

SYSTEMATIC REVIEW

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# Interventions, programmes and resources that address culturally and linguistically diverse consumer and carers' cancer information needs: a mixed methods systematic review

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## Abstract

**Background** Culturally and linguistically diverse (CaLD) consumers and carers have been identified as experiencing high levels of unmet needs relating to information and support across the cancer journey. This review identified and evaluated the effectiveness of strategies to meet the cancer information needs of consumers and carers from CaLD backgrounds.

**Methods** This review followed Joanna Briggs Institute (JBI) methodology for systematic reviews. Databases searched included MEDLINE, CINAHL Ultimate, PsycINFO and AMED, ProQuest Dissertations and Theses, and GreyNet. Published and unpublished studies between 2013 - May 2024 on interventions, programmes or resources developed for adults (aged 18 years and over) from CaLD communities in relation to cancer prevention, cancer treatment or life after cancer were reviewed for inclusion. The review protocol was registered in PROSPERO (CRD42023451557).

**Results** One hundred and twenty papers were included in the review. The majority were quasi-experimental studies ( $n=52$ ), followed by randomised controlled trials ( $n=38$ ) and qualitative studies ( $n=25$ ). The populations represented in the review included Latino ( $n=47$ ), Chinese ( $n=28$ ), Asian ( $n=19$ ), Korean ( $n=16$ ), and Vietnamese communities ( $n=7$ ). Most studies focused on prevention activities ( $n=89$ ) with a smaller number focused on active treatment ( $n=6$ ) and life after cancer ( $n=20$ ). Most studies focused on breast cancer ( $n=37$ ), followed by cervical cancer ( $n=21$ ). Engagement with community members was identified as an important requirement to develop and adapt interventions that were culturally acceptable, feasible and relevant to meet the communities' needs. The majority of interventions demonstrated a positive impact on the primary outcome measured. No studies reported on the experiences of consumers and carers from CaLD backgrounds in the development of interventions, programmes and resources to address their cancer information needs.

**Conclusions** This review supports a tailored approach to develop information, resources and interventions that leverage community resources and expertise to ensure that they are accessible and relevant to CaLD communities.

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The onus for researchers and clinicians is the creation of information, resources and interventions that are both accessible in terms of language and comprehension and are culturally relevant.

**Keywords** Culturally and linguistically diverse, Cancer, Patient, Carer, Information needs

## Background

Cancer is the leading cause of death and disability worldwide [1]. Greater awareness of cancer and its risk factors, participation in screening programmes and improvements in cancer treatment and care have contributed to higher survival rates [2]. The development and delivery of services that are consumer-focused and strive to improve cancer outcomes for all are key goals for organisations around the world [3]. Culturally and linguistically diverse (CaLD) consumers and carers have been identified as experiencing high levels of unmet needs relating to physical, psychological and information needs across the cancer journey [2]. In this review, the term consumers is used to refer to people accessing services for the purpose of prevention or active management of cancer while carers are referred to as people providing unpaid care and support to family members.

Currently, there is no standard definition for CaLD status. CaLD status can be related to country of birth, speaking a language other than English (LOTE), speaking a LOTE at home, proficiency in English, ancestry, cultural background and length of time since migrating to host country [4]. People from CaLD backgrounds may also face greater challenges when navigating the cancer healthcare system, including language and cultural barriers and not knowing where to seek help or access services [2]. CaLD communities experiencing cancer can face greater barriers to accessing and understanding health information compared to non-CaLD communities. Language barriers and cultural differences can impact CaLD communities experiencing cancer from receiving health information, and lead to delayed treatment and poorer health outcomes [5, 6]. Disparities in health outcomes have, in part, been attributed to the absence of patient-centred care for CaLD communities living with cancer [7]. Targeted and culturally tailored interventions have been linked to improved screening rates and treatment outcomes, however, the evidence on the most effective approaches to increasing knowledge to support behaviour change has not been brought together in a comprehensive review.

A recent review found that resources specific to cancer and CaLD populations were minimal [8]. Another recent review of resources related to cancer internationally [9] found that few organisations provided information and resources in a LOTE. Where information and resources are provided in a LOTE, no information was provided as to whether the resource was a direct translation into another language or whether additional development

was undertaken to ensure cultural considerations were included. Without adaptation through community consultation, there is a risk that the resource will not acknowledge cultural ways of knowing and practices.

The objective of this review was to report on approaches for developing interventions, programmes and resources to address the cancer information needs of consumers and carers from CaLD backgrounds and evaluate their effectiveness.

## Review questions

- 1) What approaches have been used to include the perspectives of consumers and carers from CaLD backgrounds in the development of interventions, programmes and resources to address their cancer information needs?
- 2) How effective are interventions that have been developed and implemented for consumers and carers from CaLD backgrounds in meeting their cancer information needs?
- 3) What are the experiences of consumers and carers from CaLD backgrounds in the development of interventions, programmes and resources to address their cancer information needs?

## Methods

The systematic review was conducted in accordance with the JBI methodology for mixed methods systematic reviews [10]. This review was conducted in accordance with an a priori protocol registered with PROSPERO (CRD42023451557). A systematic review was chosen over a scoping review where scoping reviews seek to identify and map the breadth of evidence available on a particular topic but do not report on effectiveness or make recommendations for practice [11].

## Search strategy

The search strategy included both published and unpublished studies, and this review utilised a three-step search strategy. First, an initial limited search of MEDLINE (PubMed) and CINAHL (EBSCO) was undertaken to identify articles on the topic. Secondly, titles and abstracts of relevant articles, and the index terms used to describe the articles, were used to develop a full search strategy for MEDLINE, CINAHL Ultimate, PsycINFO and AMED (Table 1). Step three involved the full search. The search strategy included all identified keywords and index terms and was adapted for each included database

**Table 1** Search strategy for MEDLINE (Searched on 29/05/2024; limited to 2013–29 May 2024)

Search number	Term searched	Number of hits
S1	Cancer n6 patient*	642,047
S2	Cancer n8 carer*	589
S3	Oncology n6 patient*	23,040
S4	Cancer n8 Caregiver*	4729
S5	MH Neoplasms+	3,969,037
S6	Information	1,900,811
S7	Resource*	859,867
S8	Intervention*	1,547,437
S9	Patient education	112,963
S10	Culturally and linguistically diverse	1036
S11	Non-english	4699
S12	Culturally diverse	2348
S13	Linguistically diverse	1284
S14	Low English	186
S15	Ethnic*	245,717
S16	Migrant*	41,259
S17	Immigrant*	47,802
S18	Emigrant*	17,315
S19	Language barrier	1289
S20	MH Cultural Diversity	13,113
S21	MH Transients and Migrants	14,207
S22	MH Emigrants and Immigrants+	15,577
S23	MH Ethnicity	75,825
S24	MH Limited English Proficiency	276
S25	MH Communication Barriers	7396
S26	MH Ethnic and Racial Minorities	523
S27	S1 OR S2 OR S3 OR S4 OR S5	4,112,761
S28	S6 OR S7 OR S8 OR S9	4,046,735
S29	S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26	322,540
S30	S27 AND S28 AND S30	6597
S31	S30 Limit to 2013-29 May 2024	<b>4243</b>

and/or information source. The reference lists of all systematic reviews on the same or similar topic were reviewed. A search of ProQuest Dissertations and Theses and GreyNet was also conducted. The reference list of all included sources of evidence were hand searched for potential studies. Any references that appeared relevant were sourced and reviewed for inclusion.

#### Inclusion criteria

The review included studies from peer-reviewed journal articles and peer-reviewed grey literature that reported on the outcomes of interest (Additional file 1). Papers were restricted to the publication period January 2013–May 2024, although any work considered seminal as found in the reference lists of the papers retrieved by the search, were considered for inclusion. Studies published in English, Vietnamese, Bhutanese and Mandarin were considered for inclusion. Interventions, programmes and resources developed for adults (aged 18 years and over)

from a CaLD background, either cancer consumers or carers with any cancer diagnosis and at any stage of cancer, were considered for inclusion.

#### Types of studies

This review considered quantitative, qualitative and mixed methods studies. Quantitative studies included experimental and quasi-experimental studies. Qualitative studies included studies that used all methodological approaches. Mixed method studies were considered where data from the quantitative or qualitative components could be clearly extracted. This referred to the ability to extract specific details about the populations, interventions, study methods and outcomes of significance to the review questions for the quantitative component of mixed methods studies and for the qualitative component of mixed methods studies, specific details about the population, context, culture, geographical location, study methods and the phenomenon of interest

relevant to the review questions. Opinion papers, text and reports with outcomes of interest relevant to the review were included.

