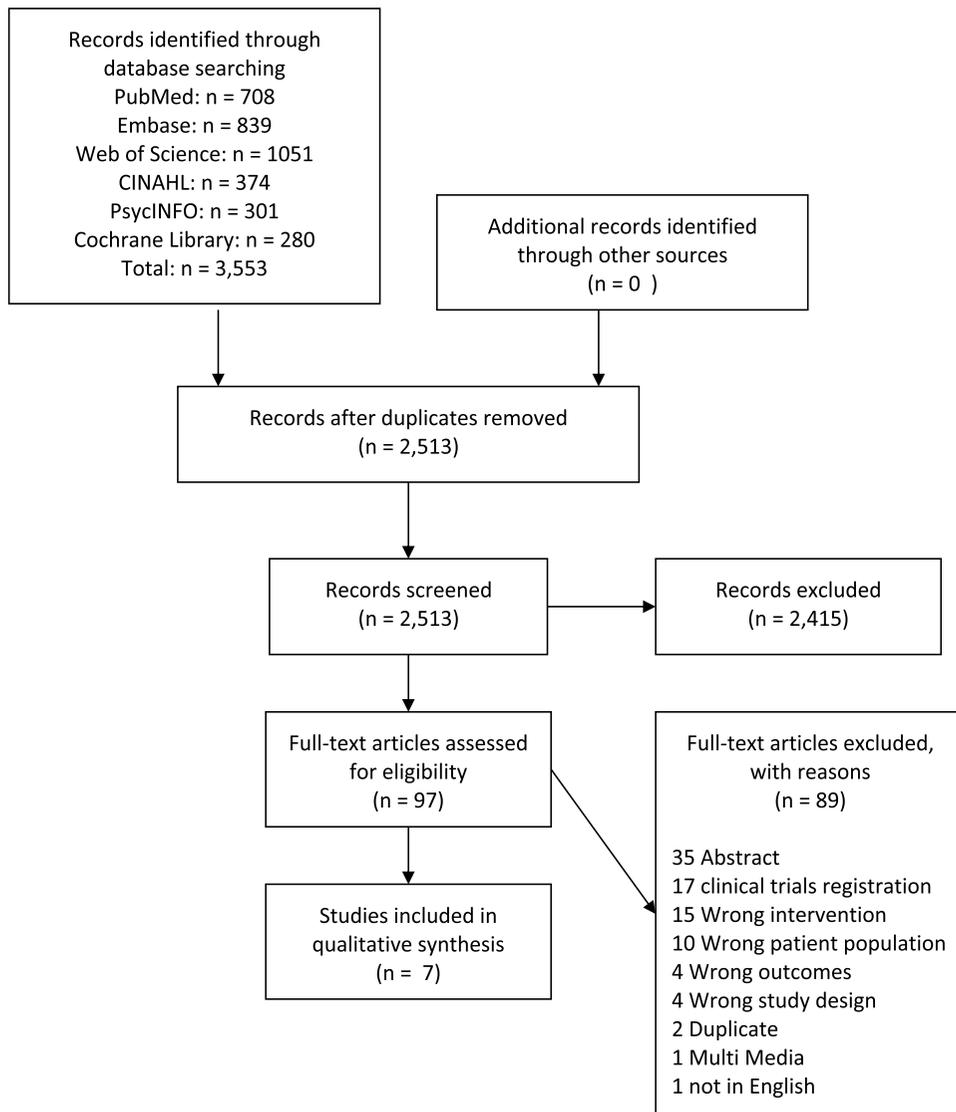


Figure ■ Prisma flow diagram.

and Montana. The quality of all qualitative studies was adequate for inclusion in this review. Item-level risk of bias assessments for qualitative studies are in Supplemental Table 1, <http://links.lww.com/CN/A32>. The quality of all quantitative studies was rated as either fair or good. Item-level risk of bias assessments for quantitative studies are in Supplemental Table 2, <http://links.lww.com/CN/A33>. See Table 2 for a summary and bias score of included studies.

Themes

Six main themes emerged: video development with stakeholders, focus on designing culturally appropriate videos, in-clinic video delivery, video intervention effects, URM survivors and providers in favor of video interventions, and building trust through personal stories.

THEME 1. VIDEO DEVELOPMENT WITH STAKEHOLDERS

The first major finding that emerged was the role of the stakeholder in developing videos. The various stakeholders included cancer

survivors, caregivers, health educators, and providers. Their input was elicited through focus groups and interviews, which were facilitated with scripted questions. In some instances, input was gathered with cognitive interviews as participants read scripts written by providers and reviewed video libraries of cancer stories. Feedback from stakeholders often determined the topics to be included in the video intervention. The selected topics included information about treatment, side effects, pain, communication with providers, coping, support, and dispelling myths. For example, in many American Indian languages, *cancer* translates into “a sore that does not heal.” Thus, efforts were made to dispel myths by hosting focus groups to understand beliefs and then developing videos of survivor stories to be used as part of a toolkit to educate American Indians about cancer.²⁸ Another intervention contained several short videos of narrative messages (ie, personal stories) from American breast cancer survivors.³⁰ By working with URMs, to develop educational videos, nurses can increase the likelihood that the needs of URMs will be appropriately represented and addressed in the videos.

