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RESEARCH ARTICLE

What is innovative in qualitative methods in birth Cohort studies? A scoping review

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Abstract
Longitudinal birth cohort research provides a glimpse into the biological and social trajectories of a cohort of people, which helps us to better understand how to improve health and social outcomes. While qualitative longitudinal, ethnographic, and other qualitative research methods are increasingly used to capture complex data in trials and cohort research, they are relatively less common, and they vary greatly within and across cohorts and national contexts. The aim of this scoping review is to provide an overview of the use of qualitative and innovative methods in longitudinal preconception and birth cohort studies. Innovative methods, defined by Mannell and Davis (2019), go beyond standard surveys, interviews, and focus groups. The review summarises the literature of the integration of qualitative methods into birth cohort methodologies. Five databases were searched systematically, using MeSH and free text terms, for articles published in English before October 2022. Two-thirds of titles, abstracts, and full-text papers were screened by independent reviewers. Data extraction followed the Centre for Reviews and Dissemination guidelines and was based on features of qualitative methods from the COREQ checklist. 43 papers were included from the 13909 papers identified from the database search. The majority of the birth cohort studies used 'traditional qualitative methods' such as focus groups and one-to-one interviews. The studies that used 'innovative qualitative methods' included participatory interviews with photovoice, photographs, and using scenario and story cards, and while not a steadfast requirement of innovation, often included coproduction between the researchers and the participants. Although the literature reports challenges in conducting innovative methods within birth studies such as time and power imbalances between researcher and participant, these methods can help us better understand how to improve social and health outcomes.

Keywords: Innovative qualitative methods; birth cohorts

Introduction

This article presents a scoping review of innovative qualitative methods within the multidisciplinary field of birth cohort studies. The concept of the birth cohort was developed around studies of fertility and maternity services in Britain in 1946 (Comstock, 2001). This type of research was built upon epidemiological studies of infectious diseases, such as the 1935 tuberculosis research from which Wade Hampton Frost coined the term 'cohort study'

(Comstock, 2001). Starting in the 1950s, other scientists would take up the concept for research into non-communicable diseases (Doll, 2001). In the twenty-first century, birth cohort studies have become key research tools to uncover the complex and interlinking nature of social and environmental factors, amongst other issues, that influence health and well-being (Lucas *et al.*, 2013; Ries *et al.*, 2010) to produce intergenerational pictures of the manifestation of health and disease (Lawlor *et al.*, 2009). While cohort studies to date have greatly varied in size (a few hundred to tens of thousands of participants), purpose (e.g. studying diet to improve child development) and demographic compositions, the foundations have generally been set within the scientific methods of quantitative measurement and analysis within the biomedicine paradigm and quantitative social science disciplines (Dickerson *et al.*, 2016).

In other words, birth cohort studies have largely relied on quantitative analysis across hundreds to thousands of the same participants from pregnancy, often to adulthood. As a result, cohorts often produce large volumes of data, with differently oriented researchers in various stages of their careers analysing a diverse range of existing data sets that include demographic data, bone and tooth scans, blood and urine samples, allergy tests, diverse skills, vision, hearing, and cognitive tests and assessments. Although studies have used mixed methods to triangulate the understanding of birth cohort participants, qualitative methods have tended to be a single sweep of each cohort. In the context of using both qualitative and quantitative research methods, triangulation refers to the practice of using multiple approaches to gather and analyse data in order to enhance the validity and reliability of the research findings.

Beyond triangulation for the validation of results, the inclusion of qualitative methods in cohort studies is an essential tool for understanding the biosocial nature of health. As archives of biosocial data and sites of biosocial knowledge, birth cohort studies are key examples of how biosocial work is done, what it can do, and the potential that researchers generate in the process (Gibbon and Pentecost, 2019). Biosocial research seeks to understand the dynamic interplays between biology, social experiences, and behaviours over the life course (Meloni, 2014; Meloni *et al.*, 2016) and is inherently interdisciplinary in its approach to the study of human life and health. While quantitative methods remain a hallmark of most biosocial birth cohorts, qualitative methods allow for the complimentary analysis of 'different interacting components that are multifaceted and socially mediated'p2 (Davis *et al.*, 2019). Biosocial research teams often utilise mixed-methods approaches so that qualitative and quantitative methods complement one another and go beyond the limitations of a purely quantitative approach.

Qualitative methods remain underused in birth cohort studies. The emphasis on quantitative methods is intentional, given that most birth cohort research is biomedical, epidemiological, or quantitative social science. This research aims to understand population health through the analysis of biological samples and medical data collected during clinic visits for anthropometry and physical assessments, participant data linkages, and self-reported questionnaire data. While qualitative data can be and is sometimes generated through these investigations, for example as a result of free-response survey questions, and from structured interviewing of participants, the data are itself relatively under-collected and under-utilised (Carpentieri *et al.*, 2023). Qualitative methods are used in sub-studies and other research studies that are done collaboratively with birth cohorts, especially ethnographic birth cohort research (Bazzano *et al.*, 2008, Roberts and Sanz 2018), but there has been no robust review of innovative, in-depth and long-term qualitative research with cohort participants, samples, and/or other data. Drawing on the definition of innovative methods provided by Mannell and Davis (2019), 'innovative' qualitative methods are defined as those which go beyond standard surveys, interviews, and focus groups in research on and/or within longitudinal preconception and birth cohort studies. By labelling these methods as innovative, the authors wanted to highlight the potential of these approaches to contribute to the collection of unique data and new perspectives, which otherwise may have been missed using more standard methodology.

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Research questions

To locate the role and importance of innovative qualitative methods within birth cohort studies, this scoping review seeks to answer the following questions:

1. Which qualitative methodologies have been used in preconception/birth cohort studies?
2. What features of these qualitative methods have been used longitudinally in preconception/birth cohort studies?
3. What innovative qualitative methods have been used in preconception/birth cohort studies?