### Study selection

Following the search, all identified citations were collated and uploaded into Endnote (version 20) and duplicates were removed. Following training and testing to ensure the team were similar in their approach, each title and abstract were screened by two reviewers against the inclusion criteria for the review. The full texts were retrieved for potentially relevant studies, and their citation details were imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI) [12]. The full texts were assessed in detail against the inclusion criteria by a team of five reviewers with two independent reviewers per paper. Reasons for exclusion of papers at full text that did not meet the inclusion criteria were recorded and reported in the systematic review. Any disagreements that arose between the reviewers at each stage of the selection process were resolved through discussion and assessed by an additional reviewer when required. The results of the search and the study inclusion process are reported in full in a Preferred Reporting Items for Systematic Reviews and Meta-analyses flow diagram [13].

### Assessment of methodological quality

All papers that met the inclusion criteria were assessed by two independent reviewers for methodological quality prior to final inclusion using the standardised critical appraisal instrument from JBI. Any disagreements that arose between the reviewers were resolved through discussion, or with a third reviewer. The results of the appraisal are reported in narrative form and in a table (Additional File 2 Assessment of Methodological Quality).

All studies, regardless of the results of their methodological quality, underwent data extraction and synthesis.

### Data extraction

For the quantitative component, data were extracted from quantitative and mixed methods (quantitative component only) studies included in the review by two independent reviewers using the standardised JBI data extraction tool in JBI SUMARI. The data extracted included specific details about the participants, study methods, interventions, and outcomes of significance to the review objective. For the qualitative component, data were extracted from qualitative and mixed methods (qualitative component only) studies included in the review by two independent reviewers using the standardised JBI data extraction

tool in JBI SUMARI. The data extracted included specific details about the population, context, culture, geographical location, study methods and the phenomena of interest relevant to the review objective.

### Data synthesis and integration

This review followed a convergent segregated approach to synthesis and integration according to the JBI methodology for mixed methods systematic reviews using JBI SUMARI. This involved conducting a separate quantitative and qualitative analysis followed by integrating and generating quantitative and qualitative evidence.

### Quantitative synthesis

The pooling of statistical meta-analysis using JBI SUMARI would have been conducted if this had been possible and included sensitivity analyses. Meta-analysis was not possible and the findings were presented in narrative form with the inclusion of tables to aid in data presentation, where appropriate.

### Qualitative synthesis

Qualitative research findings were pooled using a meta-aggregation approach. This involved the aggregation or synthesis of findings to generate a set of statements that represent that aggregation through assembling the findings and categorising these findings based on similarity in meaning.

## Results

### Study inclusion

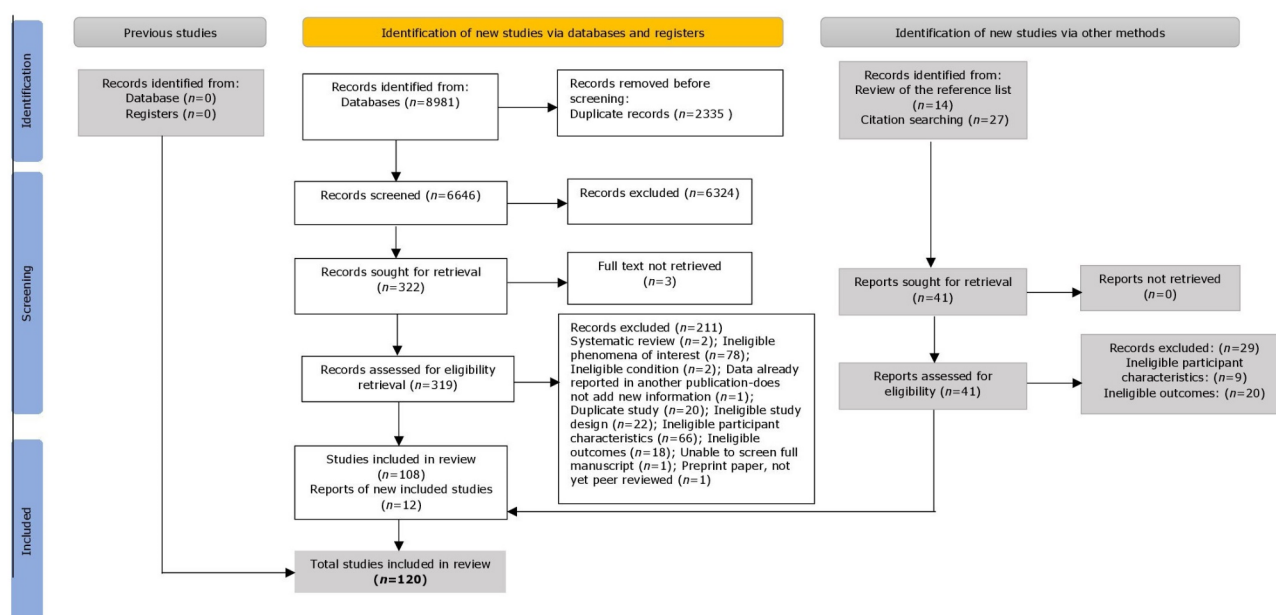
The number of papers identified by the search strategy and the number of papers included and excluded at each stage of the study selection process are set out in the Preferred Reporting Items for Systematic Reviews and Meta-analyses flow chart as shown in Fig. 1. The main reasons studies were excluded on full-text review were ineligible phenomenon of interest or ineligible participant characteristics.

### Methodological quality

A small number of studies met all quality criteria according to the JBI critical appraisal tools. The details relating to each study design are described below with further detail provided in Additional File 2.

### Analytical cross-sectional studies

Critical appraisal scores for the four analytical cross-sectional studies ranged from 6 to 8 out of a possible 8. Three studies did not report on whether confounding factors were identified and did not describe strategies to deal with confounding factors.



**Fig. 1** PRISMA flowchart for study selection

### Randomised controlled trials

Among the 38 included randomised controlled trials, the scores ranged from 6 out of 13 ( $n=1$ ) to 13 out of 13 ( $n=1$ ). Almost half the studies reported that true randomisation was used for assignment of participants to treatment groups and only 9 studies reported that the allocation of participants to treatment groups was “blind” (concealed from those completing the allocation process). Two studies reported that those delivering treatment were blind to treatment assignment and the same two studies that participants were blind to treatment assignment. Six papers reported that outcomes assessors were blind to treatment assignment. These responses are not unusual for health and social science interventions where blinding is often not possible. All but two studies reported that follow-up was complete. Thirty-three studies reported that treatment groups were similar at baseline and in 38 studies, the trial design was assessed as appropriate, and that any deviations from the research protocol (individual randomisation, parallel groups) were addressed in the conduct and analysis of the trial. It was also noted that treatment groups were treated identically other than the intervention of interest in all studies. All studies reported that participants were analysed in the groups to which they were randomised, that outcomes were measured in the same way for treatment groups, that outcomes were measured in a reliable way and that appropriate statistical analysis was used.

### Quasi-experimental studies

The quasi-experimental studies ( $n=52$ ) ranged in score from 3 out of 9 to 9 out of 9, with the majority scoring 7

out of 9 and 8 out of 9. Eleven studies employed a control group and 25 studies either provided information on follow-up completion or adequately described and analysed the differences in follow-up between the intervention and control group. Thirty three studies reported that the participants included in any comparisons were receiving similar treatment/care (other than the exposure or intervention of interest), thirty one studies indicated that the participants included in any comparisons were similar in relation to key demographics and characteristics, and 35 studies indicated that multiple measurements of the outcome both pre- and post-intervention/exposure were completed. Fifty studies reported that the same methods were used to measure participant outcomes between comparison groups, that the outcomes were measured in a reliable way and applied appropriate statistical analysis methods. All studies clearly identified and described the “cause” and the “effect.”

### Case reports

Only one case report was included and met all the criteria relevant to the study design (6 items out of a possible 8 items).

### Qualitative research

The scores ranged from 4 out of 10 to 9 out of 10 with the majority assessed as 7 to 9 out of 10. Only four studies included a statement locating the researcher culturally or theoretically in order to assess the cultural beliefs and values of the researcher as a source of bias, and only eight were assessed as having congruity between the stated philosophical perspective of the study, for example



a constructivist approach and the research methodology, for example grounded theory. Twelve studies discussed the influence of the researcher on the research, and vice-versa. The majority of studies were assessed as meeting the remaining criteria (items 2, 3, 4, 5, 8, 9 and 10).

