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Design research for menopause: a scoping review

Katherine Moline[a] and Teena Clerke[b]

aUNSW Arts, Design and Architecture, University of New South Wales, Paddington, Australia; bMaridulu Budyari Gumal, Sydney Partnership for Health, Education, Research and Enterprise (SPHERE), Faculty of Health, University of Technology Sydney, Sydney, Australia

ABSTRACT

More than half the global population experience menopause, of which a significant number are in part-time or full-time employment. Research on labour force participation reports that employment is often interrupted during the menopausal transition due to difficulties accessing timely medical support and social discrimination. These interruptions result in the loss of professional expertise for employers and financial security for employees. To identify the characteristics of and gaps in design research for menopause we conducted a scoping review of the literature. We sourced and analysed 24 articles, mapping them according to their alignment with three conceptual framings of menopause from the sociology of medicine; a medicalized condition requiring pharmacological treatment, a natural life stage that is managed with complementary therapies, and a demedicalized issue where illness and health are framed as always socially situated. We found that the articles on menopause were relatively evenly distributed across the medicalized and demedicalized framings, with fewer developed within a natural framing. Our findings offer design researchers an overview of frameworks that are commonly used in health research and that we see as productive for further multidisciplinary research collaborations for menopause, and for research concerning the intersections of gender, sexualities, ageing and health more broadly.

Introduction

Women constitute more than half the global population (United Nations 2023), and while rates vary across the United Nations geoscheme (World Bank Group 2023), in 2020, 47% of women were in paid employment (Riach and Rees 2022). Women are also working longer due to changes in

CONTACT Katherine Moline K.Moline@unsw.edu.au UNSW Arts, Design and Architecture, University of New South Wales, Paddington, Australia

economic imperatives and flexible work arrangements (Australian Bureau of Statistics 2021; D'Angelo et al. 2022; United Kingdom Parliament 2022). For example, labour force participation in OECD member states was 73% for women aged 50–53 and 65% for women aged 55–59 in 2019 (Rees et al. 2021). In the UK, women of menopausal age are the fastest growing group in the workforce (United Kingdom Parliament 2022, 3), with 4.5 million women aged 50–64 in paid employment in 2022 (17). In Australia, workforce participation by women aged 55–64 years grew by 23% between 1999 and 2012 (McPhail 2018), and the employment-to-population ratio for 65-year-old women in 2020 was 35.6%, more than triple the 10% ratio in 1966 and 2000 (Australian Bureau of Statistics 2021). The term *women* in these statistics refers largely to cisgender women due to major omissions and inconsistencies in the collection of data on the health and employment of lesbian, gay, bisexual, trans, queer and other sexuality and bodily diverse (LGBTQ+) populations internationally. Until population data collection agencies, such as national censuses, formally recognize diversity and include questions concerning sexual orientation and gender identities, evidence-based research on health and employment at midlife is constrained by heteronormative assumptions (Glyde 2021). In this study, we refer to *people*, which is an inclusive term that reflects the social diversity that research on the intersections of midlife health, employment, sexual orientation, gender, and ageing must consider.

Significant professional changes can take place during the menopausal transition, also known as perimenopause, which is marked by changes to the menstrual cycle that affect physical, emotional, mental and social wellbeing, ending with menopause 12 months after the final menstruation period, generally between the ages of 45 and 55 (United Kingdom Parliament 2022). Lived experiences of menopause-related changes vary greatly, shaped by gender, cultural and social norms across diverse contexts (World Health Organisation 2022). These changes are coupled with the social stigma associated with menopause and inadequate diagnosis and treatment attributable to shortfalls in general practitioners' medical training as well as limited access to specialist consultants (United Kingdom Parliament 2022). The Women and Equalities Committee of the United Kingdom Parliament described the impacts on people experiencing menopause in the labour force are 'widespread' and 'shocking' (United Kingdom Parliament 2022, 19). The combination of the increased participation of older people in employment, the discrimination surrounding menopause in the workplace and the limitations of medical training and medical specialist access present some of the complex challenges that influence people's decisions to interrupt or cease paid employment earlier than intended (United Kingdom Parliament 2022, 18–19). The consequences of interrupting or leaving work during menopause include the loss of significant professional expertise for

employers (Riach and Rees 2022), and reduced income and financial security for employees (Faubion et al. 2023; United Kingdom Parliament 2022).