Methods

Study selection

A scoping review was conducted to identify qualitative methods within birth cohort studies and evaluate innovative features (Arksey and O'Malley, 2005). This review method was chosen to produce a rapid account of the extent, range and nature of innovative qualitative methods. Prospero was searched for existing reviews of qualitative methods in birth cohorts, and as none were found, the scoping review plan was developed. The search was conducted in October 2022 and included major medical and social science databases including Embase, PsychINFO, Cochrane review, Global Health, and MEDLINE. There was no restriction on the publication date, and a complete search strategy can be found in Appendix A. The search strategy was narrowed to allow a focus on qualitative methods in birth cohorts with a particular interest in innovative methods. The search was conducted using keywords to link cohort research with birth, pregnancy, mother, childhood, infant, maternal, paternal, and preconception. Furthermore, the methodological focus of this paper included the keywords 'qualitative', 'interview', 'focus group', 'mixed method', 'ethnography', and 'photovoice'. Two-thirds of titles, abstracts, and full texts were double-screened by two independent researchers. Another independent reviewer supported the discrepancies between the three reviewers. Cochrane Review Methods advise that 20%, or ideally more, abstracts and full texts should be double-screened (Garritty *et al.*, 2020). Three authors double-screened 66% of abstracts and full texts. The lead author screened 100% of the entries; two further reviewers screened 33% each. A final assessment on inclusion took place during data extraction.

Table 1. Inclusion and Exclusion Criteria

Study characteristics	Inclusion criteria:	Exclusion criteria:
Type of study	Primary data, qualitative systematic reviews, books	Protocols, commentary articles, conference papers, abstracts
Participants	Participants from birth cohorts Participants in the preconception period that are not in birth cohorts but have innovative qualitative methods. Parents or expected parents, mothers, fathers, guardians/carers/ extended family	Those in pregnancy studies but are not in a birth/pregnancy cohort study. Those in cohort studies but did not start during a birth cohort study Researcher or health professional perspectives, or teachers Studies that describe a cohort of births not related to a study/trial but in relation to a period of time, e.g. baby boomers.
Types of studies	Interviews, focus groups, observations. Any methods from Davis *et al.* (2019) (e.g. Art, Mapping, Narrative, Visual)	Solely Quantitative methods (structured interviews, diagnostic interviews, survey interviews) Biological measures

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Table 2. Description Table

	Author and year	Country	Name of birth cohort study	Participant from birth cohort and life course stage	Health topic	Researchers' disciplines	Type of qualitative methods	Category of qualitative methods
1	Collins *et al.* 2019	Kenya	Pith Moromo Pregnancy Birth Cohort Study	Women during pregnancy	Water insecurity	Anthropology, Medical research institute	Go-along interviews, pile sorting, photo elicitation interviews	Innovative qualitative methods
2	Shiells *et al.* 2022	UK	Avon Longitudinal Study Avon Longitudinal Study of Parents and Children (ALSPAC)	Parent & their birth cohort child during adulthood	Digital data linkage in cohort studies	Epidemiology, Population Health Sciences, Psychological Science, Integrative Cancer Epidemiology	Qualitative synthesis of ALSPAC' focus groups using cards and story scenarios	Innovative qualitative methods
3	Thairu *et al.* 2005	South Africa	The Vertical Transmission Study	Mothers in the postnatal period	Infant feeding for HIV positive mothers	Counselling	In-depth ethnographic interviews with playing cards	Innovative qualitative methods
4	Jansen *et al.* 2020	Mexico	ENvironmental Toxicants (ELEMENT)	Birth cohort children during adolescence	Nutrition and dietary behaviours	Anthropology, Health Policy, Nutritional Sciences	In-depth ethnographic observations in participants homes	Innovative qualitative methods
5	Allen *et al.* 2016	Australia	*unspecified*	Women during pregnancy & in the postnatal period	Experiences of maternity healthcare	Nursing & Midwifery	Interviews, participant observation	Specific qualitative methods
6	Bazzano *et al.* 2008	Ghana	ObaapaVitA trial	Mothers in the postnatal period	Infant illness and mortality	Health Sciences, Medical Research	Narrative histories interviews & focus groups, participant observation,	Specific qualitative methods
7	Béhague, 2015	Brazil	1982 Pelotas cohort	Birth cohort children during adolescence	Psychiatric practices	Medical Anthropology	Interviews, participant observation	Specific qualitative methods
8	Béhague and Gonçalves, 2008	Brazil	1982 Pelotas cohort	Birth cohort children during adolescence	Psychiatric morbidity, class and sexuality	Medical Anthropology, Epidemiology	Interviews, participant observation	Specific qualitative methods
9	Behague *et al.* 2012	Brazil	1982 Pelotas cohort	Birth cohort children in adolescence	Teen childbearing and mental health	Medical Anthropology, Medicine, Epidemiology	Interviews, participant observation	Specific qualitative methods

(*Continued*)

Table 2. (*Continued*)

	Author and year	Country	Name of birth cohort study	Participant from birth cohort and life course stage	Health topic	Researchers' disciplines	Type of qualitative methods	Category of qualitative methods
10	Caspi *et al.* 2004	United Kingdom	Environmental Risk Longitudinal Twin Study	Mothers of birth cohort children during childhood	Social-emotional well-being	Psychiatry	Interviews, participant observation	Specific qualitative methods
11	Flower *et al.* 2008	USA	Family Life Project	Mothers in the postnatal period	Poverty and breastfeeding	Paediatrics, developmental science, child development institute,	Longitudinal interviews	Specific qualitative methods
12	Goncalves *et al.* 2012	Brazil	1982 Pelotas cohort	Parents & their birth cohort child during adolescence	Obesity	Epidemiology & Nutrition	Longitudinal and life history interviews	Specific qualitative methods
13	Raman *et al.* 2016	India	SJMC Hospital Cohort Study	Mothers in the postnatal period	Reproductive health	Public Health, Psychiatry, Physiology	Interviews, Participant observations	Specific qualitative methods
14	Waller, 2009	US	Fragile Families Study and Child Wellbeing Study	Parents in the postnatal period	Men's employment, social support, skills, and motivation to care for young children	Policy analysis and management	Longitudinal interviews	Specific qualitative methods
15	Adeniyi *et al.* 2018	South Africa	East London Prospective Cohort Study	Women during pregnancy & in the postnatal period	HIV	Sociology, Epidemiology, Medicine, Nursing	Interviews	Traditional qualitative methods
16	Arora *et al.* 2018	Australia	Healthy Smiles Healthy Kids	Mothers of birth cohort children during childhood	Oral health	Dentistry, Medicine, Social Sciences & Psychology	Interviews	Traditional qualitative methods
17	Arora *et al.* 2021a	Australia	Healthy Smiles Healthy Kids	Parents & their child during childhood	Nutrition & food behaviours	Dentistry, Medicine, Public Health, Social Sciences	Interviews	Traditional qualitative methods
18	Arora *et al.* 2021b	Australia	Healthy Smiles Healthy Kids	Mothers of birth cohort children during childhood	Oral health	Dentistry, Medicine, Public Health	Interviews	Traditional qualitative methods

