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Review

Review

Mixed methods systematic review of consumer engagement in rural health practice, research, and education

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Abstract

This systematic review aimed to synthesize evidence on consumer engagement in rural health practice, research, and education. It was conducted using the JBI mixed methods methodology, specifically the convergent integrated approach. PubMed, PsychINFO, Cochrane Library, SCOPUS, Web of Science, EMBASE, and CINAHL were searched, along with gray literature sources—Google, ProQuest Dissertation, and Theses Global. Primary research studies published globally in English, from 2011 to 2024 were included. Dual reviewer screening occurred in two stages, title and abstract, then followed by full text. Critical appraisals of included studies were undertaken using McMaster Critical Appraisal Tool for quantitative and qualitative studies, respectively, and the Mixed Methods Appraisal Tool. Extracted data was synthesized to develop themes for reporting per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. This review identified 25 studies that explored the top three levels of consumer involvement in rural healthcare settings, namely Partnership, Involving, and Consumer-led, adapted from the 2011 National Framework for Consumer Involvement in Cancer Control. Five key themes were developed from the data: positive impacts of co-design, importance of relationship building, sustainability of interventions, power issues in co-design, and the importance of context. Findings showed that interventions utilizing the top three partnership levels (consumer-led, partnership, and involving) consistently lead to positive impacts on health outcomes of rural communities with higher levels of sustained engagement. Enablers and barriers were identified and categorized into a macro, micro, and meso framework for direct comparison between studies. Rural healthcare initiatives involving consumer engagement appear to have several benefits including strengthening community-researcher relationships, enhanced sustainability, and enriching local contexts while addressing power imbalances to enhance healthcare outcomes.

Keywords: consumer engagement; co-design; rural healthcare; partnership in healthcare; consumer-led; rural health research; rural health education

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Contribution to Health Promotion

- The findings show that involving rural communities in healthcare decisions leads to better physical health outcomes, stronger connections between researchers and communities, and fairer healthcare access.
- Identifying the key and unique enablers and barriers to consumer engagement in a rural setting provides a framework to guide more effective policy and practice.
- Encouraging community-driven approaches ensures long-term healthcare solutions, making services more relevant, sustainable, and inclusive.
- The findings present actionable recommendations on how best to involve and actively engage stakeholders from rural communities in initiatives that will improve their health and quality of life.
- This review presents a collection of novel data from global initiatives focused on rural health which provides for the evidence gap in current research as well as develops on the work needed to be done for this topic as described by Kenny *et al.* (2013).

INTRODUCTION

Globally, rural and remote communities are well known to experience poorer health outcomes compared to those living in metropolitan areas (Cosby *et al.* 2008, Scheil-Adlung 2015, Richman *et al.* 2019). There are many prominent factors leading to this disparity including larger geographical distances from healthcare centers, poorer retention of healthcare staff, lower levels of health literacy, and higher chronic disease burden per capita (Bourke *et al.* 2012). Consumer engagement or co-design when used in a context of active involvement of consumers in the concept, design, and implementation of rural healthcare initiatives within their own local communities, can improve physical health outcomes by providing a sense of ownership and trust in not only the process but also the healthcare staff and center (Carman *et al.* 2013, Kenny *et al.* 2013, World Health Organization 2020). In addition, active consumer engagement allows for integration and understanding of the history, culture, and local context of health issues and can empower communities to have increased control over their own health (Baum 2006).

Available literature showcases the use of Participatory Action Research (PAR) in consumer engagement in various contexts (World Health Organization 2020). Within PAR methodology lies subsections of involvement in the research process ranging from "Co-Production" where previously determined solutions to an already identified problem are shared to best utilize existing community resources and assets, to "Co-Creation" where stakeholders are involved in all aspects from problem identification to solution generation and implementation (Vargas *et al.* 2022). These subsections are mapped hierarchically from highest level of consumer involvement to lowest in the National Framework for Consumer Involvement in Cancer Control (Cancer Australia and Cancer Voices Australia 2011) and are included in the World Health Organization Consumer Engagement Guide (World Health Organization 2020). Studies have shown that research involving consumers at these higher levels of engagement (i.e. involving, partnership, and consumer-led levels) have led to positive physical and mental health benefits as well as improved quality of life compared to those mapped at lower levels (i.e. informing, consulting) (Matarasso 1997, Seyfang and Smith 2002, Ziersch and Baum 2004, Callard and Friedli 2005, Bolam *et al.* 2006, Boyle *et al.* 2006).

Most current literature on consumer engagement in healthcare stems from urban and resource-rich settings, and overlooks the distinct challenges and opportunities faced by rural regions. With known disparities existing in rural areas compared to urban settings and the translation of that into poorer health outcomes (Richman *et al.* 2019), it is imperative that targeted research into mitigation measures to help close the gap are undertaken. To date, only one scoping review exists that maps six papers against "higher levels of consumer engagement" (Kenny *et al.* 2013). This paper was published over a decade ago and concluded that in order to better understand how to successfully enact consumer engagement interventions in rural settings, more in-depth research must be conducted. This systematic review aims to bridge this information gap by collating international examples of interventions in rural settings and mapping them to a standardized framework to analyze the enablers and barriers faced to conceive, grow, and initiate healthcare projects with active tertiary-level consumer engagement. The review used a mixed methods design approach as this was appropriate to maximize the depth of data collected and to allow for a wider breadth of research questions to be addressed (Wasti *et al.* 2022), which is essential when examining research, practice, and education.

The review question was "what are the enablers and barriers of consumer engagement in practice, research and education in rural regions?". It seeks to provide updated evidence for policymakers, researchers, and health care workers by offering actionable recommendations tailored to the unique constraints and needs of rural communities that can inform rural health policy, practice, research and education into the future to enhance consumer engagement.

MATERIALS AND METHODS

Categorizing enablers and barriers to consumer involvement levels utilizes the macro, meso, and micro framework (see Supplementary Figure S1) and allows in-depth analysis and recognition of the complex hierarchical architecture underpinning socio-institutional change in healthcare settings (Mayne *et al.* 2024, Woods *et al.* 2024). Granting opportunities to dissect enablers and barriers into levels that can be directly compared across

Table 1. Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Population	Consumers of rural healthcare (includes patients, survivors, carers, family member of patient/survivor, advocates)	Consumers of healthcare in metropolitan areas.
	In the case of studies conducted across various populations, if the data are reported on the populations separately, the rural data may be extracted and used.	In the case of studies where results are for rural and metropolitan populations, but results are unable to be separated out.
Investigated phenomena	Consumer involvement/co-design in rural health practice, education, and research. Must have consumer involvement that can be mapped against the top three levels of the National Framework for Consumer Involvement in Cancer Control (Cancer Australia and Cancer Voices Australia 2011)—i.e. involving, partnership, and consumer-led	Consumer involvement/co-design outside rural health settings. Unless there are mixed populations in which the rural specific data can be extracted.
		Consumer involvement that cannot be mapped on the top three levels of the National Framework for Consumer Involvement in Cancer Control (Cancer Australia and Cancer Voices Australia 2011)—i.e. consulting and involving consumers at the end for receiving feedback about a service
Context	Rural healthcare practice (both in hospitals and community), education (includes health worker education), and research that involves consumers	Practice, education, and research that involves consumers in metropolitan areas
Study design	Primary research studies Quantitative designs (including RCTs, cohort studies, pre-post, cross-sectional, etc.)	Secondary research (systematic reviews, other reviews) Editorials, opinion pieces, commentaries
	Qualitative designs (including interviews, focus groups, case studies)	Position papers
	Mixed methods design	Conference abstracts and posters
		Research protocols
Other	Global, but limited to English language literature	Non-English literature
	Publications dated 01/01/2011 until 17/04/24	Publications prior to 2011
	Full text	

different initiatives. Information can then be accessed at any level by stakeholders (consumers, community leaders, researchers, educators, policymakers, or local government) to provide a breakdown of individual suggestions of how to effectively engage rural consumers in projects related to their own healthcare.