The sociology of medicine provides three explanatory frameworks we found pertinent to understanding design research for menopause. They can be summarized as framing menopause as: (i) a medical problem requiring pharmacological intervention (medicalization); (ii) a condition that is managed with complementary therapies, such as yoga (natural); or (iii) a life stage that is subject to social norms that marginalize people who identify as women (demedicalization). These three framings emerged with endocrinological discoveries about menopausal hormones in the 1920s and 1930s (Bell 1987), the questioning of medical expertise in the 1960s and 1970s that enabled reconceptualizations of menopause as a natural life stage to flourish (Busfield 2017), and the challenging of an individualistic ethos that separated health experiences from the social contexts in which they occur in the 1980s (Lowenberg and Davis 1994).

The first framing, medicalization, articulates physiological conditions in medical terms and language and adopts a highly regulated evidence-based framework for treatment (Purdy 2001). Through medicalization, menopause is framed as an 'illness which deviates from biological normality' (Rubinstein 2014, 218) and a 'hormone-deficiency condition requiring replacement hormones to maintain health and increase longevity' (Meyer 2001, 769). Critics of medicalization contend that it pathologizes health (Boston Women's Health Book Collective and Norsigian [1970] 2011) by transforming people into patients and consumers of specialized treatments (Purdy 2001, 249), and fails to acknowledge the difficulties in defining biological normality due to the diversity of gender experiences (Ilankoon, Samarasinghe, and Elgán 2021; Murtagh and Hepworth 2003) or account for the social stigma surrounding menopause (British Medical Association 2020; United Kingdom Parliament 2022, 7). To date, medicalization frames and informs the majority of design research for menopause studies.

As part of a broader questioning of medical expertise, the holistic health movement of the 1960s and 1970s reframed menopause as a natural process, requiring only lifestyle adjustments and complementary therapies that were customized for the individual (Guillemin 2002). The criticism that medicalization pathologizes and monetizes midlife hormonal transitions and encourages profiteering by the pharmaceutical industry is equally applicable to the natural therapies industry (Guillemin 2002, 47).

A third framing we have adapted from the sociology of medicine is demedicalization, which stems from criticisms of both the medical and natural therapies industries. Demedicalization rejects both the pathologization of human experiences in medicine and the focus on the individual in natural framings of health that ignore the structural barriers that impede social and economic equality

(Busfield 2017). Instead, demedicalization frames menopause as a social and bio-logical transition that is impacted by multiple factors, such as lifestyle, social support, education, employment and economic security (Namazi, Sadeghi, and Behboodi Moghadam 2019). Demedicalization seeks to destigmatize menopause by making medical information accessible and encourage an egalitarian, rather than expert, role for health practitioners (Lowenberg and Davis 1994) and by drawing attention to the social structures and practices (Busfield 2017) sur-rounding menopause on people more generally.

As midlife design researchers, we considered a scoping review of design research for menopause timely, given the increasing international interest in menopause evidenced by the establishment in 2011 of World Menopause Day (Australasian Menopause Society 2022), and in a wide range of domains including women's health (de Villiers and Goldstein 2021), queer and trans health (Glyde 2021; De Graeve and De Vuyst 2022), government policy (United Kingdom Parliament 2022), organizational studies (Beck, Brewis, and Davies 2021; Steffan and Potočnik 2023), arts and culture (S. K. Enterprises, 2023; University of the Arts London 2023), and news media (Al Jrood 2023). To understand the characteristics of design research for menopause, identify gaps in knowledge, and encourage multidisciplinary research on gender and midlife health, we sourced and mapped literature on design research for menopause according to the three sociological framings of medicine discussed above; medicalization, natural and demedicaliza-tion. Our purpose was to articulate a shared language that might encourage new design research contributions to multidisciplinary research on gender and health at midlife, and gender and ageing more broadly.