(*Continued*)

Table 2. (*Continued*)

	Author and year	Country	Name of birth cohort study	Participant from birth cohort and life course stage	Health topic	Researchers' disciplines	Type of qualitative methods	Category of qualitative methods
19	Ayoub *et al.* 2018	Lebanon and Qatar	Mother and Infant Nutritional Assessment birth cohort	Women during pregnancy & in the postnatal period	Participation in health research	Medicine, Social Sciences, Agriculture & Food Sciences, Nutrition	Interviews & focus groups	Traditional qualitative methods
20	Berridge *et al.* 2021	United Kingdom	*unspecified*	Parents & their child during childhood	Child development	Policy Studies	Interviews	Traditional qualitative methods
21	Crane *et al.* 2016	UK	Born in Bradford cohort study	Mothers in the postnatal period	Sudden infant death syndrome	Anthropology	Interviews	Traditional qualitative methods
22	D'Agata *et al.* 2022	USA	RHODE Cohort Study	Birth cohort children during adulthood	Effects of preterm birth on adult survivors	Nursing, medicine	Interviews	Traditional qualitative methods
23	Darwin *et al.* 2017	UK	Born and Bred in Yorkshire (BaBY)	Fathers during the pregnancy and in the postnatal period	Mental health	(Health) Psychology, Nursing, Midwifery	Interviews	Traditional qualitative methods
24	Desai *et al.* 2021	Canada, India, UK	South Asian Cohort Study, Pune Maternal Nutritional Study, Born in Bradford	Grandmothers, women during pregnancy, & mothers with young children	Diet and lifestyle	Nursing, Paediatrics, psychology, food science and nutrition, medicine, health research, population health research	Interviews and focus groups	Traditional qualitative methods
25	Erasmus *et al.* 2023	South Africa	OrCHID Study; MACE cohort; SONKE mother and child cohort	Parents in the postnatal period	Complementary feeding	Dietetics and Nutrition, Agriculture and Env. Science, Engineering and Science	Interviews & focus groups	Traditional qualitative methods
26	Ertmann *et al.* 2005	Denmark	*unspecified*	Parents in the postnatal period	Reasons to go to the physician	Research Unit General Practice	Interviews	Traditional qualitative methods
27	Ertmann *et al.* 2011	Denmark	*unspecified*	Parents in the postnatal period	Parents management of signs of illness	Research Unit General Practice	Interviews	Traditional qualitative methods

(*Continued*)

Table 2. (*Continued*)

	Author and year	Country	Name of birth cohort study	Participant from birth cohort and life course stage	Health topic	Researchers' disciplines	Type of qualitative methods	Category of qualitative methods
28	Ferguson *et al.* 2014	Kenya	*unspecified*	Women during pregnancy	HIV	Global Health, Tropical Epidemiology, Obstetrics, Gynaecology, Clinical Research	Interviews	Traditional qualitative methods
29	Fogarty *et al.* 2019	Australia	The maternal health study	Mothers of birth cohort child during childhood	Intimate partner violence	Psychology and counselling	Interviews	Traditional qualitative methods
30	Ghetti *et al.* 2021	UK	LongSTEP	Parents in the postnatal period	Musical therapy	Music, Children and Youth Clinic	Interviews	Traditional qualitative methods
31	Randa *et al.* 2018	Denmark	Danish National Birth Cohort	Parents & their birth cohort child during adolescence	Psoriasis	Psychology	Interviews	Traditional qualitative methods
32	Ri *et al.* 2018	Japan	Japan Environment and Children's Study (JECS),	Parents of their birth cohort child during childhood	Assent for children	Interdisciplinary Information Studies, Environmental Studies, Public Policy	Interviews	Traditional qualitative methods
33	Ronka *et al.* 2020	Finland	Northern Finland Birth Cohort 1986	Birth cohort children during adulthood	Loneliness	History of Sciences and Ideas, Gender Studies, Centre for Life Course Health Research	Interviews	Traditional qualitative methods
34	Rydberg *et al.* 2020	Sweden	Gothenburg H70 Birth Cohort Studies (H70 study)	Birth cohort children at older age	Depression	Aging and Health, Neuropsychiatric Epidemiology, Psychiatry and Neurochemistry, Neuroscience and Physiology	Focus groups	Traditional qualitative methods
35	Sidebotham *et al.* 2001	UK	Avon Longitudinal Study Avon Longitudinal Study of Parents and Children (ALSPAC)	Parents of birth cohort children during childhood	Culture & stress	Child Health	Interviews	Traditional qualitative methods

(*Continued*)

Table 2. (*Continued*)