### **Characteristics of included studies**

An overview of the characteristics of the included studies are set out in Additional file 3. The studies were conducted in 16 countries with the majority conducted in the United States of America (USA) ( $n=101$ ) and Australia ( $n=12$ ). The studies included people from a CaLD background across a diverse range of communities. The majority of studies ( $n=47$ ) focused on Latino communities, followed by Chinese ( $n=28$ ), Asian ( $n=19$ ), Korean ( $n=16$ ) and Vietnamese ( $n=7$ ). Other CaLD communities included in the studies were from Turkey, Morocco, Greece, the Philippines, Pakistan, Africa, Russia, Japan, Italy, the Middle East, Somalia and the Pacific Islands.

### **What approaches have been used to include the perspectives of consumers and carers from CaLD backgrounds in the development of interventions, programmes and resources to address their cancer information needs?**

The data from all studies contributing to this question have been synthesised and presented below. Where studies reported on the process of developing or adapting information, resources or interventions for CaLD communities, the process was documented (Additional file 4) and the key elements are summarised below. The majority of studies ( $n=84$ ) reported engagement with communities to develop the intervention and described the approach and process of developing the information, resource/s or intervention. Nineteen studies did not describe engaging with the community to develop the intervention materials [13–31] and six referred to previous work, either their own or another research team as evidence of cultural adaptation but did not provide detail [32–37]. The majority of studies used face-to-face sessions, which often involved focus group interviews with members of the community for which the interventions were being developed for. The studies described multiple consultations with community members through focus groups or meetings to collect comprehensive feedback and to ensure that adaptations met the communities' needs. Advisory groups with consumers and expert representatives, often health-care professionals, were frequently featured among the included studies to inform the development of material and provide feedback on the same. Among the studies, the most popular methodology used to underpin intervention development was community-based participatory research.

### **How effective are interventions that have been developed and implemented for consumers and carers from CaLD backgrounds in meeting their cancer information needs?**

The data from all studies contributing to this question have been synthesised and presented below. The majority of studies focused on cancer prevention ( $n=56$ ) with a smaller number focused on CaLD consumers in active treatment ( $n=9$ ) and life after cancer ( $n=12$ ). The majority of studies focused on breast cancer ( $n=32$ ), followed by cervical cancer ( $n=18$ ).

All educational programmes that sought to improve knowledge of cancer and risk factors among participants were reported as effective. The primary outcomes of seven studies related to awareness and decision-making related to attending screening services. One study [16] reported that the decision to take up screening was not only influenced by factual, medical information, but also by practical, emotional, cultural, and religious considerations. These findings were echoed in a study [38] that sought feedback on a brochure developed to improve knowledge of colorectal cancer and screening. Recommendations were made to address screening barriers faced by Latinos and included changes to wording, visual aids and content to make the brochure more culturally appropriate. These findings also resonated with Asian and Pacific Islanders living in the USA [39] who were cancer free to assess a liver cancer module. Participants indicated that they wanted more basic information about the hepatitis B vaccine and a desire for a summative brochure about the liver and liver cancer in general that would supplement two existing resources, on the hepatitis B vaccine and a general overview of liver cancer.

One study explored the use of comics [40] and found that they created awareness and discussion more readily compared to conventional didactic educational methods. Digital approaches were explored in three studies [41–43]. The key findings from these studies were the need for resources to be multilingual, to respect cultural considerations around modesty when using images, the need for resources to be easy to navigate, user-friendly, and easily accessible on the Internet.

The effectiveness of programmes to improve participants' screening intention and uptake of screening services were variable. Specifically, participants in many studies reported an increase in their intention to engage with screening services and engagement with screening services [14, 16–21, 23, 32, 33, 44–90]. However, some studies reported no change among participants' intention or actual engagement with screening services [21, 22, 91, 92].

One cross-sectional study [93] explored the information needs of 85 people from migrant backgrounds living with colorectal cancer. The key needs of participants were longer consultations (62%) and more time to ask

questions (56.3%). The delivery of information through videos was favoured over attending a peer support group.

The studies that involved CaLD consumers and carers who were either undergoing active treatment involved the sharing of information to support people and a focus on reviewing resources developed for specific communities. The studies mostly used a series of questions to assess from the users' perspective whether the information or resource was fit for purpose. The key findings were that even when attention had been paid to the development of information and resources for specific communities, many further changes were recommended by consumers to make the resource more usable and relevant. In one study [94] seven rounds of feedback were required before the resources were deemed as ready to use.

The changes and adaptations required following consultation were cognitive-informational aspects, for example wording and sequencing including adaptation to regional lexicons and resolving vague or confusing phrasing [94] and the value of making recordings of consultations when English proficiency was low [95]. Affective-motivational aspects, for example cultural relevance [94, 96, 97] which included specific food examples and navigating cultural norms for example the power balance between patient and doctor and framing the information as complementary to the medical encounter and not challenging or replacing knowledge [98]. Two studies stressed the importance of moving beyond working with the individual and family alone to involve neighbourhoods [99] and community-based organisations [100].

Nine studies reported the effectiveness of interventions to support CaLD consumers living with cancer and were undergoing active treatment [25, 26, 34, 101–106]. The programmes in these studies aimed to provide support for people living with various types of cancer rather than focusing on a single type of cancer. Topics covered in these programmes varied from providing information on chemotherapy and strategies to managing negative emotions associated with a cancer diagnosis and treatment [25, 101, 102], using a translation device to facilitate communication between the CaLD patient and medical professional [26], and providing support related to end-of-life care [34]. All studies reported that the intervention significantly improved participants' knowledge on treatment and treatment side-effects and reduced negative emotions associated with cancer and treatment.

Twenty one studies related to cancer survivorship [27–29, 31, 35, 36, 105, 107–120]. Three studies described the challenges for cancer survivors in relation to engaging with available resources and information. Practical issues identified [121] were technology literacy and preferences, language issues, staff competence, security and

confidentiality issues, time and geographical constraints, and cultural attitudes, beliefs and values. The research team recommended future research using culturally tailored technology-based interventions among racial and ethnic minorities to address the issues identified.

The barriers to accessing cancer information on Australian cancer-related websites for CaLD communities were explored to guide the development of appropriately translated resources [122]. Beliefs about fate had a significant impact on behaviours. The study reinforces the need to fully explore cultural beliefs and structural barriers to accessing cancer information and to incorporate both into the process of developing and accessing information resources.

The use of interpreters to support cancer survivors to communicate with health-care providers was described as frustrating in one study [115] when interpreters did not speak the same dialect, causing linguistic and cultural discord.

Eight studies reported a need to focus on aspects of the cancer experience that were not included or perceived as not covered enough in the information provided, for example healthcare system navigation, employment concerns and sexuality [116], emotional and social challenges [123] and the need for a transition plan (to survivor) [117]. Culturally appropriate adaptations were also reported in relation to programmes [31, 118, 124] with some specifying the importance of including family [119] and spirituality in programmes [116].

The production of material and delivery of information in English and the native language of participants were highlighted [119, 125]. The evidence favoured face-to-face sessions and the use of advisory groups which often included a mix of consumers, health professionals and experts in the field were reported. The methodology most commonly used or referred to was community-based participatory research.

Thirteen studies reported interventions developed to support cancer survivors [27–29, 35, 36, 102, 107, 109–111, 113, 114]. Most programmes focused on breast cancer survivors. The programmes predominantly aimed to provide cancer survivors with the knowledge and skills to manage physical symptoms and negative emotions associated with living with cancer [27, 28, 102, 108–111]. Some programmes aimed to support cancer survivors to live a healthier lifestyle through diet and increased physical activity [29, 35, 113, 114]. Most programmes were delivered using technology, such as an app, online chat function, website or telephone [28, 29, 35, 107, 110, 111, 114]. The authors reported that the interventions were effective in supporting cancer survivors to reduce negative emotions (e.g., stress and depression), improve their lifestyle and improve overall quality of life.

***What are the experiences of consumers and carers from CaLD backgrounds in the development of interventions, programmes and resources to address their cancer information needs?***

No study directly addressed this question. The evidence presented in relation to objective 1 indicated that the process of involving and working with consumers and carers from a CaLD background was effective, no study directly reported on consumers and carers experience of the process.

**Discussion**

This systematic review identified and synthesised the international literature on the development of interventions, programmes and resources that address CaLD consumers' and carers' cancer information needs. Most of the literature related to materials that were developed in the USA for Latina populations and focused on cancer prevention.

In relation to objective 1 of the review, developing and adapting materials intended for CaLD communities, the majority of the studies overwhelmingly promoted and supported the need for consumer engagement or co-design with members of the community for whom the intervention was intended for. Whilst intervention studies referred to the latter, the qualitative studies were able to detail the level of community engagement involved in developing and adapting information and other intervention materials.