Methodology

Systematic literature reviews are considered the highest level of evidence in health research, which encompasses medical, nursing and allied health disci-plines. Such reviews follow the logic of an aggregative synthesis of medical research about a topic available in medical databases, such as the Cochrane Review, PubMed, Scielo and Scopus. Yet these databases often overlook research exploring intersections between design and health. For example, a database search of 'women' AND 'healthy ageing' generated many thou-sands of articles, most of which omitted or subsumed menopause within women's health (Szoeke et al. 2016), addressed a wide gamut of health con-cerns for the elderly (Kenning and Bennett 2020), or reported medical research (Faubion et al. 2023). To focus the review, we searched Cochrane using 'design' AND 'menopause', which produced 20 results, while a Patient/population, Intervention, Comparison and Outcomes (PICO) search produced one. In all cases, 'design' referred to the design of the research, rather than the discipline of design.

In contrast to systematic literature reviews, a scoping review is more wide-ranging and follows a configurative logic to investigate understandings, contexts, domains and audiences of a topic. The aim of a scoping review is to map the extent, range and nature of research activity in a specific domain, irrespective of quality, and identify areas for further research (Arksey and O'Malley 2005), with results presented in diagrammatic or tabular form (Peters et al. 2015). Scoping reviews are useful for a body of literature, such as design research for menopause, that has not previously been reviewed, presents emerging evidence and is heterogeneous in character (Peters et al. 2015, 142).

Twenty-four articles were identified using Levac, Colquhoun, and O'Brien (2010) process, adapted from Arksey and O'Malley (2005), to explore the research questions, 'What are the characteristics of design research for menopause, how can they be understood in ways that are useful for multidisciplinary research, and what is missing?' We conducted iterative searches for English-language articles published between 2015 and 2022, selected because of the recent emergence of the topic in design research. We included articles where 'design' referred to the discipline rather than the research approach, and excluded scientific research articles, grey literature and media reports. A search of EBSCO, ARTstor, JSTOR and ProQuest databases using 'design' OR 'human computer interaction' AND 'menopause' OR '*menopaus*' produced two results. An additional 14 were identified from a search of Google Scholar, design conference proceedings, design journals and this journal, and ten more from a reference search. All articles were read by both authors. Data was extracted as direct quotes and paraphrases into an Excel spreadsheet and charted in a Word table.

Quantitative analysis of extracted data identified the authors' geographic locations and publication sites, with findings reported graphically (Figures 1 and 2). Qualitative thematic analysis, enhanced by iterative discussions between the authors distilled the research methodologies and approaches and the spread of design research across the sociological framings of menopause into graphical representations (Figures 3 and 4).