	Author and year	Country	Name of birth cohort study	Participant from birth cohort and life course stage	Health topic	Researchers' disciplines	Type of qualitative methods	Category of qualitative methods
36	Smith *et al.* 2020	Australia	Men and Parenting Pathways (MAPP)	Fathers during the preconception period	Decision-making on not to become fathers	Psychology	Interviews	Traditional qualitative methods
37	Stevens *et al.* 2003	UK	Avon Longitudinal Study Avon Longitudinal Study of Parents and Children (ALSPAC)	Mothers of birth cohort children during childhood	Sexual orientation	Psychology	Interviews	Traditional qualitative methods
38	Trude *et al.* 2021	Brazil	Rio Grande birth cohort study	Mothers in the postnatal period	Social support	Nutrition, paediatrics, violence, Epidemiology, Developmental Disorder	Interviews	Traditional qualitative methods
39	van der Gugten *et al.* 2016	The Netherlands	WHeezing Illness STudy LEidsche Rijn (WHISTLER)	Parents in the postnatal period	Respiratory illnesses	Paediatric Pulmonology, Health Sciences and Primary Care	Interviews	Traditional qualitative methods
40	Wildman *et al.* 2020a	UK	Newcastle Thousand Families Study UK 1947 birth cohort	Birth cohort children at older age	Education and housing systems	Population Health Sciences	Interviews	Traditional qualitative methods
41	Wildman *et al.* 2020b	UK	Newcastle Thousand Families Study	Birth cohort children at older age	Education and housing systems	Population Health Sciences	Interviews	Traditional qualitative methods
42	Woolhouse *et al.* 2012	Australia	The Maternal Health Study	Mothers in the postnatal period	Sexual health and intimate relationships after birth	Children Research Institute, Healthy Mothers, Healthy Families	Interviews	Traditional qualitative methods
43	Woolhouse *et al.* 2014	Australia	The Maternal Health Study	Mothers in the postnatal period	Sexual health and intimate relationships after birth	Children Research Institute, Healthy Mothers, Healthy Families	Interviews	Traditional qualitative methods

Papers were stored using Endnote version X20 and duplicates were removed. The papers were then screened using the Rayyan QCRI app and website (Ouzzani *et al.*, 2016). The full text of relevant papers was obtained and assessed against the inclusion criteria (Table 1). Studies were included that used qualitative methods including interviews, focus groups, and innovative methods as defined by Mannell and Davis (2019), including art, mapping practices, multimedia representations, narrative storytelling, and an array of visual tools (Davis *et al.*, 2019). Exclusion of papers that did not meet the inclusion criteria was agreed on by the review team.

Data analysis

The data extraction process followed the Centre for Reviews and Dissemination guidelines (Centre for Reviews and Dissemination, 2009). A data extraction strategy was developed based on the consolidated criteria for reporting qualitative research (COREQ) guidance (Tong *et al.*, 2007) and concepts of innovative features as per the definition offered by Mannell and Davis (2019) and Davis *et al.* (2019). The data were extracted from each study, using a real-time shared spreadsheet including the study characteristics, the key features of qualitative and innovative methods, the results in relation to the birth cohort and the reflections on the strengths and limitations of the qualitative methods used. Assessing the quality of included studies is unnecessary in a scoping review because it allows for a greater range of study designs and methodologies than a systematic review (Arksey and O'Malley, 2005).

From the data extraction spreadsheet, a description table was produced (Table 2) which describes the characteristics of the identified studies including study design, qualitative features, participants, and researcher backgrounds. The data extraction spreadsheet was used as the basis of the narrative synthesis evaluating the types of qualitative and innovative methods used in birth cohort studies. The analysis was based on categorising the studies by three levels of qualitative methods: 'traditional qualitative methods', 'tailored qualitative methods', or 'innovative qualitative methods'. Traditional qualitative methods referred to using interviews or focus groups over one time period. Tailored qualitative methods referred to studies using specific qualitative techniques such as longitudinal interviews, life history interviews, and ethnographic observations. Innovative qualitative methods referred to creative, generative, and often participatory methods such as those identified by Davis *et al.* (2019), including visual tools and storytelling. As qualitative researchers conducting a scoping review from anthropology and psychology backgrounds, the authors of this paper exercised reflexivity throughout the review process through group discussion, to address selection conflicts and to ensure alignment with the key messages throughout the paper. This is a strength of the review.

Results

A total of 43 papers were included from the 13909 papers identified from the database search (Figure 1). The scoping review included approximately 3575 participants from the included studies found in the search. 29 studies used traditional qualitative methods, 10 used tailored qualitative methods, and 3 used innovative qualitative methods. Studies were published between the years 2004–2022. Studies were conducted in 16 countries and from 26 named birth cohort studies. Qualitative methods were conducted with the birth cohort children and their parents at different life course stages. Table 2 describes the range of qualitative and innovative methods used in birth cohort studies and lists the countries, birth cohorts, and the participants.

Traditional qualitative methods

29 of the 43 included papers used traditional qualitative methods. The majority of studies ($n = 24$) conducted interviews (Adeniyi *et al.*, 2018; Arora, Chew, *et al.*, 2021; Arora *et al.*, 2018; Arora, Maharaj, *et al.*, 2021; Berridge *et al.*, 2021; Crane and Ball, 2016; D'Agata *et al.*, 2022;

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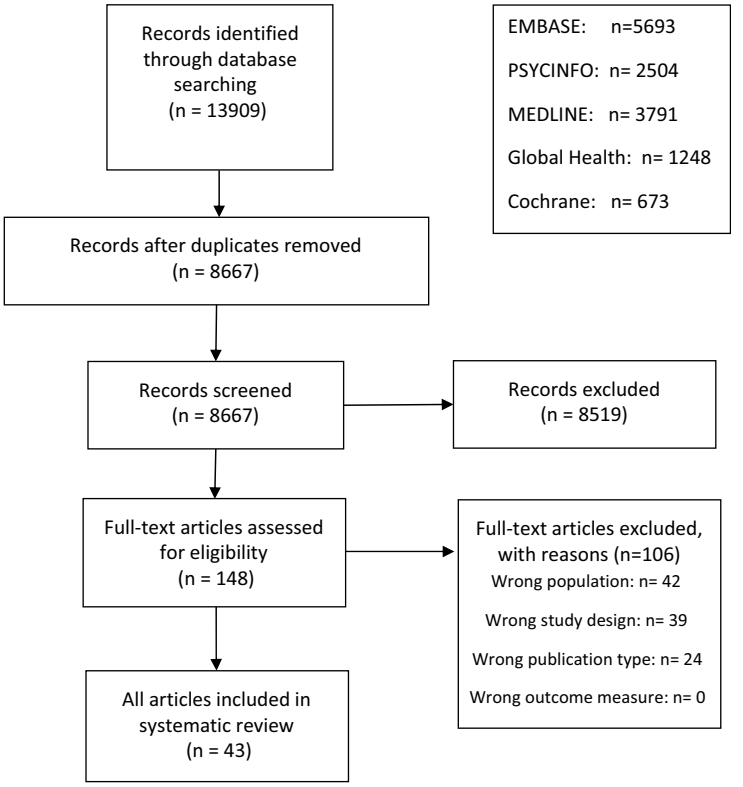

Figure 1. Flowchart of study selection PRISMA diagram.