Table 2 • Summary of Studies

Authors (Year)	Design	Purpose	n	Race/Ethnicity	Cancer Diagnosis	Intervention Description	Outcomes/Conclusions	Bias Score
Anderson et al (2004) ²⁹	RCT	Evaluate the efficacy of a pain education intervention	97	AA (n = 42) Hispanic (n = 55)	Breast (n = 36); GI (n = 21); lung (n = 17); gynecologic/genitourinary (n = 16); other (n = 7)	~20-min videos about pain that were developed through previous participatory, exploratory work with underserved AAs and Hispanics with CRP.	Pain (primary) Pain control, QOL, functional status, discrepancy between physician's estimation of patient's pain and patient's reported pain (secondary) Positive support for interventions culturally targeted to Spanish speakers, available in Spanish, that connects patients with survivors.	Good ^a
Banas et al (2017) ³⁵	Qualitative	Identify Spanish-speaking, Hispanic breast cancer survivor support needs and preferences for a mHealth intervention	31	Spanish speaking, Hispanics	Breast (86.7%), cervical (3.3%), Hodgkin lymphoma (3.3%), leukemia (3.3%), multiple myeloma (3.3%)	N/A	Knowledge about basic breast cancer and treatment options	Fair ^a
Bouton et al (2012) ³¹	Quasi experimental (case control)	Evaluate effect of a video on patient understand of basic cancer concepts	81	Hispanic (68%), Caucasian (22%), AA (6%), other (4%)	Breast (11%), breast (27%), gynecologic (4%), head/neck (7%), hematologic (25%), GI (12%), other (13%)	~8-min video addressing basic concepts about breast cancer and management. Available in English and Spanish.	Knowledge	Fair ^a
Cassileth et al (1982) ³⁶	Descriptive Quantitative	Evaluate effect of audiovisual programs	60	Black (27%)	Not indicated	~14 min including real patients staff and treatment equipment video about either chemotherapy, radiation, common questions about cancer, or pain and sleep	Knowledge	Fair ^a
Hodge et al (2012) ²⁸	Multiphase—Grounded Theory and Descriptive	Identify cultural concepts of cancer and illness beliefs, communication styles, barriers, and self-management strategies	59	American Indians	Not indicated	Video developed from focus groups of 132 survivors, caregivers, and community leaders, used in a symptom management toolkit.	The video was an important part of the toolkit because it was an easy format to share and provided role models that reflected the cultural background of participants	Include ^b
Perez et al (2014) ³⁰	Descriptive	Develop and pilot a culturally targeted, cancer-communication intervention	10	African American	Breast	Tablet with 207 video clips organized by topic and selected from the Living Proof Library of cancer stories. ^{3,2}	Usability, follow-up treatment adherence, QOL.	Fair ^a
Sanderson et al (2010) ³³	Qualitative descriptive	Evaluate video effects on treatment-related knowledge, attitudes, and beliefs and assess healthcare providers' perceived value of the video information	14	Navajo	Breast	12-min video about cancer created by health promotion specialists and educators who traveled through Navajo Nation for 6 mo getting input from the community. ^{3,4}	Majority of survivors believed the video would help them communicate with their provider and at 6-month follow-up credited the video with helping them with treatment decisions.	Include ^b

Abbreviations: AA: African American; CRP: cancer-related pain; GI: gastrointestinal; N/A, not applicable; RCT: randomized control trial; QOL, quality of life.
^aNational Heart, Lung, and Blood Institute Study Quality Assessment tools were used to score bias. Possible ratings are good, fair, and poor.
^bThe Joanna Briggs Institute criteria for qualitative research tool was used to score bias. Possible ratings are Include, Exclude, and Seek further information.

