

EFFECTIVENESS OF VIRTUAL DELIVERY OF CANCER EDUCATION FOR PATIENTS: A SYSTEMATIC REVIEW

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INTRODUCTION

Background:

As cancer survivorship increases, so does the need for clear and accessible patient education. However, many individuals continue to report unmet informational needs.¹

Traditional education methods are often limited by accessibility and resource constraints. Virtual education offers a scalable solution; however, its effectiveness in meeting patient education needs remains unclear.

Objective:

- To systematically review virtual cancer education interventions and evaluate their impact on patient knowledge improvement and user satisfaction.
- To identify trends and guide future program development and implementation in oncology care.

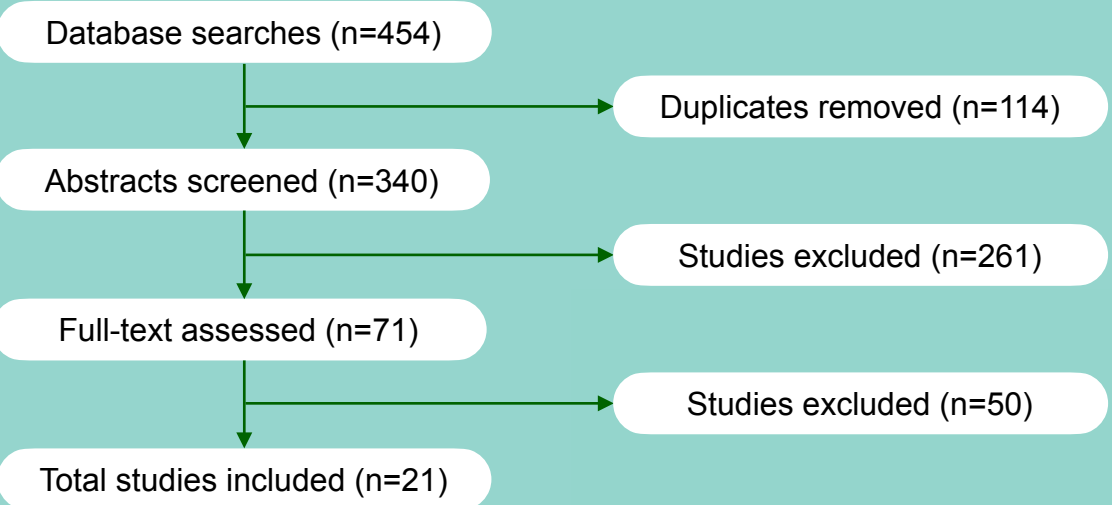
METHODOLOGY

- Pre-planned keyword searches were used to combine major concepts:**
(1) virtual education modalities AND (2) patient education and literacy AND (3) cancer-related populations AND (4) cancer-specific terminology
- Ovid MEDLINE, Embase, Cochrane, Web of Science, and CINAHL were searched (database inception to April 2025)**
- Inclusion/exclusion criteria were applied (Table 1)**
- Title, abstract, and full-text screening, as well as structured data extraction, were conducted by two independent reviewers**

Table 1: Inclusion/exclusion criteria

Inclusion criteria
Studies evaluating virtual education programs targeted at cancer patients and reporting outcomes related to knowledge translation and/or patient satisfaction with the virtual format. Published in English.
Exclusion Criteria
Conferences, Review articles, Articles not published and/or validated in English, Studies not focused on cancer education, Studies not reporting on relevant outcomes or not using virtual delivery methods.