Darwin *et al.*, 2017; Ertmann *et al.*, 2005, 2011; Ferguson *et al.*, 2014; Fogarty *et al.*, 2019; Ghetti *et al.*, 2021; Randa *et al.*, 2018; Ri *et al.*, 2018; Rönkä *et al.*, 2020; Sidebotham and Team, 2001; Smith *et al.*, 2020; Stevens *et al.*, 2003; Trude *et al.*, 2021; van der Gugten *et al.*, 2016; Wildman, 2020a, 2020b; Woolhouse *et al.*, 2012, 2014), one study used only focus groups (Rydberg Sterner *et al.*, 2020), two studies used both interviews and focus groups (Ayoub *et al.*, 2018; Erasmus *et al.*, 2023), and two studies synthesised qualitative methods in birth cohorts (Desai *et al.*, 2021; Shiells *et al.*, 2022). Traditional qualitative methods were used for the following topics: sexual health (Adeniyi *et al.*, 2018; Ferguson *et al.*, 2014; Woolhouse *et al.*, 2012, 2014), illness management (Ertmann *et al.*, 2005, 2011), oral health (Arora, Chew, *et al.*, 2021; Arora *et al.*, 2018; Arora, Maharaj, *et al.*, 2021), nutrition and feeding behaviours (Desai *et al.*, 2021; Erasmus *et al.*, 2023), participation in health research (Ayoub *et al.*, 2018; Ri *et al.*, 2018), child development (Berridge *et al.*, 2021), sudden infant death syndrome (Crane and Ball, 2016), preterm birth (D'Agata *et al.*, 2022), mental health (Rönkä *et al.*, 2020; Rydberg Sterner *et al.*, 2020; Sidebotham and Team, 2001), intimate partner violence (Fogarty *et al.*, 2019), musical therapy for premature babies (Ghetti *et al.*, 2021), psoriasis (Randa *et al.*, 2018), openness about sexual orientation (Stevens *et al.*, 2003), social support (Trude *et al.*, 2021), respiratory illnesses (van der Gugten *et al.*, 2016), and education and housing systems (Wildman, 2020a, 2020b). Two studies focused on men and their views on mental health (Darwin *et al.*, 2017) and not having children (Smith *et al.*, 2020).

Tailored qualitative methods

10 of the 43 included papers used tailored qualitative methods such as longitudinal interviews, life history interviews, or ethnographic observations. These methods were specific to the research topics

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and participants targeted. For example, one study based in the UK conducted semi-structured interviews for diagnostics of children's antisocial behaviours and used observational methods to quantitatively analyse how mother's reactions to their child influences the child's behaviour (Caspi *et al.*, 2004). Two US-based studies used qualitative longitudinal research to specifically understand poverty and breastfeeding in rural communities over a 2 year time period (Flower *et al.*, 2008) and how men's employment, social support, skills, and motivation affect caregiving of their children over two time periods (Waller, 2009). Four studies from the Pelotas birth cohort in Brazil used a mix of ethnographic methods such as life history interviews, longitudinal interviews, and observations to explore what they described as the 'social complexity of the relationships' with adolescents born in the birth cohort interviewed about sensitive topics related to weight management (Gonçalves *et al.*, 2012), traumatic experiences (Béhague and Gonçalves, 2008), early child bearing (Béhague *et al.*, 2012), and mental health (Béhague, 2015). Three studies used a combined approach of interviews with women during pregnancy and postnatally, and observations of interactions with family members and health professionals to explore women's agency and autonomy with their reproductive health in India (Raman *et al.*, 2016), the effect of maternity care on health and well-being of mother and babies in Australia (Allen *et al.*, 2016) and newborn care-seeking practices of home births in Ghana (Bazzano *et al.*, 2008).

Innovative qualitative methods

Four of the 43 included papers used innovative qualitative methods. These methods included participatory interviews with photovoice, photographs, using scenario and story cards and ethnographic observations.

Thairu *et al.*, (2005) conducted in-depth ethnographic interviews with 22 South African mothers in the postnatal period to explore infant feeding in the context of HIV. Twenty-two interviews were conducted in rural and urban clinics in Kwa-Zulu Natal, South Africa. Exploratory interviews were conducted to identify key factors that influence infant feeding for the participants. From this data, the research team codesigned a set of cards with words or phrases linked to a specific factor related to infant feeding (e.g. work or household composition) with a small sample of mothers enrolled in the birth cohort. The cards were used to ask open questions in an additional round of interviews on how the specific factor on the card affected infant feeding. The authors found that social stigma was the major factor affecting women's decisions on infant feeding, but maternal age and family influences, economic circumstances, and beliefs about the quality of breastmilk compared to formula were also barriers.

Collins *et al.* (2019) conducted 18 'go-along' semi-structured interviews and 40 observations with women who were pregnant or within one year postnatal in Kenya as part of the Pith Moromo (Dhuluo for 'enough food',) Pregnancy Birth Cohort Study in 2015. Go-along interviews were conducted by researchers accompanying participants on outings in their familiar environments, such as a neighbourhood or the local area (Carpiano, 2009). The study explored women's perceptions and observation of water insecurity during pregnancy and postnatally. The women were recruited from the five clinics that had HIV care in Nyanza, Kenya. Women were observed, photographed and interviewed while acquiring water as part of their daily activity, as per go-along interview methods (Carpiano, 2009). After this, the women were shown illustrations of men and women doing water chores and they were asked to rank them by task difficulty, time intensity, amount of water needed, and which gender is expected to complete the task. 20 women also used photovoice to take photographs of their water chores and then came back 5 days later to discuss the photos and choose 3–5 images that were most illustrative of their household water situation. They met for a third time to share the selected images with their peers in focus groups. The authors found that women were responsible for the majority of water-related household activities, irrespective of their HIV status. They found that the water-related household activities had negative impacts on maternal and infant psychosocial and physical health, nutrition, and mother's economic well-being.