The reporting of this mixed methods systematic review is per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page *et al.* 2021). The steps of the review included the development of rationale, protocol development, literature searching, screening and study selection, data extraction, risk of bias assessment, data synthesis, and report dissemination. Page *et al.* (2021) This systematic review was conducted using the JBI mixed methods methodology, specifically the convergent integrated approach (Lizarondo *et al.* 2024). This is a process of combining extracted data from quantitative and qualitative studies (Lizarondo *et al.* 2024). A full protocol was developed and registered on PROSPERO (CRD42023448430) (Martin *et al.* 2023).

Eligibility criteria

A Population, Investigated Phenomena, and Context (PICo) criteria was utilized to determine the key terms for the search strategy and develop the inclusion criteria for study selection (Table 1). Due to the wide breadth of our search parameters, we defined some key terms prior to searching databases to ensure a standardized screening criteria. Three main terms were defined (Supplementary Table S2).

Searches

The following electronic databases were searched as they predominantly include medical and healthcare literature: PubMed, PsycINFO, Cochrane Library, SCOPUS, Web of Science, EMBASE, and CINAHL (Search date: 17/04/2024). The gray literature search was undertaken through ProQuest Dissertation and Thesis Global, and Google on 28th and 29th July 2024.

Search strategy

Searches were restricted to the English language, publications from January 2011 until July 2024 and those with full text available. This somewhat aligns with the time when the benefit of consumer involvement was acknowledged and the methods of implementing consumer involvement gained attention (Nilsen *et al.* 2006). Based on PICo, the key terms for the search were rural health (population), enablers and barriers of consumer involvement in practice, education, and research (investigated phenomenon) and health services (context). Search strategies for all databases have been included in Supplementary Tables S3a–S3i. The search strategy was developed by an information specialist in the review team (L.L.), and a healthcare librarian.

Screening and study selection

Citations generated by the electronic databases were uploaded onto Covidence (Veritas Health Innovation 2024). In the initial selection process (title and abstract screening), all records were dual screened independently from among six reviewers

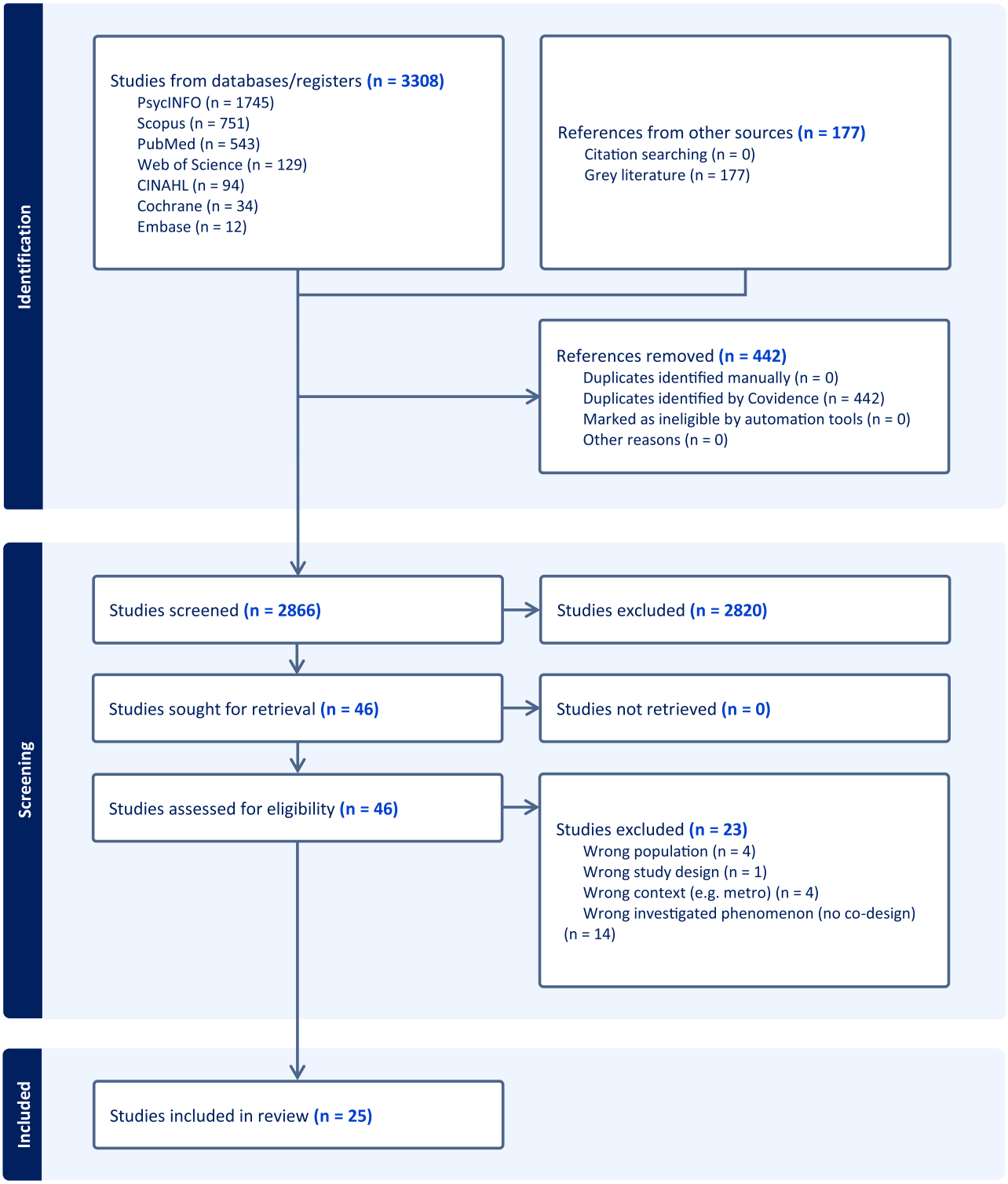

Figure 1. PRISMA flowchart of included studies.