The majority of studies used face-to-face sessions rather than on-line intervention and described multiple consultations with community members through focus groups or meetings to gain comprehensive feedback and to ensure that adaptations met the communities' needs. Advisory groups with consumers and expert representatives, often health-care professionals, were frequently featured among the included studies to inform the development of material and provide feedback on the same. Among the studies, the most popular methodology used to underpin intervention development was community-based participatory research.

A key finding of this review was the importance of community evaluation of information, resources and intervention programmes to identify cognitive informational and affective-motivational revisions to optimise the "fit" of information, resources and interventions for the communities they were targeted for. Involvement of the community at all stages of development aligns with the World Health Organisation's recommendations on strategies to assist the health literacy needs of migrants and includes involving migrants in the planning, implementation and evaluation processes [126]. In the majority of the studies reviewed, community members generally advised on multiple changes to materials to improve

comprehension. This included language where literal translations of the English materials created nonsensical content, or where the translated language was vague and lacked clarity and specificity. In response to the feedback, researchers simplified the English script, corrected out-of-context translations and removed words that contributed to creating text that lacked clarity. Additionally, abstract terms or catchphrases in English that lack a direct equivalent in the language being translated require particular attention.

Awareness of, and accommodation for, dialects were also highlighted as important. Recognition and incorporation of culturally sensitive beliefs and practices and alignment of these with key concepts in the framework guiding the work should be recognised. For example, Latino populations have identified the concepts of 'personalismo' (a personal and empathetic way to relate to another person), 'respeto' (a feeling of high esteem and respect for others), and 'confianza' (the trust in the relationship) as vital in Latino cultural theory [89]. The development of information and resources that include a visual format and plain language are recommended. Beyond language proficiency, other barriers to seeking and using health-related information involve culturally based values and beliefs, including a preference to use folk remedies or Chinese Medicine, particularly if Western medicine was perceived as ineffective. Many CaLD consumers in the studies expressed interest in complementary and alternative medicines and this needs to be recognised in information, resources and intervention programmes, whether or not support or access to them are incorporated. The lack of familiarity with Western healthcare systems and processes was a recurrent theme. Multimedia resources attempted to fill these gaps by including in-language information about the Western health systems and what to commonly expect when attending hospital for cancer treatment. Awareness of language and culture are vital and include issues such as stigma associated with a cancer diagnosis and community perceptions about cancer (e.g., a cancer diagnosis is fatal or contagious).

The process of introducing, delivering and evaluating information, resources and interventions is critical. Feedback from participants in the studies included in this review highlighted that resources should be responsive and flexible. Resources need to be consumer-focused with flexibility for consumers to engage with resources that meet their needs. The involvement of bilingual speakers, with consideration of professional qualifications in translation and interpretation, are important if cultural synergy is to be achieved.

In relation to the effectiveness of interventions, the included studies primarily centred on prevention rather than active treatment or survivorship. They focused on



screening and improving the uptake of screening, either during the course of the study or to promote future uptake, through awareness raising of screening services and the benefits of screening. The components of effective cancer screening programmes, that aimed to improve knowledge and beliefs about cancer and screening, screening intentions and uptake rates, included using theories to guide intervention development, delivery of services in community settings, using culturally relevant and linguistically appropriate materials, content that highlighted key messages about cancer and screening measures, and adopting multiple intervention strategies.

The interventions were mostly reported as effective in improving the primary outcome of the study. The findings support the value of creating culturally targeted information, resources and interventions to increase engagement with services, change behaviours and improve screening uptake. Of key importance was the consideration of the implementation of the intervention. Structural barriers were identified in the majority of studies and had an ongoing and pervasive impact on the ability and confidence of CaLD consumers and carers to engage with screening services. Barriers included low health literacy, socioeconomic status, language barriers, cultural beliefs and transportation issues. CaLD consumers and carers face many challenges and these share common underlying causes linked to the inequitable distribution of resources that affect social, structural, economic, political, environmental and commercial determinants of health [123]. It is also important to create awareness of both the benefits and the impacts of digital technologies. These create both opportunities for digital health solutions but also to widen equity gaps in access to health care. Currently few studies consider equity of access in relation to digital interventions [127].

A number of approaches were described to support the delivery of the intervention. These included a peer support model and using ethnically concordant interventionists who had an innate understanding of the cultural and social contexts of participants to help “bridge the gap” between cultures and improve communication. A key recommendation from this review is that both the content of an intervention and the implementation are carefully considered at the outset and use cultural- and language-specific outreach strategies into the community.

No studies reported on the experiences of CaLD consumers and carers in the development of interventions, programmes and resources to address their cancer information needs. This is an area for future focus. At this point in time there is no evidence to guide researchers and clinicians on how best to engage with consumers and carers in the field of cancer care to ensure that the process is acceptable, equitable and productive.

This review has highlighted that there is a paucity of interventions to support knowledge and behaviour change for cancer patients undergoing active treatment and cancer survivors. CaLD communities are a priority population and growing in size in many countries, including Australia. CaLD consumer engagement in decision-making is a vital part of patient-centred care. The provision of culturally competent care is well recognised as a priority issue in health care and is characterised as the integration of culture into the delivery of health services through staff who have the knowledge and ability to deliver culturally competent care in an environment that supports this [128].

The synthesis of the findings has informed some of the key steps that researchers and clinicians can engage with to support the creation of information, resources and interventions for CaLD communities in relation to cancer care. The most important finding was the need for engagement with a methodology that supports consultation and cycles of feedback, for example, a community participatory approach. Community-based participatory research is an approach to research that involves collective, reflective and systematic inquiry in which researchers and community stakeholders engage as equal partners in all steps of the research process with the goals of educating, improving practice or bringing about social change [129, 130]. Community-based participatory research questions the power of relationships that are inherently embedded in Western knowledge production, advocates for power to be shared between the researcher and those being researched, acknowledges the legitimacy of experiential knowledge, and focuses on research aimed at improving situations and practices [131]. This approach to research is recognised as particularly useful when working with populations that experience marginalisation.

A small number of studies used a theoretical framework to guide the theoretical and therapeutic components of the engagement and evaluation process. A recommendation from the review is the use of a framework to create a bridge between the operational elements of a project and the key theoretical drivers. The frameworks used in the studies included in this review were: the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) [132, 133], the Health Belief Model [133, 134] the PRECEDE-PROCEED model [134, 135], Transtheoretical Model of Change [135, 136], Ottawa Decision Support Framework [136, 137] and the Tipping Point Model [137, 138]. Theoretical frameworks can support understanding of the critical elements of an intervention that contribute to effectiveness [138, 139].

## Limitations

The review employed a systematic approach to searching and securing the relevant studies for this review. The team included members who were bilingual in several languages, however, all studies included were published in English. The majority of studies included in the review were conducted in the USA and the population most commonly involved were Latinos/ Hispanic Americans. This limits the generalisability of the findings to other health care settings and populations. In line with the JBI approach to conducting systematic reviews all papers were included regardless of methodological quality. Whilst few papers were lower quality these have not been highlighted in the review and caution must be taken in the interpretation of results where some studies were pilot interventions with small sample sizes, which limit both the statistical power and generalisability of the findings. The heterogeneity of the studies included in the review meant that a meta-analysis could not be undertaken, and a narrative synthesis was completed.

## Conclusions

The review provides directions for practice, policy and future research.

The outcomes and findings of this review can support and guide progress towards achieving key policies and strategies, including the priorities of Cancer Plans internationally with specific reference to providing consumers with reliable information about their cancer care. The review provides insight into the gaps in the field, key considerations and the next steps.

Before developing information, resources or interventions, understanding and addressing the contexts, motivation and preparedness of CaLD communities for change is needed. This includes screening services, lifestyle, health behaviours, opportunity (e.g., their household environment and access to food and exercise), competing priorities, health and technological literacy, readiness to change, and clinical characteristics. The review supports a tailored approach to develop information, resources and interventions that leverage community resources and expertise to ensure that CaLD communities have the best opportunity possible to engage with them to achieve effective outcomes.

## Abbreviations

CaLD	Culturally and linguistically diverse
SUMARI	System for the unified management of the assessment and review of information
LOTE	Language other than english
USA	United states of America

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12885-025-13931-5>.

Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

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## Author contributions

LW contributed to conception and study design, database search, data analysis and interpretation, literature review, writing of the manuscript. DK contributed to conception and study design, database search, data analysis and interpretation and critical revision of the manuscript. PC and WL database search, data analysis and interpretation and critical revision of the manuscript. MN contributed to conception and study design, database search, data analysis and interpretation and critical revision of the manuscript. CB, CL and ME contributed to data interpretation and critical revision of the manuscript. The authors read and approved the final manuscript.