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Shiells *et al.* (2022) conducted a qualitative synthesis of the five innovative qualitative methods used in the UK Avon Longitudinal Study Avon Longitudinal Study of Parents and Children (ALSPAC) study. The synthesis focused on data linkage in birth cohort studies and on parents and their children born in the birth cohort, when they were in adulthood. Multiple innovative methods were used. In one study, focus groups were conducted using a deck of 20 cards with different types of data linkage methods (e.g. mobile phone use or health records) and the participants were asked to rank the cards and come to a group consensus. Another study conducted focus groups using story cards which represented the viewpoints of fictional characters affected by data linkage, to ask the participants if they could relate to these scenarios. Other innovative methods included conducting focus groups and using word scenario cards with blanks in the sentences for the participants to fill in the blanks through discussion, to explore how they expected data to be shared and presented. It was found that birth cohort participants accepted digital footprint data if they could understand the value, validity, and the risks but also needed to trust the mechanisms of governance over the data. Unlike many of the other qualitative studies in this review, the findings from this qualitative synthesis were explicitly discussed to have direct learnings for the ALSPAC birth cohort and other birth cohorts to develop their digital footprint data linkage strategy. The other qualitative studies did not directly report on whether their findings impacted the birth cohort study.

Jansen *et al.* (2020) conducted ethnographic observations of six families in their homes for up to 3–6 hours at a time, over multiple times a week for six months to observe and participate in the families' daily routines, including larger neighbourhood activities such as festivals and political events. The participants were part of the Early Life Exposure in Mexico to ENvironmental Toxicants (ELEMENT) birth cohort study. The observation study aimed to explore dietary patterns within the context of the nutrition transition among Mexican adolescents from the birth cohort. Additional observations were conducted with neighbours and with extended family members to get a sense of how typical the families were. The observations were analysed together with survey data on dietary, sociodemographic, and health behaviour. Findings revealed that families of higher socio-economic status could afford to prepare larger home-cooked meals on a regular basis while lower socio-economic status households had less-stable patterns and greater reliance on processed food.

Discussion

This scoping review illustrates a gap in the use of innovative qualitative methods in birth cohort studies. A total of 43 papers using qualitative methods within birth cohort studies were identified. Of the 43 papers, four used innovative qualitative methods, ten used tailored qualitative methods and 29 used traditional qualitative methods such as interviews or focus groups. Only four studies, within the ten tailored qualitative methods, used qualitative longitudinal methods in this review (Collins *et al.*, 2019; Flower *et al.*, 2008; Gonçalves *et al.*, 2012, Jansen *et al.* 2020), which is surprising given the longitudinal nature of birth cohorts. This suggests that there are challenges in using more innovative qualitative methods in birth cohort studies, such as those that directly capitalise on the temporal scope of such studies, which require further reflection and analysis. The four innovative qualitative methods studies showed the potential of these methods for coproducing findings with participants (Collins *et al.*, 2019; Shiells *et al.*, 2022; Thairu *et al.*, 2005). For example, one innovative qualitative methods study from this review found through observation and using photovoice during the interviews that household water labour was gendered and also had negative impacts on women's health, well-being and economic capital (Collins *et al.*, 2019). This aligns with reflections from Davis *et al.* (2019) review and stakeholder interviews that found participatory methods to be more powerful to understand the social, political, and cultural context of randomised control trials. Elliott (2008)'s overview on British birth cohort studies explains that 'more innovative narrative approaches to analysis become

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possible as an increasing number of large-scale quantitative studies include the collection of qualitative textual material' p414. Innovative qualitative methods are not only useful for broadening the scope of qualitative inquiry in birth cohort research, but they also provide the depth for tackling difficult questions, while also providing platforms for policy recommendations to address the complexities of contemporary health, particularly in terms of disparities in health outcomes.

Challenges of using qualitative methods in birth cohort studies

In general, there are logistical, methodological, and ethical challenges with using any type of qualitative methods in birth cohorts. Goertz and Mahoney (2012) emphasised the power imbalance of quantitative vs qualitative research, where the value to quantitative methods is favoured for actionable results and policy implications. One of the main critiques of qualitative research vs quantitative is the sample size, which is especially relevant within birth cohorts. As birth cohorts typically involve a large number of participants, many of the qualitative studies in this scoping review described small sample sizes in their study limitations. Qualitative studies described the challenges of selecting representative subsets of participants and for generalisability of the findings to the larger cohort (Allen *et al.*, 2016; Arora, Chew, *et al.*, 2021; Arora *et al.*, 2018; Arora, Maharaj, *et al.*, 2021; Darwin *et al.*, 2017; Erasmus *et al.*, 2023; Fogarty *et al.*, 2019; Ghetti *et al.*, 2021; Randa *et al.*, 2018; Rydberg Sterner *et al.*, 2020; Sidebotham and Team, 2001; Smith *et al.*, 2020; Stevens *et al.*, 2003; Thairu *et al.*, 2005; Trude *et al.*, 2021; van der Gugten *et al.*, 2016; Woolhouse *et al.*, 2012, 2014). Although qualitative research does not aim to be representative or generalisable, it is still important for qualitative researchers working with birth cohorts to consider how to recruit participants and how the findings inform the other studies and findings within the birth cohort. From a biosocial perspective, the qualitative data can help to understand the social, cultural and political findings of the other research findings from the birth cohort.