(T.B., C.B., P.M., L.S., Y.J.C., and J.V.H.). In step two (full-text screening), each record was dual screened independently from among four reviewers (T.B., P.M., Y.J.C., and J.V.H.). Any discrepancies in both stages of screening were resolved through collaborative team discussions. Publications which met all the inclusion criteria (Fig. 1) were included in the final review. Supplementary Table S4 contains a list of excluded studies with reasons for exclusion.

Risk of bias (quality) assessment

Two reviewers (J.V.N. and T.B.) assessed the methodological quality of the included studies using the McMaster Critical Appraisal Tool for Quantitative Studies (Law *et al.* 1998), McMaster Critical Appraisal Tool for Qualitative Studies (Letts *et al.* 2007), and the Mixed Methods Appraisal Tool (Hong *et al.* 2018), as appropriate depending on the

methodology used. These quality assessment tools have been widely used in reviews and are freely available and cover all aspects of a quality assessment required by the authors. Moreover, these tools provide a framework for evaluating various research designs. A third reviewer (from Y.J.C., C.B., and L.S.) conducted a full verification of all the judgments. Any conflicts were resolved by mutual discussions or by a third reviewer. The quality assessment allowed for a better understanding of the strengths and limitations associated with this body of work insofar as reporting standards go, allowing a comprehensive offer of information for future applications based on this assessment.

Data extraction, transformation, and synthesis

A custom data extraction template was developed and piloted with the review team on a small proportion of articles. Two reviewers extracted all the data (J.V.H. and T.B.), and an additional reviewer (Y.J.C. or L.S.) was brought in where clarification was needed. The following minimum data were extracted: (i) authors, (ii) year of publication, (iii) country/region of origin, (iv) study design, (v) type of consumer (patient, carer, family member, doctor, and nurse), (vi) barriers, and (vii) enablers. The data extraction template has been attached as Supplementary Table S5.

Following data extraction, a systematic process was undertaken to facilitate the integration of quantitative and qualitative data (Lizarondo *et al.* 2024). Quantitative data were only limited and were "qualitized" by converting numerical findings into textual descriptions or narrative interpretations that aligned with the review questions as per the JBI guidelines (Lizarondo *et al.* 2024). This process involved repeated, detailed examination to ensure that the quantitative results were meaningfully represented in a way that allowed direct comparison with qualitative data. The transformed (qualitized) data were then carefully assembled with the qualitative data and categorized based on conceptual similarity to generate integrated findings. These findings were synthesized into lines of action statements, ensuring that they reflected a cohesive interpretation of both data types. To further structure the synthesis, the identified enablers and barriers to co-design were mapped across macro, meso, and micro framework layers, providing a multi-level perspective on the factors influencing co-design implementation.

Extracted data were analyzed using reflexive thematic analysis that emphasizes the roles of the researchers' self-awareness and critical reflection throughout the analysis process (Braun and Clarke 2019). Accordingly, two reviewers (J.V.H. and P.M.) analyzed the data using a flexible and iterative approach with frequent group discussions with the larger review team to make sense of the findings.

RESULTS

This review consists of one quantitative study (Wereta *et al.* 2018), eight mixed methods (Seguin *et al.* 2014, Fennell *et al.* 2017, Taylor *et al.* 2018, Morrison *et al.* 2020, Yadav *et al.* 2021, Pandey *et al.* 2022, Dzobo *et al.* 2023, Shrestha *et al.* 2023), and 16 qualitative studies (Barnidge *et al.* 2015, Goris *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Fort *et al.* 2019, Mammen *et al.* 2019, Rafie *et al.* 2019, Skewes *et al.* 2019, Lazo-Porras *et al.* 2020, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Milton *et al.* 2021, Hards *et al.* 2022, Hove *et al.* 2023, Muhumuza *et al.* 2023, Okop *et al.* 2023). Of these, 14 were qualitative PAR (Barnidge *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Fort *et al.* 2019, Mammen *et al.* 2019, Rafie *et al.* 2019, Skewes *et al.* 2019, Lazo-Porras *et al.* 2020, Milton *et al.* 2021, Pandey *et al.* 2022, Hove *et al.* 2023, Muhumuza *et al.* 2023, Okop *et al.* 2023). Overall, there were two longitudinal case studies, one mixed method (Taylor *et al.* 2018) and one qualitative (Gheduzzi *et al.* 2021), as well as one cluster randomized controlled trial (Morrison *et al.* 2020). All methods are summarized in the study characteristics table (Table 2).

Included reviews were published between 2014 and 2023. Twelve studies were published in the 2010s and 13 studies were published in the 2020s, with 17 of these published in the last 5 years (Fort *et al.* 2019, Mammen *et al.* 2019, Rafie *et al.* 2019, Skewes *et al.* 2019, Lazo-Porras *et al.* 2020, Morrison *et al.* 2020, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Milton *et al.* 2021, Yadav *et al.* 2021, Hards *et al.* 2022, Pandey *et al.* 2022, Dzobo *et al.* 2023, Hove *et al.* 2023, Muhumuza *et al.* 2023, Okop *et al.* 2023, Shrestha *et al.* 2023). The studies included in this review were mainly conducted in the USA ($n = 7$), Australia ($n = 3$), Canada ($n = 2$), Ethiopia ($n = 2$), and Nepal ($n = 2$).

The sample size of included studies ranged from $n = 8$ (Dzobo *et al.* 2023) to more than $n = 628$ as consumer participant counts were not explicitly reported (Morrison *et al.* 2020). Fourteen studies failed to explicitly report the number of participants. The level of consumer involvement in included studies were mapped against the National Framework for Consumer Involvement in Cancer Control (Cancer Australia and Cancer Voices Australia 2011) and included 11 studies at the partnership level (Barnidge *et al.* 2015, Mutiso *et al.* 2018, Taylor *et al.* 2018, Muhumuza *et al.* 2023, Rafie *et al.* 2019, Morrison *et al.* 2020, Yadav *et al.* 2021, Hards *et al.* 2022, Pandey *et al.* 2022, Dzobo *et al.* 2023, Hove *et al.* 2023), 11 studies at the involving level (Goris *et al.* 2015, Fennell *et al.* 2017, Fort *et al.* 2019, Mammen *et al.* 2019, Skewes *et al.* 2019, Lazo-Porras *et al.* 2020, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Okop *et al.* 2023, Shrestha *et al.* 2023, Lizarondo *et al.* 2024), and three studies mapped as consumer-led (Seguin *et al.* 2014, Mutale *et al.* 2017, Milton *et al.* 2021). The context of co-design involved 19 studies in health practice, 9 studies in research, and 2 studies were involved in education. Table 2 presents further characteristic information of included reviews.

Methodological quality

The primary methodological risk of bias identified in the qualitative studies included insufficient reporting on whether sampling continued until data saturation ($n = 13$). Additionally, many studies did not adequately identify researchers' assumptions and potential biases ($n = 13$), which is critical for descriptive clarity. Despite these gaps, the overall quality of the studies was high, with eleven studies scoring over 80%, meeting more than 17 of the 21 McMaster criteria (Letts *et al.* 2007) (Supplementary Table S6a). However, several studies did not provide a clear and thorough description of participants ($n = 7$) or explain the role of the researcher and their relationships with participants ($n = 8$), both key to ensuring procedural and descriptive rigor.