Results and discussion

The results and discussion of our findings first focus on the growth of design research interest in menopause, the uneven distribution of the authors' geographic locations, and the concentration of publications in design conference proceedings and journals. To articulate a key contribution of the field of design to research for menopause, we then identified the diversity of methodologies and approaches used in the studies. Finally, to find the implicit affinities between design research and other fields of research, we mapped
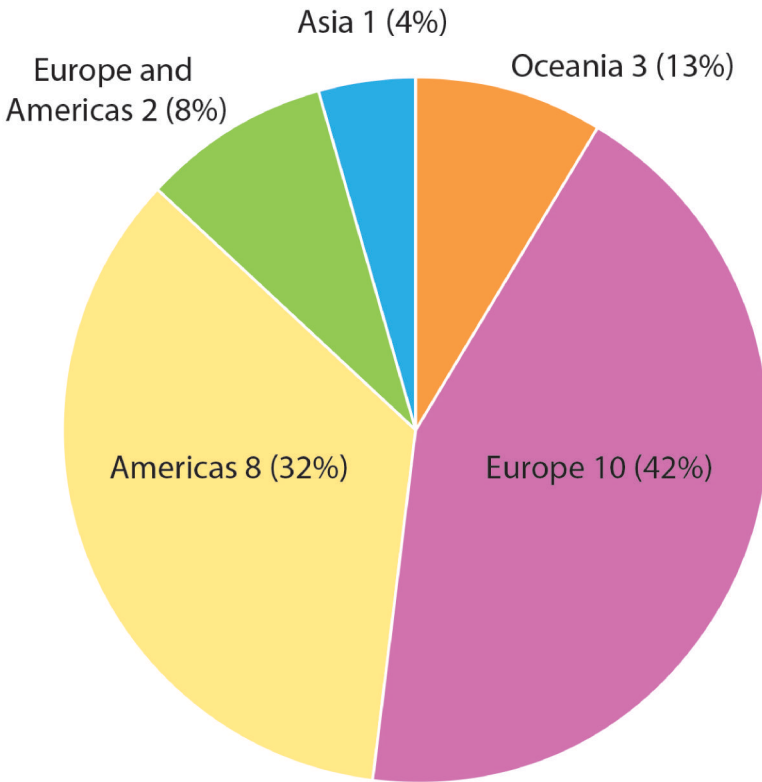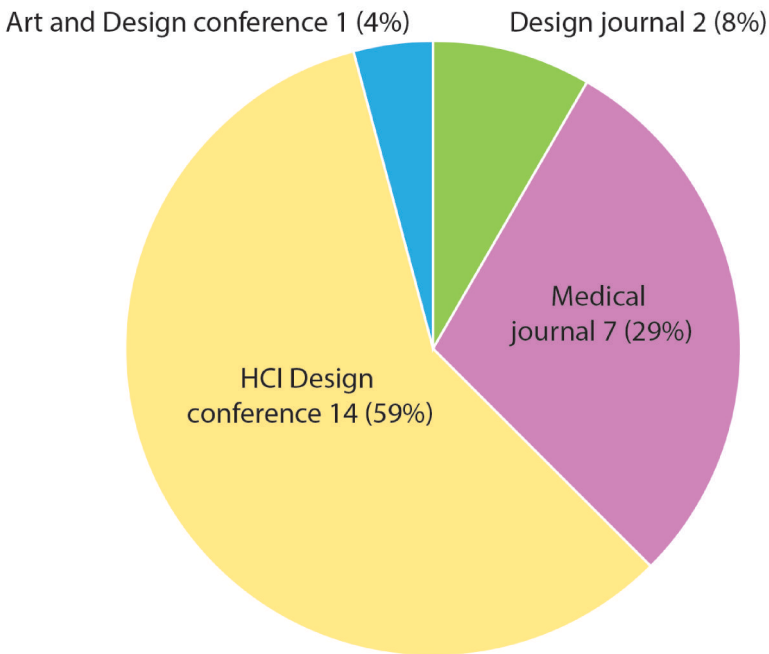
Figure 1. Authors' geographic location.
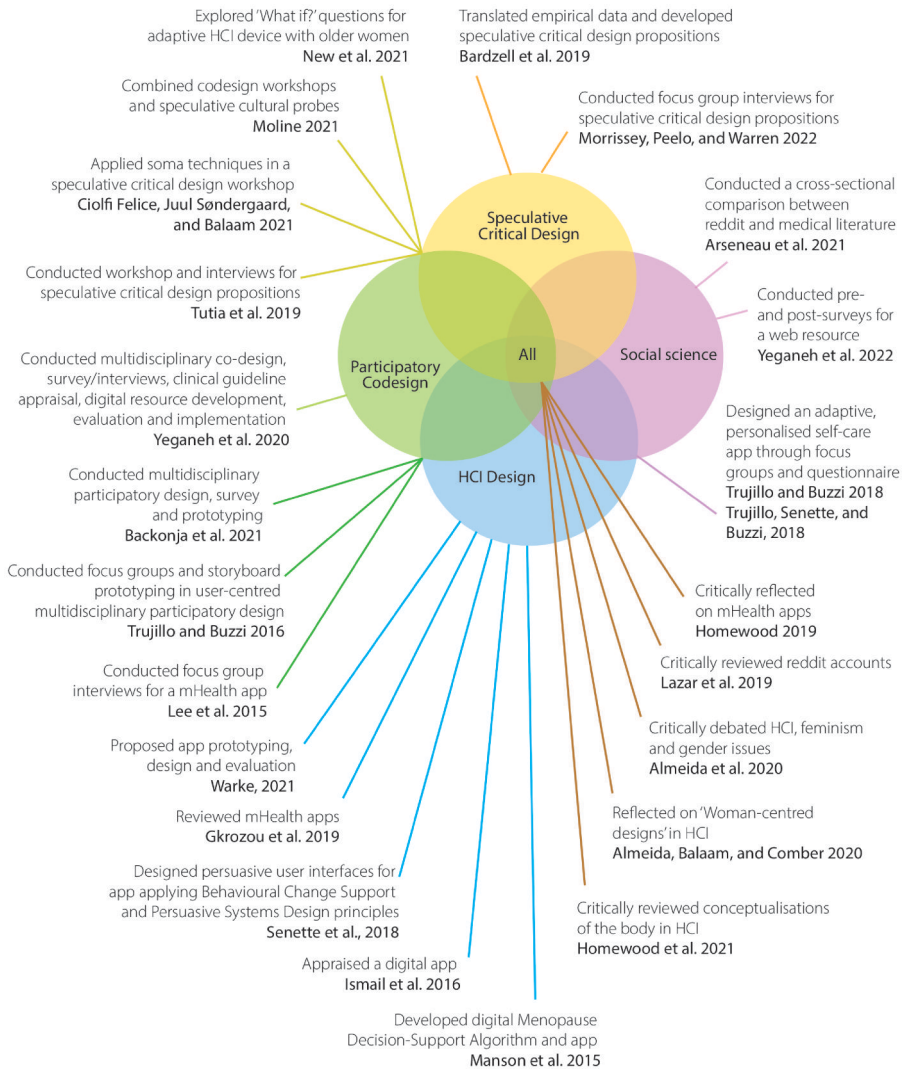