Another challenge is that qualitative research is typically time-consuming and resource-intensive. As Helen Pearson (2016) writes in her book 'Life Project' based on five British birth studies, there are constant funding challenges in birth cohort research, and that includes qualitative studies. The studies in this review reported challenges in conducting multiple interviews, follow-ups, observations, and innovative methods (Arora *et al.*, 2018; Erasmus *et al.*, 2023; Ghetti *et al.*, 2021; Rönkä *et al.*, 2020; Rydberg Sterner *et al.*, 2020; Wildman, 2020a, 2020b). This required significant investments in time, travel for participant or researcher to interviews, increased researcher capacity, and financial resources. This can overload participants leading to consequent refusal to continue participating in the birth cohort (Clark., 2008), if the value of qualitative work is not communicated to participants. However, if qualitative inquiry and its efforts are recognised by cohort researchers as important and worthy of those costs, in the same way that quantitative and biomedical inquiry and efforts are, the burden of the costs may be revealed to be, at least partly, a matter of perception in a hierarchical world of research practices. Arguably, the extra resources required do yield very rich qualitative data and potentially build important relationships with participants in the birth cohorts and therefore should be seen as an investment rather than resource-intensive. Trude *et al.* (2021) reflected that the qualitative methods created good rapport and trust with interviewees and Ghetti *et al.* (2021) reflected that a deeper level of engagement was achieved.

Another challenge is that qualitative research within birth cohorts often explores personal experiences and sensitive topics. Most of the studies in this review interviewed vulnerable populations with specific health conditions, and some interviewed children (Arora, Maharaj, *et al.*, 2021; Béhague, 2015; Béhague *et al.*, 2012; Béhague and Gonçalves, 2008; Berridge *et al.*, 2021; Gonçalves *et al.*, 2012; Randa *et al.*, 2018; Ri *et al.*, 2018; Sidebotham and Team, 2001). Research teams must navigate ethical challenges related to obtaining informed consent, ensuring confidentiality, and protecting the well-being and privacy of participants.

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Finally, one of the challenges of conducting qualitative research in birth cohort studies may be due to the disciplinary background and training of those who lead birth cohort studies. Often the discipline of the research team dictates the methods conducted in birth cohort studies. Table 2 outlines the different researcher backgrounds in relation to the qualitative research methods found in this review. The majority of researchers came from academic backgrounds in anthropology (Béhague, 2015; Béhague *et al.*, 2012; Béhague and Gonçalves, 2008; Collins *et al.*, 2019; Crane and Ball, 2016), psychology (Darwin *et al.*, 2017; Desai *et al.*, 2021; Fogarty *et al.*, 2019; Randa *et al.*, 2018; Shiells *et al.*, 2022; Smith *et al.*, 2020; Stevens *et al.*, 2003; Thairu *et al.*, 2005), other social science (Adeniyi *et al.*, 2018; Arora, Chew, *et al.*, 2021; Arora *et al.*, 2018; Berridge *et al.*, 2021; Ri *et al.*, 2018; Rönkä *et al.*, 2020; Waller, 2009), or health sciences (Adeniyi *et al.*, 2018; Allen *et al.*, 2016; Arora, Chew, *et al.*, 2021; Arora *et al.*, 2018; Arora, Maharaj, *et al.*, 2021; Bazzano *et al.*, 2008; D'Agata *et al.*, 2022; Darwin *et al.*, 2017; Desai *et al.*, 2021; Raman *et al.*, 2016; Sidebotham and Team, 2001; van der Gugten *et al.*, 2016; Wildman, 2020a, 2020b). All these disciplines have traditionally worked with qualitative methods compared to other disciplines. Biosocial researchers and others with qualitative expertise should be invited to shape the design of birth cohort studies from the beginning or be invited to increase the agenda of qualitative methods in existing birth cohort studies (Roberts and Sanz, 2018).

Opportunities of using innovative qualitative methods in birth cohort studies

Using innovative qualitative methods can come with opportunities, such as increasing participant engagement and foregrounding participant voices through research coproduction. Such methods can address why and how disparities worsen over time and aid efforts to lessen them. An example of increasing participant engagement through innovative qualitative methods is in the Born in Bradford birth cohort study (Dogra *et al.*, 2023). The birth cohort study published a protocol in 2023 describing how they will use innovative qualitative longitudinal research methods such as art, activism, online and digital content, portraits, and critical events to empower young people to shape the narrative of their own lives (Dogra *et al.*, 2023).

Coproduction shares the power between researcher and those who have a stake in the project to enhance the quality of the research and help it to bring about positive change for society and the economy (McCutcheon *et al.*, 2022; Rycroft-Malone *et al.*, 2022). Coproduction refers to modelling research on a principle of researcher and participant collaboration, whereby research problems are identified based on participants' needs and findings are 'useful, usable, and used'p1, that is, oriented toward tangible and actionable benefits to participants (McCutcheon *et al.*, 2022; Rycroft-Malone *et al.*, 2022). Simply put, coproduction gives participants the power to shape research, including how research is done, what is focused on, how findings are packaged and presented, and much more depending on the content of a given study. Research coproduction is therefore a hallmark of specific types of qualitative research that lend themselves to it by design, such as participatory ethnography and action research. Coproduction takes seriously the concept of reciprocity or the notion that participants should benefit from research that depends on them. Giving participants a voice in research design, methods, content foci, analysis, and communication of results is therefore one potential means of ensuring reciprocity (Freire, 2018).

Several birth cohort studies already incorporate coproduction into their work, such as in ALSPAC's Participant and Public Advisory Panel and Born in Bradford's participant co-produced ActEarly programme, both in the UK. Coproduction using innovative qualitative methods can increase the rapport between participants and researchers (Trude *et al.*, 2021), provides participants the opportunity to share their stories (Rydberg Sterner *et al.*, 2020), and can keep participants engaged in the research (Ghetti *et al.*, 2021).

However, coproduction is not always feasible, and even when feasible, does not always live up to researcher and/or participant expectations. It can induce participant fatigue in demanding additional labour of participants (Clark., 2008). As much as coproduction can attempt to

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challenge the hierarchical structure of the academic 'researcher' versus the 'researched', researchers must ask themselves: 'Does participation really open a space for coproduction and fruitful negotiation over alternative epistemologies and different ways of knowing, or does it merely reinforce a hegemonic and/or academic theoretical framework upon the experiences of the participants?' pxxiii (Lähdesmäki *et al.*, 2021). Coproduction also has limitations in practice, such as remaining symbolic and on-the-surface, i.e. as a 'tick-box' exercise under the guise of greater equity in research (Arnstein, 1969). In the context of working together, researchers and participants form a constellation of diverse identities and practices that iterate and can reproduce, inequities in different ways. Coproduction thus prompts researchers and participants to reflect on their social positions and examine how the process is likely to be affected by power dynamics in one way or another. Ultimately, it requires reflexivity on the part of researchers to acknowledge, examine, and address not only the power dynamics inherent in research but also those present within the milieu of a particular project.