The single quantitative study assessed met 11 out of the 15 criteria outlined in the McMaster tool (Law *et al.* 1998) (Supplementary Table S6b). Key areas of methodological

Table 2. Study characteristics.

Author/s and year	Country and context (practice, research, education)	Study design	Level of consumer engagement	Participants—consumers ($n = X$) Description n	Participants—HCWs ($n = X$) Profession n
Barnidge *et al.* (2015)	United States of America. Health practice, and education.	Qualitative participatory regional partnership process.	Partnership.	Community partners ($n = 30$) Community liaisons ($n = 2$)	Researchers (n = not explicitly reported)
Dzobo *et al.* (2023)	Zimbabwe. Health practice.	Multiphase sequential exploratory mixed methods study.	Partnership.	Women ($n = 4$)	Nurses ($n = 2$) Healthcare policy makers ($n = 2$)
Fennell *et al.* (2017)	Australia. Health practice, patient education.	Mixed methods study—participatory action research (reported only qualitative results).	Involving.	Phase 1: consumers ($n = 10$) Phase 2: cancer patients ($n = 24$) Carer/parents/etc. ($n = 29$) Other ($n = 5$)	Phase 1: healthcare professional ($n = 1$) Phase 2: healthcare professionals ($n = 53$)
Fort *et al.* (2019)	Guatemala. Health practice.	Qualitative community-based participatory research approach.	Involving.	Patients and family members. (n = not explicitly reported)	Health area and district directors, technical team members, frontline health care providers. (n = not explicitly reported)
Gheduzzi *et al.* (2021)	Italy. Research and health practice Predominantly research.	Qualitative longitudinal case study.	Involving.	Co-assessment workshops: Carers ($n = 11$)	Semistructured interviews: ATSP representatives ($n = 4$) Co-assessment workshops: ATSP representatives ($n = 3$) Researchers ($n = 2$) Reflexivity approach: Researchers ($n = 4$)
Goris *et al.* (2015)	United States of America. Research.	Qualitative study phenomenology.	Involving.	Community members ($n = 16$) Community leaders ($n = 30$)	Interviewees ($n = 3$) Other researchers (n = not explicitly reported)
Hards *et al.* (2022)	Canada. Research.	Qualitative study phenomenology.	Partnership.	Patient co-lead ($n = 1$) Forum participants ($n = 6$) Interviewed participants ($n = 12$)	Researchers ($n = 2$)
Hove *et al.* (2023)	South Africa. Health practice .	Qualitative participatory action research.	Partnership.	Community and religious leaders, community health workers, traditional healers, and family members ($n = 31$). Community stakeholders ($n = 24$) Village-based discussion group ($n = 16$) Workshop 1 stakeholders ($n = 13$) Workshop 2 stakeholders ($n = 12$) Workshop 3 stakeholders ($n = 15$)	Researchers (n = not explicitly reported)
Lazo-Porras *et al.* (2020)	Peru.	Qualitative participatory action research.	Involving.	Health workers, traditional healers, patients, and caregivers, community representatives ($n = 68$).	Researchers (n = not explicitly reported)

Table 2. Continued

Author/s and year	Country and context (practice, research, education)	Study design	Level of consumer engagement	Participants—consumers ($n = X$) Description n	Participants—HCWs ($n = X$) Profession n
	Health practice				Ministry of Health office at the regional level, regional medical stores, pharmacies, hospitals, and clinics ($n = 6$).
Mammen *et al.* (2019)	United States of America. Health practice.	Qualitative participatory action research .	Involving.	Rural, low-income mothers' participation: Focus groups ($n = 43$) Interviews ($n = 75$) Other communication channels ($n = 33$)	Educators, social workers and others directly involved in providing services to rural, low-income families ($n = 64$). Researchers ($n =$ not explicitly reported).
Masunga *et al.* (2021)	The Gambia. Research.	Qualitative participatory action research.	Involving.	Participants ($n =$ not explicitly reported).	Researchers ($n =$ not explicitly reported).
Milton *et al.* (2021)	Australia. Health practice.	Qualitative participatory action research.	Consumer led.	Consumers of Butterfly's National Helpline ($n = 45$)	Workshop facilitators, mental health professionals ($n =$ not explicitly reported).
Morrison *et al.* (2020)	Nepal. Health practice.	Mixed methods cluster randomised controlled trial participatory action research.	Partnership.	Total of 203 women's groups ($n =$ not explicitly reported).	Female community health volunteers ($n = 195$) Health management committee members ($n = 177$) Community representatives ($n = 202$) Health workers and auxiliary staff ($n = 54$)
Muhumuza *et al.* (2023)	Uganda. Health practice	Qualitative participatory action research.	Partnership.	Participants who had unmet family planning needs ($n = 26$). Small pilot group sessions ($n = 14$).	Key informant interviews ($n = 15$).
Mutale *et al.* (2017)	Zambia. Health practice.	Qualitative participatory action research.	Consumer-led.	Community conversation participants ($n = 605$). Community conversation facilitators ($n =$ not explicitly reported).	District directors of health, local health workers, and non-governmental organizations ($n =$ not explicitly reported). lorganizations
Mutiso *et al.* (2018)	Kenya. Health practice.	Qualitative participatory action research.	Partnership.	Consumers ($n =$ not explicitly reported).	Researchers ($n =$ not explicitly reported).
Okop *et al.* (2023)	Ethiopia, Malawi, Rwanda, and South Africa. Research.	Qualitative participatory action research.	Involving.	Citizen scientists ($n = 51$). Participants surveyed ($n = 205$). Stakeholders in advocacy workshops ($n = 320$).	Researchers ($n =$ not explicitly reported).
Pandey *et al.* (2022)	Canada. Health practice.	Mixed methods—participatory action research (reported only qualitative results).	Partnership.	People with lived experience ($n = 5$). Elders ($n = 2$). Community members ($n = 3$).	Focus group: Healthcare professional ($n = 1$), nurse manager ($n = 1$). Multidisciplinary team: infectious disease physicians ($n = 2$), nurses ($n = 4$), nurse manager ($n = 1$), and community outreach worker ($n = 1$).