THEME 2. FOCUS ON DESIGNING CULTURALLY APPROPRIATE VIDEOS

Researchers thoughtfully included or intended to include components to make the videos culturally appropriate. Barring feedback from stakeholders, strategies included developing video content and images that could be easily understood by their target audiences. Essential culturally appropriate components included appropriate use of language and relatable stories from target URM survivors. Videos developed featured narrators speaking the language and dialect of the intended audience, crafted stories that gave instructional detail, and targeted images of individuals who were members of the intended audience offering racial/ethnic concordance along with age and gender concordance. For example, in 1 study, Hispanic cancer survivors modeled how to discuss pain with a provider.²⁹ Two studies included videos that were created in Spanish.^{29,31} Another study noted that there are more than 500 different American Indian tribes, many of which have different languages, in which cancer translates to “a sore that does not heal.”²⁸ Although this study created materials in English, there was great attention placed on the use of English language and how it may translate to American Indian languages. Finally, 1 study created a video in Navajo language.³³

THEME 3. IN-CLINIC VIDEO DELIVERY

The videos were all delivered in clinic settings, either on a TV screen or tablet. Completed videos varied from 8 to 20 minutes. Videos were sometimes viewed with a family member, friend, or a roommate. Two of the studies included a complimentary conversation with a provider. In one, a nurse met with the survivor after video to review the content.²⁹ In the other, the video was a reinforcement of basic information after a surgical oncologist visit.³¹ Delivery of content via video is another opportunity to provide education and reinforce cancer information for URM survivors.

THEME 4. VIDEO INTERVENTION EFFECTS

Stakeholder evaluation of such videos identified favorable acceptability and improved knowledge, influenced behavior, and reduced cancer-related morbidity. The videos had positive effects on outcomes of pain, knowledge, treatment adherence, communication, and the correlation between patient-reported pain and physician-estimated pain. Armed with knowledge, survivors reported being more likely to engage in the decision-making process, being more likely to communicate with healthcare providers about their health given their feelings of comprehension.^{33,35,36} Patients who watched videos about communicating pain with physicians had physicians who more accurately reported their pain at 3 to 4 weeks postintervention compared with control arm participants for whom physicians underestimated pain ($P < .05$). However, these effects were not sustained at 6 to 7 weeks postintervention.²⁹ Importantly, in studies comparing groups, African Americans had less knowledge about common cancer concerns than non-Hispanic whites; yet, there was no statistical difference in knowledge post watching the video.³⁶ Thus, African Americans may benefit from videos more than non-Hispanic whites. However, across studies, no effects on perceived pain control or functional status were noted. Finally, across studies, interventions had differing effects on quality of life outcomes, in which 1 intervention had no effect on quality of life,²⁹

and in another, participants expressed beliefs that the intervention could improve quality of life.³⁰

THEME 5. URM SURVIVORS AND PROVIDERS IN FAVOR OF VIDEO INTERVENTIONS

Findings revealed that videos are a favorable intervention mode, as both survivors and providers would recommend them. Two explanations emerged that support reasons video interventions would be recommended. First, participants thought that videos were a good way to review information. For example, in 1 study, a participant said:

when you are waiting for the oncologist, where sometimes they take up to half an hour, 20 min, an hour [I could be] sitting there watching [a] program with information about what oncology is, How do you overcome? What do you feel? And as far as chemotherapy...you sit for hours.³⁵

Participants also expressed that although many have the devices necessary to use apps and websites, they do not use them. For example, 1 study detailed that although most of the sample, 77%, had computer access, only 47% knew how to use the computer, and although most had smart phones, they chose not to use all its features.³⁵ One participant in this study stated, “I do not have a computer, but I do have a phone without service, but has Facebook once in a while.”

THEME 6. BUILDING TRUST THROUGH PERSONAL STORIES

A final valuable finding from this synthesis is that the survivors enjoyed the videos most when they included personal stories. Personal stories were meant to be both informative and motivational, in efforts to increase the potential efficacy for health education uptake. Both survivors and healthcare providers valued realistic portrayal of survivorship. Because stakeholders identified with the narrators within the videos, they found the videos to be trustworthy.

■ Discussion

Overall, the findings of this review indicate that video interventions that are culturally targeted and contain messages from racially/ethnically matched individuals are well received, easily delivered, and promising to impact health-related outcomes among URM cancer survivors.

The approaches to create video interventions included in this review were culturally targeted and included various stakeholders. Indeed, interventions are more effective when they are culturally relevant.³⁷ Engaging the targeted population to create and narrate videos increases the likelihood that relevant population-specific needs are addressed.¹³ By showing the videos in clinical oncology settings, patients, caregivers, and families have the opportunity to have video content reinforced and questions answered by nurses.

Videos that contained narrative messages (ie, a personal story from an individual who has similar characteristics to the intended recipient of the story) from URM survivors seemed to be particularly powerful. According to narrative theory, stories from similar

individuals can be powerful and effective because the recipient relates to the narrator and believes they may have a similar experience.^{32,38,39} Written narrative messages that include photographs of the story teller have been well received and have had positive impacts on health beliefs and physical activity, among African American and non-Hispanic white cancer survivors.^{40–42} Research supports that narrative messages may be effective among African American cancer survivors when they have positive thoughts about and view the narrators as being similar to themselves.³⁹

Compared with non-Hispanic whites, URM cancer survivors report less access to and knowledge of available resources. Women with fewer resources, less education, and lower income report insufficient guidance and/or skills to maximize health and quality of life.⁴³ Better communication and increased knowledge may contribute to decreasing cancer disparities experienced by URM survivors. This review provides support that video interventions are a promising strategy to create trust and promote health communication in cancer care.