Fig 1: PRISMA Flow Diagram



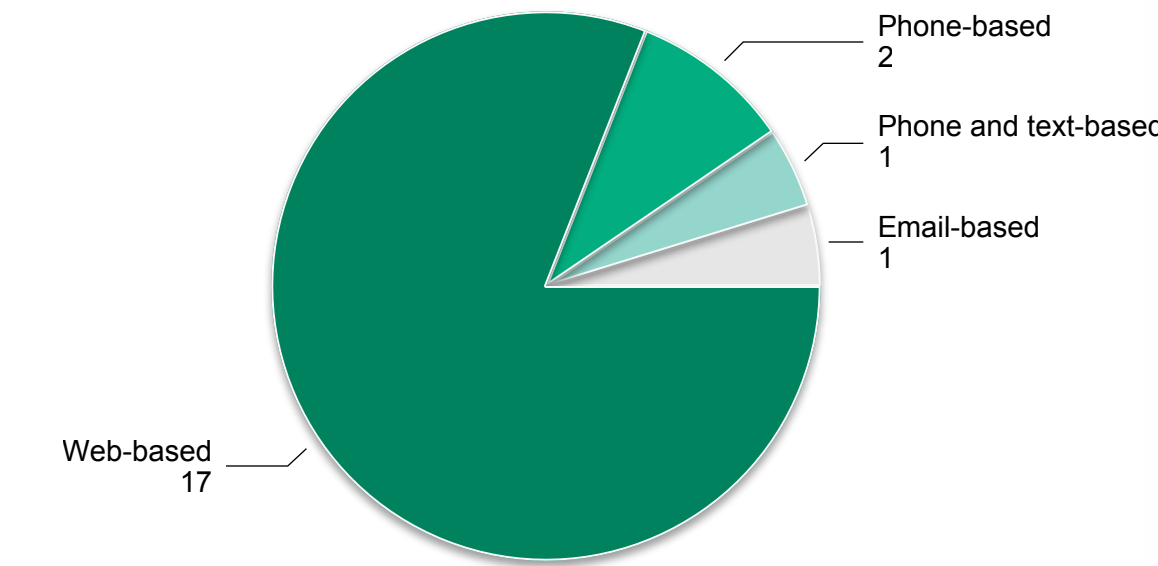
RESULTS

A total of 454 records were identified from bibliographic databases and imported into Covidence.² After removing duplicates and performing two-stage screening, a total of 21 studies were included in the review (Fig 1).³

STUDY CHARACTERISTICS

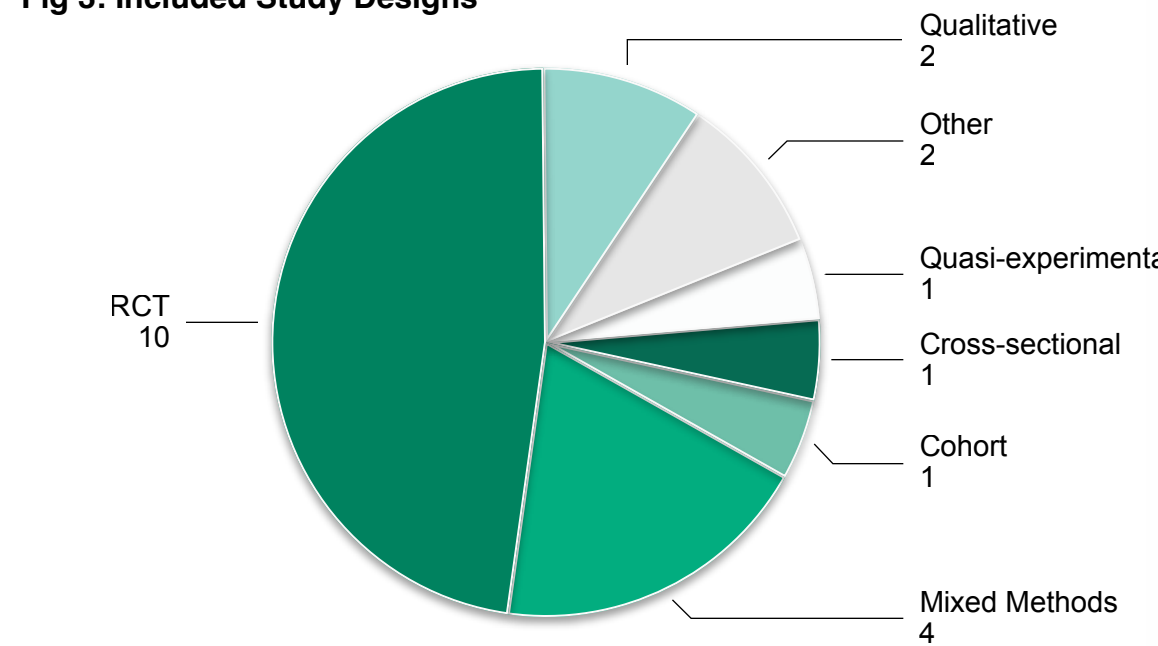
- Studies primarily originated from the United States (42.9%). The remaining were from the Netherlands, Canada, Japan, Turkey, Norway, Germany, and Australia
- Breast cancer was the most commonly represented cancer type (47.6%). Other more commonly reported cancer types included gastrointestinal, genitourinary, and lung
- The majority of studies (81%) employed web-based interventions, while the remaining studies were delivered via phone, email, or text messaging (Fig 2)

Fig 2: Virtual Delivery Methods



- Study designs included RCTs (47.6%), followed by mixed methods, qualitative, feasibility, cross-sectional, and cohort study designs (Fig 3)