Table 2. Continued

Author/s and year	Country and context (practice, research, education)	Study design	Level of consumer engagement	Participants—consumers ($n = X$) Description n	Participants—HCWs ($n = X$) Profession n
					Other researchers (n = not explicitly reported).
Rafie *et al.* (2019)	United States of America.	Qualitative participatory action research	Partnership.	Cancer patients and caregivers, healthcare providers and administrators, and policymakers from a rural Virginia community ($n = 61$).	Non-physician clinical care providers ($n = 8$).
	Research.	.		Lung cancer patients and caregivers ($n = 7$).	Access influencers ($n = 6$).
				Consumers (n = not explicitly reported).	Community research team ($n = 11$). Other researchers (n = not explicitly reported).
Seguin *et al.* (2014)	United States of America. Health practice.	Mixed methods—participatory action research.	Consumer led.	Participants ($n = 107$).	Researchers (n = not explicitly reported).
Shrestha *et al.* (2023)	United States of America. Health practice.	Mixed methods.	Involving.	Community members and agency representatives ($n = 366$). Participants involved in sorting and rating ($n = 60$).	Practice partners, researchers, local community health workers (n = not explicitly reported).
Skewes *et al.* (2019)	United States of America. Health practice.	Qualitative participatory action research.	Involving.	Tribal members ($n = 25$).	Researchers, investigators from a public research university, employees from the treatment center and project manager (n = not explicitly reported).
Taylor *et al.* (2018)	Australia. Research and health practice.	Mixed methods case study.	Partnership.	Representatives of Medicare locals ($n = 8$). Community members of health advisory committees ($n = 2$).	Health service managers/personnel ($n = 13$). Community service providers ($n = 2$). Local government representatives ($n = 3$).
Wereta *et al.* (2018)	Ethiopia. Research and health practice.	Quantitative participatory action research.	Involving.	Participants ($n = 408$).	Health extension worker (n = not explicitly reported).
Yadav *et al.* (2021)	Nepal.	Mixed methods participatory action research.	Partnership.	People with COPD and their family members and respiratory physicians (n = not explicitly reported).	Local community leaders, representatives from local, provincial and central government; academicians and representatives from local and international Non-Government Organisations (n = not explicitly reported).
	Health practice.			Advisory group: Patients and their caregivers ($n = 4$), clinicians and health care workers ($n = 4$). Preliminary sharing workshop (n = not explicitly reported).	Advisory group: Academics ($n = 2$), and policy makers ($n = 2$).

concern included a lack of detailed description of the intervention, which limited clarity on its implementation and replication potential, and an absence of reporting on participant dropouts, which could impact the study's internal validity. Despite these limitations, the study generally demonstrated a sound approach, with an appropriate design for the research question and reliable and valid outcome measures. The analysis methods were suitable, and the results were presented with statistical significance, supporting the study's overall conclusions.

The primary methodological risk of bias in the mixed methods study (Supplementary Table S6c) was the lack of discussion on divergences and inconsistencies between the qualitative and quantitative findings ($n = 7$). This omission limits the depth of integration and may obscure potential insights that could arise from exploring contrasting data patterns.

Five themes were developed from the extracted data including the positive impacts of co-design, the importance of relationship building, sustainability, power issues in co-design, and the importance of context. Finally, enablers and barriers of co-design were mapped onto the macro, meso, micro framework (Mayne *et al.* 2024, Woods *et al.* 2024).

The positive impacts of co-design

Studies reported numerous benefits from using consumer engagement in their research. Shared decision-making allowed collaboration between consumers and health care providers, enabling the generation of unique solutions and knowledge that neither group could have developed independently (Mammen *et al.* 2019, Pandey *et al.* 2022). Dominant research practices were challenged when researchers and health care providers avoided imposing authority or externally determined solutions onto communities. Instead, participants developed skills in active engagement and collaboration with healthcare professionals, researchers, and the research process (Mutale *et al.* 2017, Mammen *et al.* 2019, Yadav *et al.* 2021). Co-design encouraged the incorporation of consumer values and priorities into designs (Barnidge *et al.* 2015, Milton *et al.* 2021, Yadav *et al.* 2021, Pandey *et al.* 2022, Okop *et al.* 2023).

The benefits of consumer engagement involved locally oriented, culturally appropriate (Mutale *et al.* 2017, Mammen *et al.* 2019, Skewes *et al.* 2019, Masunaga *et al.* 2021, Muhumuza *et al.* 2023, Okop *et al.* 2023), and effective solutions (Seguin *et al.* 2014, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Yadav *et al.* 2021). This collaborative approach enhanced trust, acceptance, perceived relevance, and competence using interventions, leading to increased utilization of services (Fennell *et al.* 2017, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Yadav *et al.* 2021, Muhumuza *et al.* 2023, Okop *et al.* 2023). Consumers were deliberately empowered with skills, knowledge, and expertise, particularly in areas such as leadership, collaboration, and the research process (Seguin *et al.* 2014, Barnidge *et al.* 2015, Goris *et al.* 2015, Mutiso *et al.* 2018, Mammen *et al.* 2019, Yadav *et al.* 2021, Hards *et al.* 2022, Pandey *et al.* 2022, Hove *et al.* 2023, Okop *et al.* 2023). Consumer engagement played a pivotal role in directing research toward person-centered care (Muhumuza *et al.* 2023, Okop *et al.* 2023) and allowed the needs of marginalized subgroups of populations to be heard (Masunaga *et al.* 2021, Hards *et al.* 2022).

The importance of relationship building

A large emphasis was placed on the importance of relationship building between all the stakeholders involved in co-design (Barnidge *et al.* 2015, Taylor *et al.* 2018, Skewes *et al.* 2019, Yadav *et al.* 2021, Okop *et al.* 2023). It was vital to build trust between parties to aid effective and truthful knowledge exchange (Barnidge *et al.* 2015, Taylor *et al.* 2018, Masunaga *et al.* 2021, Yadav *et al.* 2021, Hards *et al.* 2022, Pandey *et al.* 2022, Muhumuza *et al.* 2023, Okop *et al.* 2023, Shrestha *et al.* 2023). Studies encouraged the formation of partnerships with influential partners within the community, government, and organizations. These included community leaders, sponsors, funders, policymakers, government officials, human rights activists, and non-government organizations. Leveraging these partnerships ensured sustainability and helped to create the desired change (Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Wereta *et al.* 2018, Skewes *et al.* 2019, Yadav *et al.* 2021, Muhumuza *et al.* 2023, Shrestha *et al.* 2023).

Sustainability

The sustainability of interventions, where co-design was employed, was a prominent theme in the reviewed literature. Allowing the community to have a sense of ownership of the project was a major facilitator of sustainability. This ensured that consumer and community participants felt a sense of agency and accountability which catalyzed progress and allowed confidence in the long-term viability of the project (Barnidge *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Mammen *et al.* 2019, Morrison *et al.* 2020, Yadav *et al.* 2021, Hove *et al.* 2023, Okop *et al.* 2023, Lizarondo *et al.* 2024). A sense of ownership was achieved by identifying the strengths of the community and utilizing existing resources (Seguin *et al.* 2014, Mutiso *et al.* 2018, Yadav *et al.* 2021, Pandey *et al.* 2022, Lizarondo *et al.* 2024). Consumers were empowered with training, leadership roles, and encouraged to take control of challenges (Seguin *et al.* 2014, Barnidge *et al.* 2015, Goris *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Mammen *et al.* 2019, Morrison *et al.* 2020, Yadav *et al.* 2021, Pandey *et al.* 2022, Hove *et al.* 2023, Okop *et al.* 2023). Ensuring that the community "owned" the project was considered more sustainable than externally funded solutions (Mutale *et al.* 2017, Taylor *et al.* 2018, Yadav *et al.* 2021, Lizarondo *et al.* 2024).