Innovative qualitative methods can also help uncover unexplored relationships in birth cohort data.

A prime example is Roberts and Sanz (2018) creation of a research platform they call bioethnography. Bioethnography combines biological and ethnographic methods to disentangle phenomena and approaches to 'arrive at a better understanding of the larger histories and life circumstances that shape health, disease and inequality' (ibid: 749) (Roberts and Sanz, 2018). This research platform is the outcome of long-term collaboration between quantitative-focused environmental health scientists and anthropologists. The collaboration recognises all methodological approaches as equally valuable and demonstrates how their synthesis can uncover previously missed relationships. Roberts' (2017) in-depth ethnographic work with 6 ELEMENT birth cohort families in two different neighbourhoods in Mexico City demonstrated how living in a polluted and undesirable neighbourhood had an unexpected protective effect in that this area was subject to less police violence and unwanted surveillance. In other words, living in a toxic and polluted environment was a protective factor against other threats to their livelihood. Understandings of how social worlds interact with biological outcomes is not possible using purely quantitative evaluations. While Roberts and Sanz (2018) admit that building such a research platform is a rather slow process because of the 'epistemic, temporal, and logistical coordination of disparate and differently positioned intellectual research environments' p757, it provides fruitful ground for developing new research questions that could otherwise not be created with solely biological nor ethnographic data.

Such interdisciplinary collaboration frequently not only sets the foundations for innovative methodology but also for biosocial research. Another innovative example is Tinkler *et al.* (2021)'s work with the National Survey of Health and Development (NSHD), in which they generated biographical collages of women coming of age post-World War II through a secondary qualitative analysis of 30 participants' pre-existing surveys and data that had already been collected by health scientists. By combining answers from open-text questions and comments in the margins of questionnaires by participants, parents and teachers, they were able to shed light on the meaning and significance of an event or experience in participants' lives. Through this methodology, they were able to consider the shifting nature of what is recognised as 'data' over time, while also rethinking what constitutes data about persons in longitudinal surveys. Through creatively engaging data originally collected by health scientists, social scientists examined subjectivity, relationality, and temporality within existing birth cohort data p266 (Tinkler *et al.*, 2021).

Limitations

While a scoping review is a useful methodology for mapping the existing contours of research on a particular topic, this approach also has limitations. Most importantly, the scoping review relies on judicious use of keywords when conducting the search strategy. It was surprising to find that

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innovative studies such as those by Roberts and Sanz (2018) and Tinkler *et al.* (2021) were not selected for using in the search criteria. While the exclusion of Tinkler's (2021) work can be linked to the methodological approach, which only relied on existing data, Roberts' and Sanz's (2018) ethnographic research leaves a greater caveat. While their focus is on how to do bioethnographic data collection, and the paper covers multiple research studies, they do focus on innovative methodology. It could be speculated whether adding 'bioethnography' as an extra keyword may have made the difference. Another article that was not included in the search findings was Elliott's (2013) qualitative interview-based research on the concept of generational identity amongst the 1958 British Birth Cohort Study. In addition to these missed papers, the scoping review did not detect the significant grey literature that might include reference to innovative methodologies in birth cohorts. Taking these exclusions into consideration, the review was conducted systematically and thoroughly following the Centre for Reviews and Dissemination guidelines. There could be a possible limitation that certain qualitative studies and potentially innovative qualitative studies were not captured in the search due to imperfect keywords and human error in screening. Quality assessments of the studies were not conducted, which could be considered a limitation to the review. However, Arksey and O'Malley (2005) advise that a quality assessment is not required in a scoping review. Data extraction acted as a form of quality assessment as it used the COREQ guidelines as a template (Tong *et al.*, 2007). Scoping reviews are time-intensive, and the inclusion or exclusion of papers also required reflective discussion among team members to account for different approaches. Despite all of these limitations, this scoping review has provided a useful overview of the extent to which innovative qualitative methods have been adopted in birth cohort research.

Conclusion

This scoping review has highlighted a gap in using innovative qualitative methods in birth cohorts, potentially due to the well-published challenges about conducting qualitative research within birth cohort studies (Arora *et al.*, 2018; Erasmus *et al.*, 2023; Ghetti *et al.*, 2021; Rönkä *et al.*, 2020; Rydberg Sterner *et al.*, 2020; Wildman, 2020a, 2020b). While some but not all birth cohorts have a focus on qualitative research by design, most if not all collect quantitative data by default. Diverse qualitative methods beyond the collection of qualitative free-response survey data by cohorts can be used alongside quantitative methods to study the problems and politics of birth cohort studies, which can be hidden by an assumption of the neutrality of rigorous contemporary epidemiological research. Conducting interviews, focus groups, and ethnographic observations can add a level of understanding about the relationships between biological, social, cultural, and political context of participants. Conducting qualitative longitudinal research, alongside already existing quantitative longitudinal birth cohort methods, would complement the understanding of a cohort of people over time (Neale, 2021). If traditional qualitative methods such as focus groups and interviews can provide more depth to complex questions including cohort participation, innovative qualitative methods may have the potential to push research on nuanced and multifaceted biosocial phenomena in birth cohort research even further. Biosocial researchers, who are interdisciplinary by nature, are well placed to lead in developing innovative methods within birth cohorts by collaborating and learning from each other, especially those with expertise in qualitative methods and coproduction. Ultimately, birth cohort research helps us to better understand how to improve health and social outcomes, and innovative methods are particularly adept at giving us a glimpse into the context and the links between the biological and social narratives that create these outcomes.

Supplementary material

The supplementary material for this article can be found at https://doi.org/10.1017/S0021932025000161

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