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## Data availability

All data generated or analysed during this study are included in this published article [and its supplementary information files].

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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## References

1. WHO. (2024) Global cancer burden growing, amidst mounting need for services. Global cancer burden growing, amidst mounting need for services Accessed 04/02/2025.
2. Australian Institute of Health and Welfare. Cancer in Australia. 2021.
3. WHO. WHO global survey on the inclusion of cancer care in health-benefit packages, 2020–2021 Geneva: World Health Organisation2024 [Available from: <https://www.who.int/publications/i/item/9789240088504>
4. Federation of Ethnic Communities' Councils of Australia. IF, WE DON'T COUNT IT, IT DOESN. 'T COUNT! Towards Consistent National Data Collection and Reporting on Cultural, Ethnic and Linguistic Diversity 2020 [Available from: <https://fecca.org.au/if-we-dont-count-it-it-doesnt-count/>
5. Khatri RB, Assefa Y. Access to health services among culturally and linguistically diverse populations in the Australian universal health care system: issues and challenges. BMC Public Health. 2022;22(1):880.

6. Phillipson L, Larsen-Truong K, Jones S, Pitts L. Improving cancer outcomes among culturally and linguistically diverse communities: a rapid review by Sax Institute for the Cancer Institute NSW; 2012.
7. Harun A, Harrison JD, Young JM. Interventions to improve patient participation in the treatment process for culturally and linguistically diverse people with cancer: a systematic review. *Asia Pac J Clin Oncol*. 2013;9(2):99–109.
8. The Cancer and Palliative Care Research and Evaluation Unit (CaPCREU). Understanding Consumers' Needs for Cancer Information. 2022 [Available from: <https://health.wa.gov.au/~media/Corp/Documents/Health-for/Health-Networks/Cancer/Cancer-fellowships/Understanding-Consumers-Needs-for-Cancer-Information-report.pdf>]
9. Whitehead L, Kirk D, Chejor P, Liu W, Nguyen M. The availability of cancer resources for consumers in a language other than English. Report prepared for the WA Department of Health, 2023. 2023.
10. Lizarondo L, Stern C, Carrier J, Godfrey CRK, Salmond S, Apostolo J, et al. editors. Mixed methods systematic reviews 2020.
11. Munn Z, Pollock D, Khalil H, Alexander L, McInerney P, Godfrey C, Peters M, Tricco A. What are scoping reviews? Providing a formal definition of scoping reviews as a type of evidence synthesis. *JB Evid Synthesis* 20(4):p 950–952, April 2022. | <https://doi.org/10.11124/JBIES-21-00483>
12. Munn Z, Aromataris E, Tufanaru C, Stern C, Porritt K, Farrow J, et al. The development of software to support multiple systematic review types: the Joanna Briggs Institute system for the unified management, assessment and review of information (JBI SUMARI). *Int J Evid Based Healthc*. 2019;17(1):36–43.
13. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.
14. Koh E, Choi GY, Cho JY. Effectiveness of an ongoing, Community-Based breast cancer prevention program for Korean American women. *Health Soc Work*. 2016;41(1):51–9.
15. Fleming K, Simmons VN, Christy SM, Sutton SK, Romo M, Luque JS, et al. Educating Hispanic women about cervical cancer prevention: feasibility of a Promotora-Led Charla intervention in a farmworker community. *Ethn Dis*. 2018;28(3):169–76.
16. Calderón-Mora I, Alamari A, Byrd TL, Shokar NK. Evaluation of a narrative video to promote prevention and early detection of cervical cancer among Latinas. *Health Promot Pract*. 2022;23(5):884–91.
17. Borrayo EA, Rosales M, Gonzalez P. Entertainment-Education narrative versus nonnarrative interventions to educate and motivate Latinas to engage in mammography screening. *Health Educ Behav*. 2017;44(3):394–402.
18. Cumberland WG, Berman BA, Zazove P, Sadler GR, Jo A, Booth H, et al. A breast cancer education program for D/deaf women. *Am Ann Deaf*. 2018;163(2):90–115.
19. Fang CY, Lee M, Feng Z, Tan Y, Levine F, Nguyen C, Ma GX. Community-Based cervical cancer education: changes in knowledge and beliefs among Vietnamese American women. *J Community Health*. 2019;44(3):525–33.
20. Maxwell AE, Danao LL, Cayetano RT, Crespi CM, Bastani R. Implementation of an evidence-based intervention to promote colorectal cancer screening in community organizations: a cluster randomized trial. *Transl Behav Med*. 2016;6(2):295–305.
21. Han HR, Song Y, Kim M, Hedlin HK, Kim K, Ben Lee H, Roter D. Breast and cervical cancer screening literacy among Korean American women: A community health Worker-Led intervention. *Am J Public Health*. 2017;107(1):159–65.
22. Coronado GD, Beresford SA, McLerran D, Jimenez R, Patrick DL, Ornelas I, et al. Multilevel intervention raises Latina participation in mammography screening: findings from ¡Fortaleza Latina! *Cancer Epidemiol Biomarkers Prev*. 2016;25(4):584–92.
23. Ko LK, Vu T, Bishop S, Leeman J, Escoffery C, Winer RL, et al. Implementation studio: implementation support program to build the capacity of rural community health educators serving immigrant communities to implement evidence-based cancer prevention and control interventions. *Cancer Causes Control*. 2023;34(Suppl 1):75–88.
24. McDonough AM, Vargas M, Nguyen-Rodriguez S, Garcia M, Galvez G, Rios-Ellis B. Mujer Sana, Familia Fuerte: the effects of a Culturally-Relevant, Community-Based, promotores program to increase cervical cancer screening among Latinas. *J Health Care Poor Underserved*. 2016;27(2):568–79.
25. Hoogland AI, Lechner SC, Gonzalez BD, Small BJ, Tyson DM, Asvat Y, et al. Efficacy of a Spanish-Language Self-Administered stress management training intervention for Latinas undergoing chemotherapy. *Psychooncology*. 2018;27(4):1305–11.
26. Hunter D, Anderson N, Oates R, Kok D, Sapkaroski D, Treffry N, Wright C. Piloting a Language translation device for Mandarin-speaking patients presenting for radiotherapy treatment-assessing patient and radiation therapist perspectives. *Support Care Cancer*. 2024;32(4):234.
27. Marshall CA, Badger TA, Curran MA, Koerner SS, Larkey LK, Weihs KL, et al. Un Abrazo Para La Familia: providing low-income Hispanics with education and skills in coping with breast cancer and caregiving. *Psychooncology*. 2013;22(2):470–4.
28. Im EO, Kim S, Lee C, Chee E, Mao JJ, Chee W. Decreasing menopausal symptoms of Asian American breast cancer survivors through a technology-based information and coaching/support program. *Menopause*. 2019;26(4):373–82.
29. Crane TE, Badger TA, O'Connor P, Segrin C, Alvarez A, Freylersythe SJ, et al. Lifestyle intervention for Latina cancer survivors and caregivers: the Nuestra Salud randomized pilot trial. *J Cancer Surviv*. 2021;15(4):607–19.
30. Hamdoui N, Marchena E, Stein ML, van Steenberghe JE, Crutzen R, van Keulen HM, et al. Decision-making, barriers, and facilitators regarding cervical cancer screening participation among Turkish and Moroccan women in the Netherlands: a focus group study. *Ethn Health*. 2022a;27(5):1147–65.
31. Im E-O, Kim S, Jang M, Chee W. Attitudes toward Technology-Based cancer support programs among Korean American breast cancer survivors. *West J Nurs Res*. 2021;43(8):732–41.
32. Juon HS, Park BJ. Effectiveness of a culturally integrated liver cancer education in improving HBV knowledge among Asian Americans. *Prev Med*. 2013;56(1):53–8.
33. Badger TA, Segrin C, Hepworth JT, Pasvogel A, Weihs K, Lopez AM. Telephone-delivered health education and interpersonal counseling improve quality of life for Latinas with breast cancer and their supportive partners. *Psychooncology*. 2013;22(5):1035–42.
34. Yun YH, Kang E, Park S, Koh SJ, Oh HS, Keam B, et al. Efficacy of a decision aid consisting of a video and booklet on advance care planning for advanced cancer patients: randomized controlled trial. *J Pain Symptom Manage*. 2019;58(6):940–e82.
35. Buscemi J, Buitrago D, Iacobelli F, Penedo F, Maciel C, Gittleman J, et al. Feasibility of a Smartphone-based pilot intervention for Hispanic breast cancer survivors: a brief report. *Transl Behav Med*. 2019;9(4):638–45.
36. Marshall CA, Curran MA, Brownmiller G, Solarte A, Armin J, Hamann HA, et al. Oregon's familias En acción replicates benefits for underserved cancer co-survivors through Un Abrazo Para La Familia. *Psychooncology*. 2018;27(10):2405–11.
37. Lee FH, Wang HH, Yang YM, Tsai HM, Huang JJ. The effects of an educational intervention on preventing cervical cancer among Vietnamese women in Southern Taiwan. *J Cancer Educ*. 2017;32(3):622–8.
38. Cooperman JL, Efuni E, Villagra C, Duhamel K, Jandorf L. Colorectal cancer screening brochure for Latinos: focus group evaluation. *J Cancer Educ*. 2013;28(3):582–90.
39. Whitehead L, Robinson S, Arabiat D, Jenkins M, Pahlsson Morelius EM. The report of access and engagement with digital health interventions among children and young people: systematic review. *JMIR Pediatr Parent*. 2024;7(2024):Article number 44199. <https://doi.org/10.2196/44199>
40. Wang JL, Acevedo N, Sadler GR. Using comics to promote colorectal cancer screening in the Asian American and Pacific Islander communities. *J Cancer Educ*. 2018;33(6):1263–9.
41. Yuen SWJ, Tay TY, Gao N, Tho NQ, Tan NC. Development of a decision aid to support colorectal cancer screening: perspectives of Asians in an endemic urban community-a qualitative research study. *BMC Med Inf Decis Mak*. 2021;21(1):86.
42. Jones T, Guzman A, Silverman T, Freeman K, Kukafka R, Crew K. Perceptions of Racially and ethnically diverse women at high risk of breast cancer regarding the use of a Web-Based decision aid for chemoprevention: qualitative study nested within a randomized controlled trial. *J Med Internet Res*. 2021;23(6):e23839.
43. Duong HT, Hopfer S. Let's chat: process evaluation of an intergenerational group chat intervention to increase cancer prevention screening among Vietnamese American families. *Translational Behav Med*. 2021;11(3):891–900.
44. Warner EL, Martel L, Ou JY, Nam GE, Carbajal-Salisbury S, Fuentes V, et al. A Workplace-Based intervention to improve awareness, knowledge, and utilization of breast, cervical, and colorectal cancer screenings among Latino service and manual labor employees in Utah. *J Community Health*. 2019;44(2):256–64.
45. Foley OW, Birrer N, Rauh-Hain JA, Clark RM, DiTavi E, Del Carmen MG. Effect of educational intervention on cervical cancer prevention and screening in Hispanic women. *J Community Health*. 2015;40(6):1178–84.