Sustainability was achieved by striving for changes in policy and organizational structure that supported the goals of the project (Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Yadav *et al.* 2021, Hove *et al.* 2023, Okop *et al.* 2023, Lizarondo *et al.* 2024). This was achieved by leveraging partnerships with influential stakeholders who had the resources and ability to implement changes at governmental or organizational levels (Barnidge *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Skewes *et al.* 2019, Yadav *et al.* 2021, Muhumuza *et al.* 2023, Shrestha *et al.* 2023, Lizarondo *et al.* 2024). Studies utilized the active involvement of advisory boards or existing organizations to reduce dependency on individuals (Goris *et al.* 2015, Taylor *et al.* 2018, Lazo-Porras *et al.* 2020). For example, Mutiso *et al.* (2018) adapted their intervention to meet the needs of the existing health system by analyzing local mental health services and consulting with regional medical professionals.

Systemic constraints to sustainability involve limitations in funding, resources (Barnidge *et al.* 2015, Lazo-Porras *et al.* 2020), and time restraints of research projects (Mutale *et al.* 2017, Fort *et al.* 2019, Mammen *et al.* 2019, Hove *et al.* 2023). The busy schedules and conflicting priorities of consumers and other participants were a barrier to sustainable commitment and participation in co-design (Seguin *et al.* 2014, Morrison *et al.* 2020, Masunaga *et al.* 2021, Yadav *et al.* 2021, Hove *et al.* 2023).

Power issues in co-design

Power disparities were highlighted in the literature, notably in the researcher–patient relationship (Mammen *et al.* 2019, Masunaga *et al.* 2021). This was compounded by differences in language, such as academic and lay language (Hards *et al.* 2022), and local distrust in academics (Skewes *et al.* 2019, Gheduzzi *et al.* 2021). Power imbalances were embedded within the local power structures of communities (Lazo-Porras *et al.* 2020). Participants had power based on their access to resources such as financial, time, information, connections, and political or social standing (Morrison *et al.* 2020, Hove *et al.* 2023). Power was influenced by consumers' education level and ability to mobilize action (Rafie *et al.* 2019, Morrison *et al.* 2020, Masunaga *et al.* 2021, Hove *et al.* 2023, Okop *et al.* 2023). Groups with lower levels of power involved marginalized populations such as rural, low-income families (Mammen *et al.* 2019).

The theme of addressing power imbalance to facilitate co-design frequently emerged. Researchers aimed to challenge assumed hierarchies and empower consumers (Mutale *et al.* 2017, Mammen *et al.* 2019, Masunaga *et al.* 2021, Okop *et al.* 2023). Power was negotiated by ensuring that all stakeholders shared the same vision (Mutiso *et al.* 2018, Taylor *et al.* 2018, Fort *et al.* 2019, Masunaga *et al.* 2021, Hove *et al.* 2023) and leadership roles were frequently given to consumers (Seguin *et al.* 2014, Barnidge *et al.* 2015, Goris *et al.* 2015, Mutale *et al.* 2017, Mutiso *et al.* 2018, Taylor *et al.* 2018, Mammen *et al.* 2019, Morrison *et al.* 2020, Yadav *et al.* 2021, Pandey *et al.* 2022, Hove *et al.* 2023, Okop *et al.* 2023). Trusting relationships were intentionally built (Barnidge *et al.* 2015, Taylor *et al.* 2018, Masunaga *et al.* 2021, Yadav *et al.* 2021, Hards *et al.* 2022, Pandey *et al.* 2022, Muhumuza *et al.* 2023, Shrestha *et al.* 2023) and safe spaces for communication were used to reduce intimidation. This sometimes involved conducting the research in community spaces rather than having consumers leave their home environment (Taylor *et al.* 2018, Masunaga *et al.* 2021, Yadav *et al.* 2021, Pandey *et al.* 2022, Hove *et al.* 2023). It was important that researchers understood the value of lived experience and local knowledge rather than relying on observational evidence. For example, Urquhart *et al.* (2022) describe a co-design project with a rural Aboriginal community in Australia where observational data alone failed to capture the holistic understanding of well-being held by local participants. While external health indicators focused on physical and mental health metrics, community members emphasized cultural connection, access to Country, family relationships, and community safety as central to their well-being. These insights, surfaced through culturally respectful yarning circles, led to the design of a strengths-based well-being program rooted in Aboriginal knowledge systems and priorities. Local knowledge was crucial for understanding the context, culture, and the issues that were prioritized by the community (Rafie *et al.* 2019, Hards *et al.* 2022, Pandey *et al.* 2022, Hove *et al.* 2023).

Importance of context

Studies reported that each rural community is different and that the interventions and frameworks used need to be individually contextualized. Different communities assign different priorities to issues and have unique perspectives on situations (Mutiso *et al.* 2018, Taylor *et al.* 2018, Rafie *et al.* 2019, Gheduzzi *et al.* 2021). Studies suggest that researchers need to invest effort toward understanding the context and culture of communities. This includes identifying the best forms of communication and recognizing differences in language (including academic versus lay language, colloquial language, and local languages) to find the true meaning of what participants aim to communicate (Mammen *et al.* 2019, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Yadav *et al.* 2021, Hards *et al.* 2022, Shrestha *et al.* 2023).

Enablers and barriers to rural health co-design

Supplementary Table S7 categorizes the enablers and barriers to rural co-design using the macro, meso, and micro framework (Mayne *et al.* 2024, Woods *et al.* 2024) to highlight different factors across systemic, local, and everyday practice levels. The barriers and enablers were identified based on the authors' observations, discussion, and suggestions. It is noteworthy that enablers outweigh barriers at the meso level (i.e. local health service and community), and barriers outweigh enablers to co-design at the micro level (i.e. day-to-day practice). At the macro level (i.e. legal, regulatory, and economic), enablers and barriers to co-design appear balanced.

DISCUSSION

This systematic review highlights that co-design with consumers is beneficial in the rural health context. Findings highlight that addressing power dynamics between healthcare providers and consumers, such as allowing local consumers to take on leadership roles, could be a crucial first step in fully realizing these benefits (Mutale *et al.* 2017, Mammen *et al.* 2019, Gheduzzi *et al.* 2021, Masunaga *et al.* 2021, Hove *et al.* 2023, Lizarondo *et al.* 2024). The studies in our review illuminate the benefits of co-design in generating unique, culturally appropriate, and person-centered solutions, which in turn led to improved uptake of rural health services and interventions. Notable identified solutions include consumer involvement in day-to-day practices and meeting in local community environments. For example, Mutale *et al.* (2016) documented increased participation and community ownership in health interventions following consumer-led design processes, as evidenced by qualitative interviews and program uptake statistics that reflected measurable increase in facility-based deliveries among Zambian mothers who were involved in their own health planning. Our findings align with those of previous studies that underscore the importance of co-design in developing rural health interventions that are tailored to, as well as resonate with, rural communities (Cosby *et al.* 2008, Bourke *et al.* 2012, Farr 2018).