Fig 3: Included Study Designs

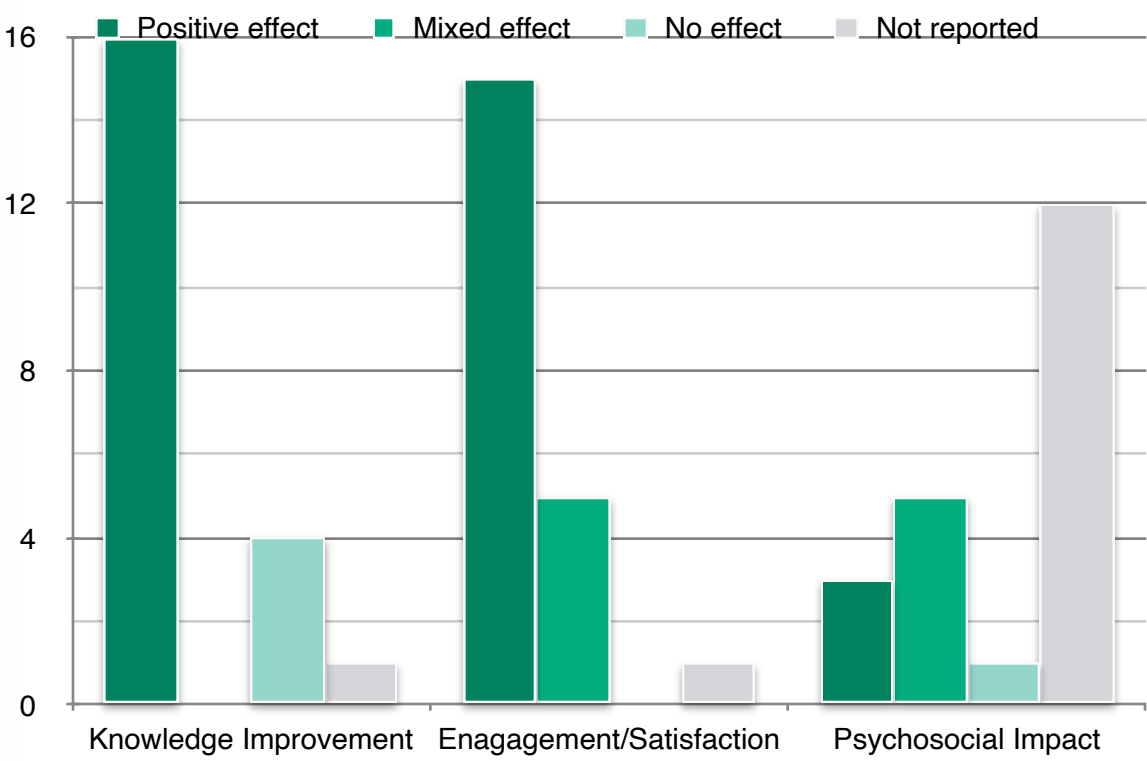


- Sample sizes across studies ranged from 8 to 753 participants (mean = 201.9; standard deviation [SD] = 210.1). The average across studies was 58.5 years

SUMMARY OF RELEVANT OUTCOMES

- 81 % of studies reported a positive impact of virtual education on knowledge translation** (Fig 4).⁴⁻²⁰
 - 43% reported increased self-efficacy.^{5, 9, 11, 12, 16, 17, 19-21}
 - 14% reported improved informed decision making.^{7, 15, 17}
 - 14% reported increased healthcare participation.^{6, 11, 18}
- 71% of studies reported high overall patient satisfaction and engagement with the virtual interventions** (Fig 4).^{5, 7-12, 14, 16, 18-22, 24}
- 14% of studies revealed positive psychosocial effects on emotional well-being and reduced distress** (Fig 4).^{4, 22, 24}

Fig 4: Distribution Across Relevant Outcomes



Successful Characteristics:

- Tailored content based on patient needs (e.g. cancer type, treatment stage)
- Interactive features (e.g., videos, quizzes, personalized feedback, live support)
- Multimodal formats (text, visual, audiovisual)
- Culturally and linguistically inclusive resources (e.g., multilingual modules)

Areas for Improvement:

- Usability issues in platform navigation, especially for older adults and those with low digital literacy.^{9-11, 15-17, 24}
- Limited engagement in some interventions due to unrefined design, insufficiently tailored education, or lack of interactivity.^{9, 10, 23}
- Emotional distress or anxiety triggered by overly complex or impersonal content.^{5, 8, 10, 17}

DISCUSSION

Study Limitations:

- Limited inclusion of digitally underserved populations
- Lack of comparison to in-person education methods across studies
- Inconsistent evaluation frameworks limit comparability and generalizability.
- Lack of data on long-term behavioural and system-level outcomes

Key Insights:

- Educational success** depends on quality content and delivery methods that align with patient needs. The evidence underscores the importance of digestible, practical, and engaging formats in supporting information retention.
- To maximize **patient engagement**, careful attention must be paid to platform usability, accessibility, patient demographics, and digital literacy.
- Psychosocial outcomes** should be evaluated alongside knowledge and engagement to support empathetic, user-centred design and ensure virtual education tools include emotionally supportive, sensitive content.

Recommendations for Future Implementation:

- Design for inclusivity and accessibility**
 - Interventions should consider digital literacy, language, and cultural appropriateness. Multimodal content (e.g., text, video, voice), multilingual support, and user-friendly interfaces can enhance accessibility for diverse populations.
- Incorporate tailored and interactive features**
 - Future interventions should prioritize personalization based on patient characteristics, treatment context, and cancer type, while integrating interactive elements such as live support and adaptive learning tools.

CONCLUSION

Virtual cancer education has demonstrated strong potential to improve patient knowledge and engagement across cancer care.

The findings highlight the potential of virtual education to address critical gaps in cancer-related informational needs, especially when interventions are tailored, interactive, and culturally responsive.

REFERENCES