46. Lee HY, Koopmeiners JS, Rhee TG, Raveis VH, Ahluwalia JS. Mobile phone text messaging intervention for cervical cancer screening: changes in knowledge and behavior pre-post intervention. *J Med Internet Res*. 2014;16(8):e196.
47. Gondek M, Shogan M, Saad-Harfouche FG, Rodriguez EM, Erwin DO, Griswold K, Mahoney MC. Engaging immigrant and refugee women in breast health education. *J Cancer Educ*. 2015;30(3):593–8.
48. Goel MS, O'Connor R. Increasing screening mammography among predominantly Spanish speakers at a federally qualified health center using a brief previsit video. *Patient Educ Couns*. 2016;99(3):408–13.
49. Chung GY, Brown G, Gibson D. Increasing melanoma screening among Hispanic/Latino Americans: A Community-Based educational intervention. *Health Educ Behav*. 2015;42(5):627–32.
50. Briant KJ, Sanchez JI, Ibarra G, Escareño M, Gonzalez NE, Jimenez Gonzalez V, et al. Using a culturally tailored intervention to increase colorectal cancer knowledge and screening among Hispanics in a rural community. *Cancer Epidemiol Biomarkers Prev*. 2018;27(11):1283–8.
51. Choi JA, Kim O. Cervical cancer prevention education program for rural Korean immigrant women. *West J Nurs Res*. 2022;44(7):684–91.
52. Wu TY, Lin C, Chen SL, Jung Y. A community-based intervention to promote breast cancer awareness and screening among Asian American women. *Int Q Community Health Educ*. 2013;34(2):171–85.
53. Hurtado-de-Mendoza A, Graves KD, Gómez-Trillos S, Carrera P, Campos C, Anderson L, et al. Culturally targeted video improves psychosocial outcomes in Latina women at risk of hereditary breast and ovarian cancer. *Int J Environ Res Public Health*. 2019;16(23).
54. Choi SY. Development of an educational program to prevent cervical cancer among immigrants in Korea. *Asian Pac J Cancer Prev*. 2013;14(9):5345–9.
55. Gu J, Maxwell AE, Ma GX, Qian X, Tan Y, Hsieh HC, et al. Evaluating the training of Chinese-Speaking community health workers to implement a Small-Group intervention promoting mammography. *J Cancer Educ*. 2019;34(4):705–11.
56. Laughman AB, Boselli D, Love M, Steuerwald N, Symanowski J, Blackley K, et al. Outcomes of a structured education intervention for Latinas concerning breast cancer and mammography. *Health Educ J*. 2017;76(4):442–53.
57. Lee MK, Shin G. A mobile video intervention for women's health of North Korean defectors. *Public Health Nurs*. 2018;35(6):558–62.
58. Nakajima M, Haji A, Mohamud S, Ahmed O, Hodges JS, Pratt R. A culturally adapted colorectal cancer education video for the Somali community in Minnesota: A pilot investigation. *Am J Health Promot*. 2022;36(3):514–7.
59. Lee-Lin F, Menon U, Leo MC, Pedhiwala N. Feasibility of a targeted breast health education intervention for Chinese American immigrant women. *Oncol Nurs Forum*. 2013;40(4):361–72.
60. Tuzcu A, Bahar Z, Gözümlü S. Effects of interventions based on health behavior models on breast cancer screening behaviors of migrant women in Turkey. *Cancer Nurs*. 2016;39(2).
61. Zhu L, Kim EJ, González E, Fraser MA, Zhu S, Rubio-Torío N, et al. Reducing liver cancer risk through dietary change: positive results from a Community-Based educational initiative in three Racial/Ethnic groups. *Nutrients*. 2022;14(22).
62. Luque JS, Tarasenko YN, Reyes-García C, Alfonso ML, Suazo N, Rebing L, Ferris DG. Salud Es Vida: a cervical cancer screening intervention for rural Latina immigrant women. *J Cancer Educ*. 2017;32(4):690–9.
63. Lee EE, Brecht ML, Park H, Lee J, Oh KM. Web-Based study for improving mammography among Korean American women. *J Cancer Educ*. 2017;32(2):257–63.
64. Li M, Yeh YL, Sun H, Chang B, Chen LS. Community-Based participatory research: a family health History-Based colorectal cancer prevention program among Chinese Americans. *J Cancer Educ*. 2020;35(3):485–92.
65. So WKW, Law BMH, Chan CWH, Leung DYP, Chan HYL, Chair SY. Development and evaluation of a multimedia intervention to promote cervical cancer prevention among South Asian women in Hong Kong. *Ethn Health*. 2022;27(2):284–96.
66. Hurtado-de-Mendoza A, Gómez-Trillos S, Graves KD, Carrera P, Campos C, Anderson L, et al. Process evaluation of a culturally targeted video for Latinas at risk of hereditary breast and ovarian cancer. *J Genet Couns*. 2021;30(3):730–41.
67. Lee-Lin F, Nguyen T, Pedhiwala N, Dieckmann N, Menon U. A breast health educational program for Chinese-American women: 3- to 12-month postintervention effect. *Am J Health Promot*. 2015;29(3):173–81.
68. Freund A, Cohen M, Azaiza F. A culturally tailored intervention for promoting breast cancer screening among women from Faith-Based communities in Israel: A randomized controlled study. *Res Social Work Pract*. 2019;29(4):375–88.
69. Fang CY, Ma GX, Handorf EA, Feng Z, Tan Y, Rhee J, et al. Addressing multilevel barriers to cervical cancer screening in Korean American women: A randomized trial of a community-based intervention. *Cancer*. 2017;123(6):1018–26.
70. Gwede CK, Sutton SK, Chavarria EA, Gutierrez L, Abdulla R, Christy SM, et al. A culturally and linguistically salient pilot intervention to promote colorectal cancer screening among Latinos receiving care in a federally qualified health center. *Health Educ Res*. 2019;34(3):310–20.
71. Ma GX, Lee M, Beeber M, Das R, Feng Z, Wang MQ, et al. Community-Clinical linkage intervention to improve colorectal cancer screening among underserved Korean Americans. *Cancer Health Disparities*. 2019;3:e1–15.
72. Wong CL, Choi KC, Chen J, Law BMH, Chan DNS, So WKW. A community health Worker-Led multicomponent program to promote cervical cancer screening in South Asian women: A cluster RCT. *Am J Prev Med*. 2021;61(1):136–45.
73. Hyatt A, Lipson-Smith R, Gough K, Butow P, Jefford M, Hack TF, et al. Including migrant oncology patients in research: A multisite pilot randomised controlled trial testing consultation audio-recordings and question prompt lists. *Contemp Clin Trials Commun*. 2022;28:100932.
74. Jandorf L, Hecht MF, Winkel G, Thélémaque LD, Saad-Harfouche FG, Bursac Z, et al. Increasing cancer screening for Latinas: examining the impact of health messages and navigation in a Cluster-Randomized study. *J Racial Ethnic Health Disparities*. 2014;1(2):85–100.
75. Fung LC, Nguyen KH, Stewart SL, Chen MS Jr, Tong EK. Impact of a cancer education seminar on knowledge and screening intent among Chinese Americans: results from a randomized, controlled, community-based trial. *Cancer*. 2018;124(Suppl 7):1622–30.
76. Lipson-Smith R, Hyatt A, Butow P, Hack TF, Jefford M, Hale S, et al. Are audio recordings the answer? - a pilot study of a communication intervention for non-English speaking patients with cancer. *Psychooncology*. 2016;25(10):1237–40.
77. Lee E, Menon U, Nandy K, Szalacha L, Kviz F, Cho Y, et al. The effect of a couples intervention to increase breast cancer screening among Korean Americans. *Oncol Nurs Forum*. 2014;41(3):E185–93.
78. Dominic OG, Chinchilli V, Wasserman E, Curry WJ, Kambic DM, Caicedo CH, et al. Impact of social support on colorectal cancer screening among adult Hispanics/Latinos: A randomized Community-based study in central Pennsylvania. *Cancer Prev Res (Phila)*. 2020;13(6):531–42.
79. Ford S, Meghea C, Estes T, Hamade H, Lockett M, Williams KP. Assessing the fidelity of the kin keepersm prevention intervention in African American, Latina and Arab women. *Health Educ Res*. 2014;29(1):158–65.
80. Cristizabal C, Suther S, Yao Y, Behar-Horenstein LS, Webb F, Stern MC, Baezconde-Garbanati L. Training community African American and Hispanic/Latino/a advocates on prostate cancer (PCa): a multicultural and bicoastal approach. *J Cancer Educ*. 2023;38(5):1719–27.
81. Chan DNS, Choi KC, Wong CL, So WKW, Fan N. Use of a linguistically appropriate decision aid for cervical cancer screening of South Asian ethnic minority women in Hong Kong: A pilot randomised controlled trial. *Int J Behav Med*. 2023;30(6):878–90.
82. Ghebrendrias S, Mody S, Washington S, Hussein B, Jama F, Jacobs M. A cervical cancer screening toolkit for Somali women: A pilot randomized controlled trial. *J Immigr Minor Health*. 2023;25(6):1307–14.
83. Guo M, Brar Prayaga R, Levitz CE, Kuo ES, Ruiz E, Torres-Ozadali E, Escaron A. Tailoring a text messaging and Fotonovela program to increase patient engagement in colorectal cancer screening in a large urban community clinic population: quality improvement project. *JMIR Cancer*. 2023;9:e43024.
84. Mora J, Romo R, Dempsey S, Silva B, Nevels D, Leone GW, Stolley M. Engaging the community served: a U.S. Cancer center's Facebook live cancer awareness campaign for Spanish-speaking Latinos during COVID-19. *Cancer Causes Control*. 2023;34(12):1037–42.
85. Rivas G, Rodríguez-Colon S, Ramirez SI, Galdamez C, Valdez S, Shirley S, et al. Evaluation of the Spanish-Language cancer educational webinar series Vámos a educarnos contra El cancer with the RE-AIM framework. *J Cancer Educ*. 2023;38(5):1629–35.
86. Dolan NC, Ramirez-Zohfeld V, Rademaker AW, Ferreira MR, Galanter WL, Radosta J, et al. The effectiveness of a Physician-Only and Physician-Patient intervention on colorectal cancer screening discussions between providers and African American and Latino patients. *J Gen Intern Med*. 2015;30(12):1780–7.
87. Thompson B, Barrington WE, Briant KJ, Kupay E, Carosso E, Gonzalez NE, Gonzalez VJ. Educating Latinas about cervical cancer and HPV: a pilot randomized study. *Cancer Causes Control*. 2019;30(4):375–84.