The resulting interventions were more widely adopted by rural communities due to increased trust, acceptance, and perceived relevance, reflecting the positive impacts of consumer co-design in rural healthcare (Kenny *et al.* 2013). For instance,

community partners involved in the Healthier Missouri Communities initiative identified several benefits of the participatory regional partnership approach (Barnidge *et al.* 2015). These benefits included enhanced resource sharing across 12 rural counties, increased capacity among local organizations to implement environmental and policy interventions, such as establishing farmer's markets and improving walking trails, and strengthened relationships among diverse stakeholders including residents, public health officials, and community leaders. Despite challenges like coordinating activities across multiple counties and managing differing community priorities, partners emphasized that the collaborative and inclusive nature of the process fostered trust and mutual respect. This, in turn, led to interventions that were well-tailored to local contexts and thus more widely accepted and sustained by the rural communities involved.

Furthermore, co-design helped empower consumers, particularly in marginalized subgroups whose needs are often overlooked in mainstream healthcare models (Hards *et al.* 2022, Hove *et al.* 2023). However, broader evidence reveals that the success of co-design is heavily dependent on how power imbalances are managed. Power dynamics, if left unaddressed, can undermine the co-design processes by silencing marginalized opinions or allowing dominant groups to steer the agenda (Pot *et al.* 2018, Harrison *et al.* 2024). A solution for mitigating these potential power imbalances is through co-facilitation, a process by which one member of each interested party (i.e. consumer and provider) oversees the co-design process and acts as external mediators to mitigate subtle power shifts. Use of this process can allow for greater responsibility and subsequently greater ownership of the project from both parties (Harrison *et al.* 2024). Our review findings suggest that these power issues need to be identified and proactively addressed from the outset to fully realize the positive impacts of co-design.

A key finding of this review is the critical role of relationship building in the success of co-design initiatives, especially to foster effective collaboration among stakeholders (Barnidge *et al.* 2015, Skewes *et al.* 2019). Given the well-documented disparities in health outcomes between rural and metropolitan communities (Smith *et al.* 2008, Bourke *et al.* 2012), the importance of establishing trusting relationships is paramount. Included studies in this review repeatedly highlight that trust and positive relationships are crucial in facilitating effective healthcare delivery, which is vital in contexts where healthcare access is limited. This is consistent with the broader consumer engagement literature, which recognizes the potential of relationship building in empowering rural communities by incorporating their unique local contexts and practices into healthcare solutions (Baum 2006, Bate and Robert 2008, Kenny *et al.* 2013, Palmer *et al.* 2019, O'Brien *et al.* 2021, McGowan *et al.* 2024).

Community empowerment also emerged as critical for the sustainability of health interventions. Unlike the traditional top-down models of health intervention developments, such as central government-led programs, the reviewed consumer co-design approaches (consumer-led, involving, and partnership) emphasized a participatory model that leverages extensive community contribution of local knowledge and capacities in the co-design processes. Across the included studies with the highest level of consumer engagement (i.e. consumer-led co-design), evidence consistently shows that empowering consumers through training, leadership roles, and partnerships enhances their capacity for long-term engagement as well as their intervention outcomes (Seguin *et al.* 2014, Mutale *et al.* 2017, Milton *et al.* 2021). This is particularly relevant in rural settings where community participation is often essential to compensate for limited external funding and resources. This finding is consistent with previous studies that support this notion that newly empowered communities are better positioned to actively engage in decision-making and problem-solving processes at both local and systemic levels (Clark *et al.* 2007, Watt *et al.* 2019, World Health Organization 2020, Juel *et al.* 2024). This review adds to this understanding that community-driven initiatives are not only cost-effective but also more sustainable. For instance, economic evaluations of community-led programs in remote Aboriginal communities showed improved health outcomes and more efficient use of resources when research processes and initiatives were driven by the community members, mainly due to increased sense of ownership (Pyett 2002). By aligning services with local priorities and knowledge systems, co-designed initiatives not only worked to improve health outcomes but also ensured the longevity of the program, as they fostered self-sustainability by the community members themselves.

Our review findings emphasize the importance of contextualizing the co-design initiatives to the unique local dynamics and characteristics of the rural communities in influencing the success of interventions. Broader literature consistently highlights the lack of tailored healthcare solutions in rural communities, which exacerbates the disparities in health outcomes (Cosby *et al.* 2008, Smith *et al.* 2008, Bourke *et al.* 2012). An understanding of the specific context and culture of each community is essential for developing relevant interventions that resonate with local needs, which advocate for engaging stakeholders and consumers to ensure relevant and effective solutions (Kenny *et al.* 2013). Efforts to identify the most effective forms of communication while also recognizing the language differences among communities, are important in accurately capturing what consumers prioritize in their health decisions (Barnidge *et al.* 2015, Fort *et al.* 2019, Masunaga *et al.* 2021). In rural contexts where health literacy can be variable and where traditional methods of communication may be ineffective, such tailored approaches are crucial for achieving meaningful engagement and successful outcomes. The emphasis on contextualization not only strengthens the relevance of the interventions, but also supports the broader objectives of reducing health disparities by tailoring solutions that address the unique challenges of rural communities (Mutale *et al.* 2017, Okop *et al.* 2023).

Mapping of enablers and barriers of co-design on the macro, meso, and micro framework revealed the large concentration of enablers at the meso level, underscoring the pivotal role of community involvement in the success of co-design approach. For instance, creating community advisory boards, building a sense of ownership among consumers, and leveraging on existing community resources and capacities were all identified as key strategies in enabling co-design processes in rural communities (Barnidge *et al.* 2015, Mutale *et al.* 2017, Taylor *et al.* 2018, Fort *et al.* 2019, Hove *et al.* 2023, Lizarondo *et al.* 2024). These findings suggest that co-design approach thrives when communities are not only participants, but also active contributors to its process. The emphasis on community engagement also aligns with the broader recognition that health interventions are more effective when they are

culturally and contextually relevant (Scarinci *et al.* 2012, Eisenstein *et al.* 2018, McKinley *et al.* 2019), which is achieved from effective involvement and understanding at the community level.

Similarly, effective communication was found to be an enabler in micro and meso levels but not in the macro level. Effective communication is essential for building trust, rapport, and sustainable co-design interventions in rural health practice, education, and research. The development of a unifying enabler would allow a common resource that all systematic levels can utilize to help ensure consistent and effective outcomes irrespective of community size or project scale. A common barrier identified across all levels was resource limitations and time constraints. Co-design processes can incur substantial costs and take lengthy lead time to reach the desired outcomes, which can inevitably create reluctance among its community participants, health providers, and organizations to continue working on the co-design processes (Jagtap 2022). Thus, adequate resources and funding are essential to realizing the realities and progress of agreed solutions (Jagtap 2022). In addition, utilizing synthesized data such as are presented in this review, the opportunity arises for integration of co-design into everyday research practices, thus reducing time constrictions and subsequently reducing cost.