However, to comprehensively address cancer disparities, a multitude of strategies need to be used. The social determinants of health encompass both upstream and downstream factors that ultimately impact health outcomes.³⁴ Cultural competence, bias awareness, and bias training are critical to increase trust and communication in URM communities.⁴⁴ Video interventions may be helpful to improve communication and well received by URM cancer survivors; yet, they are not likely to be effective without continued efforts to address and break down factors that contribute to disparities.

Limitations

This review is not without limitations. Despite setting no date restrictions, we identified only 7 independent studies for inclusion in this review. All included studies were quality appraised as fair to good. Scores were most often lowered because of lack of control groups, no randomization, or small sample sizes. Strengths of this review were its rigor and systematic approach that applied PRISMA guidelines. Furthermore, this review identified articles describing participatory approaches and iterative processes to co-develop the video interventions.

Future research should assess how nurses viewing culturally targeted videos may educate them on the cultural needs of their patients and impact the communication and care they deliver. Future research should develop and test targeted health education materials for adult URM survivor populations and providers. These interventions should be tested alongside additional strategies to decrease cancer disparities. Video interventions are an innovative and promising approach to achieve increased racial/ethnic concordance in health communication.

Conclusions

Our systematic review highlights how video interventions, especially those containing narrative stories from racial/ethnic concordant survivors, are well received by African American, American Indian, and Hispanic cancer survivors. Such interventions are

promising to improve pain, knowledge, treatment adherence, and communication with providers among these URM cancer survivors. Finally, videos are easily delivered as an intervention approach. More rigorous studies are warranted to understand best practices of video development and use for URM cancer survivors. Harnessing videos is promising to deliver effective education to URM, as a critical first step in decreasing cancer disparities.

Implications for Practice

Videos can serve as an easy, effective tool to achieve favorable outcomes in the care of URM survivors. Applying video education can increase survivor's knowledge and support informed-decision making. In addition, by nurses viewing culturally targeted videos, they may gain insight into the cultural needs of their patients, thereby allowing them to follow up on common concerns and assess for other concerns in an appropriate manner. Finally, by using videos to supplement patient teaching, nurses can increase the amount of information they provide to patients, while continuing to complete additional nursing tasks in busy clinic settings. This review provides evidence that culturally targeted videos are a valuable educational tool for nurses to use when educating URM cancer survivors.

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Section/Topic	No.	Checklist Item	Reported on Page No.
Title			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
Structured summary	2	Provide a structured summary including, as applicable, background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
Introduction			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4-5
Methods			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (eg, Web address), and, if available, provide registration information including registration number.	TBD
Eligibility criteria	6	Specify study characteristics (eg, PICOS, length of follow-up) and report characteristics (eg, years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (eg, databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5-6
Search	8	Present full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Table 1
Study selection	9	State the process for selecting studies (ie, screening, eligibility, included in systematic review, and, if applicable, included in the metaanalysis).	5-6
Data collection process	10	Describe method of data extraction from reports (eg, piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6-7
Data items	11	List and define all variables for which data were sought (eg, PICOS, funding sources) and any assumptions and simplifications made.	7
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level) and how this information is to be used in any data synthesis.	6
Summary measures	13	State the principal summary measures (eg, risk ratio, difference in means).	6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (eg, I ²) for each meta-analysis.	n/a
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (eg, publication bias, selective reporting within studies).	6
Additional analyses	16	Describe methods of additional analyses (eg, sensitivity or subgroup analyses, meta-regression), if done, indicating which were prespecified.	n/a
Results			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (eg, study size, PICOS, follow-up period) and provide the citations.	6
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	7
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study (a) a simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	n/a
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see item 15).	6
Additional analysis	23	Give results of additional analyses, if done (eg, sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
Discussion			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (eg, healthcare providers, users, and policy makers).	11
Limitations	25	Discuss limitations at study and outcome level (eg, risk of bias), and at review-level (eg, incomplete retrieval of identified research, reporting bias).	12

(continues)

 **Appendix 1 • PRISMA Checklist, Continued**

Section/Topic	No.	Checklist Item	Reported on Page No.
Conclusions	26	Provide a general interpretation of the results in the context of other evidence and implications for future research.	13
Funding Funding	27	Describe sources of funding for the systematic review and other support (eg, supply of data); role of funders for the systematic review.	Title page