88. Fung J, Vang S, Margolies LR, Li A, Blondeau-Lecomte E, Li A, Jandorf L. Developing a culturally and linguistically targeted breast cancer educational program for a multicultural population. *J Cancer Education: Official J Am Association Cancer Educ.* 2021;36(2):395–400.
89. WHO. (2025) Improving Health Literacy Improving health literacy accessed 03/02/2025125.
90. Baezconde-Garbanati LA, Chatterjee JS, Frank LB, Murphy ST, Moran MB, Werth LN, et al. Tamale lesson: A case study of a narrative health communication intervention. *J Commun Healthc.* 2014;7(2):82–92.
91. Wu TY, Lin C. Developing and evaluating an individually tailored intervention to increase mammography adherence among Chinese American women. *Cancer Nurs.* 2015;38(1):40–9.
92. Hofvind S, Iqbal N, Thy JE, Mangerud G, Bhargava S, Zackrisson S, Berstad P. Effect of invitation letter in Language of origin on screening attendance: randomised controlled trial in breast screen Norway. *BMJ.* 2023;382:e075465.
93. Truong L, Tat J, Booy M, Le A, Marasigan J, Yuan C, et al. The Asian grocery Store-Based cancer education program: creating new education modules. *J Cancer Educ.* 2016;31(2):292–300.
94. Melnic I, Alvarado AE, Claros M, Martinez CI, Gonzalez J, Gany F. Tailoring nutrition and cancer education materials for breast cancer patients. *Patient Educ Couns.* 2022;105(2):398–406.
95. Hyatt A, Lipson-Smith R, Gough K, Butow P, Jefford M, Hack TF, et al. Culturally and linguistically diverse oncology patients' perspectives of consultation audio-recordings and question prompt lists. *Psycho-oncology.* 2018;27(9):2180–8.
96. García I, Palacios RL, Reyes C. A Latina community's evaluation of the culturally adapted conexiones program. *Health Promot Pract.* 2022;23(4):662–71.
97. Wu VS, Smith AB, Girgis A. Moving beyond translation: development of WeCope, a self-management resource for Chinese-Australian immigrants affected by cancer. *Eur J Cancer Care.* 2022;31(1):e13531.
98. Robotin MC, Porwal M, Hopwood M, Nguyen D, Sze M, Treloar C, George J. Listening to the consumer voice: developing multilingual cancer information resources for people affected by liver cancer. *Health Expectations: Int J Public Participation Health Care Health Policy.* 2017;20(1):171–82.
99. Wang EY, Borno HT, Washington Ili SL, Friedlander T, Zhang S, Trejo E, et al. Engaging men of diverse Racial and ethnic groups with advanced prostate cancer in the design of an mHealth diet and exercise intervention: focus group study. *JMIR cancer.* 2023;9:e45432.
100. Wood EH, Leach M, Villicana G, Goldman Rosas L, Duron Y, O'Brien DG, et al. A community-Engaged process for adapting a proven community health worker model to integrate precision cancer care delivery for Low-income Latinx adults with cancer. *Health Promot Pract.* 2023;24(3):491–501.
101. Piombo SE, Miller KA, Alderete K, Egan A, Golingay S, Valente TW. Evaluation of a Nurse-Delivered Pre-Chemotherapy educational intervention to increase knowledge and reduce anxiety among ethnically diverse patients. *J Cancer Educ.* 2021;36(4):728–34.
102. Badger TA, Segrin C, Sikorski A, Pasvogel A, Weihs K, Lopez AM, Chalasani P. Randomized controlled trial of supportive care interventions to manage psychological distress and symptoms in Latinas with breast cancer and their informal caregivers. *Psychol Health.* 2020;35(1):87–106.
103. Lu J, Zeng X, Liao J, Zhang Y, Yang L, Li Y, Lv J. Effectiveness of an intervention to promote Self-Efficacy on quality of life of patients with nasopharyngeal carcinoma of the Zhuang tribe minority in Guangxi, China: A prospective study. *Med Sci Monit.* 2017;23:4077–86.
104. Madore S, Kilbourn K, Valverde P, Borrayo E, Raich P. Feasibility of a psychosocial and patient navigation intervention to improve access to treatment among underserved breast cancer patients. *Support Care Cancer.* 2014;22(8):2085–93.
105. Sungur H, Yilmaz NG, Chan BMC, Muijsenbergh METCvd W, JCMv, Schouten BC et al. Development and Evaluation of a Digital Intervention for Fulfilling the Needs of Older Migrant Patients With Cancer: User-Centered Design Approach. *Journal of Medical Internet Research.* 2020;22(10):N.PAG-N.PAG.
106. Lu J, Zeng X, Liao J, Zhang Y, Yang L, Li Y, Lv J. Effectiveness of an intervention to promote Self-Efficacy on quality of life of patients with nasopharyngeal carcinoma of the Zhuang tribe minority in Guangxi, China: A prospective study. *Med Sci Monitor: Int Med J Experimental Clin Res.* 2017;23:4077–86.
107. Yanez B, Oswald LB, Baik SH, Buitrago D, Iacobelli F, Perez-Tamayo A, et al. Brief culturally informed smartphone interventions decrease breast cancer symptom burden among Latina breast cancer survivors. *Psycho-oncology.* 2020;29(1):195–203.
108. Marshall CA, Curran MA, Koerner SS, Kroll T, Hickman AC, García F. Un Abrazo Para La Familia: an evidenced-based rehabilitation approach in providing cancer education to low-SES Hispanic co-survivors. *J Cancer Educ.* 2014;29(4):626–33.
109. Im EO, Kim S, Yang YL, Chee W. The efficacy of a technology-based information and coaching/support program on pain and symptoms in Asian American survivors of breast cancer. *Cancer.* 2020;126(3):670–80.
110. Im EO, Chee W, Paul S, Choi MY, Kim SY, Yeo S, et al. Five dimensions of needs for help: the efficacy of a Technology-Based intervention among Asian American breast cancer survivors. *J Cancer Educ.* 2024;39(3):335–48.
111. Juarez G, Hurria A, Uman G, Ferrell B. Impact of a bilingual education intervention on the quality of life of Latina breast cancer survivors. *Oncol Nurs Forum.* 2013;40(1):E50–60.
112. Larson KL, Mathews HF, Melendez CR, Hupp T, Estrada M, Moye JP, et al. Original research: can a palliative care Lay health Advisor–Nurse partnership improve health equity for Latinos with cancer? *AJN Am J Nurs.* 2023;123(7):18–27.
113. Deng F, Chen D, Swartz MC, Sun H. A pilot study of a culturally tailored lifestyle intervention for Chinese American cancer survivors. *Cancer Control.* 2019;26(1):1073274819895489.
114. Buscemi J, Oswald LB, Baik SH, Buitrago D, Iacobelli F, Phillips SM, et al. My health smartphone intervention decreases daily fat sources among Latina breast cancer survivors. *J Behav Med.* 2020;43(5):732–42.
115. Alanzeh I, Ramjan L, Kwok C, Levesque JV, Everett B. Arab-migrant cancer survivors' experiences of using Health-care interpreters: A qualitative study. *Asia-Pacific J Oncol Nurs.* 2018;5(4):399–407.
116. Valle CG, Padilla N, Gellin M, Manning M, Reuland DS, Rios P, et al. ¿ahora Qué?? Cultural adaptation of a cancer survivorship intervention for Latino/a cancer survivors. *Psycho-oncology.* 2019;28(9):1854–61.
117. Burke NJ, Napoles TM, Banks PJ, Orenstein FS, Luce JA, Joseph G. Survivorship care plan information needs: perspectives of Safety-Net breast cancer patients. *PLoS ONE.* 2016;11(12):e0168383.
118. Wiley G, Piper A, Butow PAM, Schofield P, Douglas F, Roy J, et al. Developing written information for cancer survivors from culturally and linguistically diverse backgrounds: lessons learnt. *Asia-Pacific J Oncol Nurs.* 2018;5(1):121–6.
119. Juarez G, Mayorga L, Hurria A, Ferrell B. Survivorship education for Latina breast cancer survivors: empowering survivors through education. *Psicooncologia (Pozuelo De Alarcon).* 2013;10(1):57–68.
120. Wong AKY, Collins A, Ng A, Buizen L, Philip J, Le B. Evaluation of a large scale advance care planning Co-Design education program for Chinese-Speaking people in Australia. *Am J Hosp Palliat Care.* 2022;39(2):178–83.
121. Im E-O, Chee W, Hu Y, Kim S, Choi H, Hamajima Y, Chee E. What to consider in a culturally tailored Technology-Based intervention?? Computers, informatics, nursing: CIN. 2018;36(9):424–9.
122. O'Callaghan C, Dharmagesan GG, Roy J, Dharmagesan V, Loukas P, Harris-Roxas B. Enhancing equitable access to cancer information for culturally and linguistically diverse (CALD) communities to complement beliefs about cancer prognosis and treatment. *Supportive Care Cancer: Official J Multinational Association Supportive Care Cancer.* 2021;29(10):5957–65.
123. Banas JR, Victorson D, Gutierrez S, Cordero E, Gutleman J, Haas N. Developing a peer-to-peer mHealth application to connect Hispanic cancer patients. *J Cancer Educ.* 2017;32(1):158–65.
124. McFarlane SJ, Morgan SE, Occa A, Peng W. An evaluation of clinical trial multimedia to support Hispanic cancer patients' informational and decision-making needs. *J Cancer Educ.* 2021;36(1):110–7.
125. Chou FY, Kuang LY, Lee J, Yoo GJ, Fung LC. Challenges in cancer Self-management of patients with limited english proficiency. *Asia Pac J Oncol Nurs.* 2016;3(3):259–65.
126. Leonhardt M, Aschenbrenner K, Gröne J, Kreis ME, Lauscher JC. Sources of support and information during disease: an exploratory study, comparing migrant and nonmigrant colorectal cancer patients in Germany. *J Transcultural Nursing: Official J Transcultural Nurs Soc.* 2020;31(4):387–96.
127. WHO. 2023 Achieving well-being: a global framework for integrating well-being into public health utilizing a health promotion approach ISBN 978-92-4-008485-8 (electronic version) ISBN 978-92-4-008486-5 (print version).
128. Lee J, Carvallo M, Lee E. Feasibility of utilizing ethnic beauty salons for cervical cancer screening education. *West J Nurs Res.* 2015;37(11):1489–509.
129. Bainbridge R, McCalman J, Clifford A, Tsey K. Cultural competency in the delivery of health services for Indigenous people. Canberra: AIHW. 2015 [Available from: <https://www.aihw.gov.au/reports/indigenous-australians/cultural-competency-in-the-delivery-of-health-serv/summary>]
130. Green LW, Canada RSo, Research BCHP, editors. Study of participatory research in health promotion: review and recommendations for the