At the macro level, often due to smaller population sizes in rural areas, attracting funding and resources is difficult in these regions. These regions tend to lack influence on state and federal policy due to their limited scope and perceived impact (Smith *et al.* 2019). Funders often prioritize projects with broader applicability and greater potential for generalizability, which smaller sample sizes and unique contexts may not offer. At the meso and micro levels, resource constraints manifest in the form of limited community capacity for problem-solving, including time and access to consumer training. Broader literature reports on how the time and resource constraints disproportionately affect rural health and its quality of care (Coombs *et al.* 2022), and how the limited access to special expertise for support and consultations when problems arise (Brems *et al.* 2006), undermines the community capacity to contribute effectively to the co-design processes.

Strengths and limitations

Following the PRISMA guidelines, this systematic review showcased reporting, rigorous methodology, and transparency, with both mixed methods and qualitative studies being reviewed, which provided a comprehensive view of consumer engagement in rural health internationally. Also, the inclusion of the healthcare practice, research, and education contexts ensured the breadth of the topic reviewed. Mapping consumer engagement against the National Framework for Consumer Involvement in Cancer Control (Cancer Australia and Cancer Voices Australia 2011), and the enablers and barriers against the macro, meso, and micro framework (Mayne *et al.* 2024, Woods *et al.* 2024) kept our review aligned with current theory available in this area, thereby progressing scholarship. The review team had diverse areas of expertise. For example, the reviewers were from the following professions: medicine (T.B., Y.C., C.B., J.V.H., B.N., and S.K.), biomedicine (J.V.H. and L.S.), physiotherapy (L.L.), statistics (M.M.), systems science (A.H.), and occupational therapy (P.M.). The review team had combined collective experience in rural health. All members of the review team have lived experience as a healthcare consumer in rural health. Further, L.S., B.N., and P.M., additionally have consumer engagement advocacy roles.

Limitations found include the scope being limited to English language studies only, potentially excluding relevant research published in other languages. Additionally, by using one national framework for co-design involvement levels (Cancer Australia and Cancer Voices Australia 2011), there will potentially have been missed opportunities to analyze studies that have utilized other definitions of high levels of consumer involvement. Finally, our review criteria did not yield analysis for any papers relating to rural education, all potential studies were filtered out at various stages and therefore, our scope of discussion does not relate to rural education practices and further research should be done to mitigate this gap in research. During the data extraction stage, several studies did not make clear the numbers of participants who were consumers and those that included organizational and governmental representation, and it was therefore not possible to separate them numerically. This meant that in the analysis, any results were not able to be solely contributable to consumer involvement alone and thus diluting the validity of those studies that higher levels of consumer involvement yielded better results. In addition, this review found that many papers appeared to overstate the level of consumer involvement by describing co-design methodology to only upon review, have interviewed participants before and after the intervention, which as previously mentioned, is considered a lower level of involvement (Cancer Australia and Cancer Voices Australia 2011). Although the review investigated consumer engagement in rural health across practice, research and education, the findings and implications have been presented at a broader level.

IMPLICATIONS FOR PRACTICE, RESEARCH, EDUCATION, AND POLICY

This review underscores the necessity for context-specific co-design approaches in rural healthcare. To enhance health practice, actionable strategies involve the healthcare workers actively engaging community members in the co-designing processes, i.e. the planning, designing, and the delivery of health services to ensure culturally and locally relevant interventions. Health workers should also be encouraged to conduct services in community settings, which means to deliver health interventions in places that are familiar and accessible to the community they are serving, rather than restricting these services to formal medical environments such as hospitals or clinics. Engaging communities in this manner fosters trust, acceptance, and perceived relevance of health initiatives, leading to more effective and sustainable outcomes (Kenny *et al.* 2013). Healthcare professionals should also be supported to facilitate co-design processes in culturally respectful ways, recognizing the strengths of local knowledge and addressing power imbalances to build equitable partnerships.

In health research, establishing trust and mutual respect between researchers and community members is fundamental. Researchers should respect participant autonomy and adapt their roles as needed throughout the project lifecycle—embracing adaptation throughout the project to respond to community priorities and genuine collaboration. Secondly, a focus on reciprocity in knowledge sharing is needed to strengthen the research partnership and enhance the relevance and cultural appropriateness of findings. These practices not only enhance the relevance of findings but also improve the quality

and legitimacy of community-based research. Lastly, to promote transparency and allow for more robust evaluation and meaningful comparison of outcomes, research publications should include clear reporting on how consumers were involved in co-design processes and employ standardized frameworks for consumer involvement, data collection, and feedback (Pyett 2002). These approaches will help ensure that research conducted in rural settings is rigorous and responsive to local contexts and priorities.

In health education, actionable recommendations for improving consumer engagement include early and sustained involvement of consumers in curriculum co-design, ensuring that their lived experience meaningfully shapes educational content and priorities (Brand *et al.* 2021). Educational institutions should establish clear role definitions and shared leadership structures between educators and consumer representatives to foster mutual respect and accountability. Additionally, as Fossey *et al.* (2024) highlight, authentic consumer involvement requires institutional support and adequate preparation or training for both staff and consumers to participate effectively. This is to highlight the need for institutional commitment, which includes providing resources and creating supportive environments where consumers feel valued and empowered to contribute beyond tokenistic roles and recognizing the legitimacy of consumer knowledge. Incorporating consumers as co-teachers and co-evaluators helps embed real-world perspectives, improves cultural safety, and strengthens social accountability—particularly important in rural health education where aligning training with community needs promotes more relevant and responsive health care development.

For policymakers, it is critical to adapt flexible frameworks to rural contexts to promote health practice, research, and education with local relevance. By addressing the limitations of current studies, and utilizing the micro, meso, and macro framework outlined in this review to implement recommendations, future health practice, policy, and research can be implemented to be more effective for meeting the specific needs of each rural community.

CONCLUSION

This review confirms the importance of co-design in rural health settings and provides evidence that solidifies the significance of involving consumers in tertiary levels of co-design. Findings highlight that building strong relationships between communities and researchers, sustainability and local community context whilst remaining vigilant to power imbalances will yield the most valuable results community involvement in their own health. The identification of enablers and barriers across different levels of the healthcare systems provides insight that can be utilized by healthcare workers, researchers and policymakers to provide unique opportunities for rural areas to enhance their community health, education, and research needs.

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Author contributions

The work represents original research that contributes novel insights to the rural health field. All authors listed in this manuscript have made substantial contributions to the work presented leading to this report, including study conception and design, data acquisition, analysis, and interpretation, and all have read and approved this version of the manuscript. Each of the authors jointly and individually takes responsibility for its content and the development of the submitted manuscript has adhered to ethical standards.

Supplementary data

Supplementary data is available at *Health Promotion International* online.

Conflict of interest

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Data Availability

All data available is included in the main text and Supplementary tables.

Ethical approval

As this is a systematic review, formal ethics approval was not applicable.

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