- development of participatory research in health promotion in Canada 1995: Royal Society of Canada.
131. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health*. 1998;19:173–202.
  132. Baum F, MacDougall C, Smith D. Participatory action research. *J Epidemiol Community Health*. 2006;60(10):854–7.
  133. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am J Public Health*. 1999;89(9):1322–7. <https://doi.org/10.2105/ajph.89.9.1322>. PMID: 10474547; PMCID: PMC1508772.
  134. 137, Hochbaum GM. Public participation in medical screening programs: a socio-psychological study. Public Health Service Publication No. 572. Washington, DC: United States; 1958.
  135. 138, Crosby R, Noar SM. What is a planning model? An introduction to PRECEDE-PROCEED. *J Public Health Dent*. 2011;71(Suppl 1):S7–15.
  136. Prochaska JO, DiClemente CC. Transtheoretical therapy: toward a more integrative model of change. *Psychotherapy: Theory Res Pract*. 1982;19(3):276.
  137. O'Connor AM, Tugwell P, Wells GA, Elmslie T, Jolly E, Hollingworth G, et al. A decision aid for women considering hormone therapy after menopause: decision support framework and evaluation. *Patient Educ Couns*. 1998;33(3):267–79.
  138. Gladwell M. *The tipping point: how little things can make a big difference*. New York: Little, Brown; 2000.
  139. Whitehead L, Glass C, Coppell K. The effectiveness of goal setting on glycaemic control for people with type 2 diabetes and prediabetes: A systematic review and meta-analysis. *J Adv Nurs*. 2022;78:1212–27. <https://doi.org/10.1111/jan.15084>.

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