Figure 2. Publication sites.

Figure 3. Research methodologies and approaches (note that circles are not to scale and are for illustrative purposes only).

the spread of design research on the topic across the medicalized, natural and demedicalized frameworks adapted from the sociology of medicine.

The growth in research interest

Our review identified 24 articles reporting design research for menopause between 2015 and 2022 (Table 1).

The exponential increase in the number of design research for menopause studies between 2015 and 2022 demonstrates a growing interest in the topic that the relatively small number of publications we sourced (24) does not immediately reflect. Two articles were published in 2015 and two in 2016,
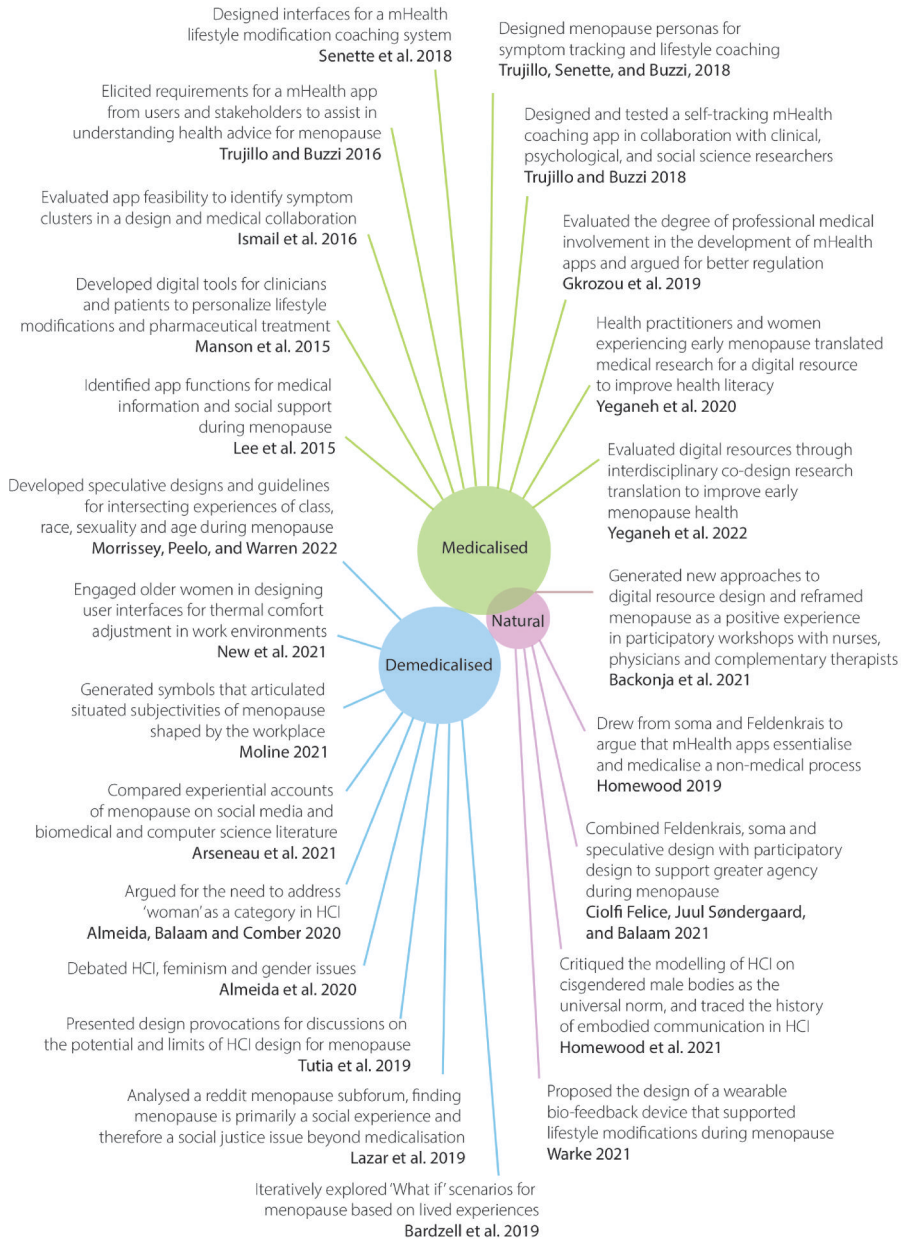
Figure 4. Design research mapped onto medicalization, natural and demedicalization framings of menopause.

three in 2018, five in 2019, three in 2020, eight in 2021, and two at the time of our literature searches in 2022. The increasing volume of design research for menopause publications reflects the growing interest in design research for health, such as that published in this journal.

Table 1. Design research on menopause 2015–2022.

Citation	Authors' geographic location	Publication site
Lee et al. (2015)	South Korea [Sungkyunkwan University]	HCI Design conference proceedings
Manson et al. (2015)	USA [North America Menopause Society]	Medical journal
Ismail et al. (2016)	Seattle Midlife Women's Health Study	Medical journal
Trujillo and Buzzi (2016)	Italy [Tuscany, multi-disciplinary consortium]	HCI design conference proceedings
Senette et al. (2018)	Italy [Tuscany, multi-disciplinary consortium]	HCI Design conference proceedings
Trujillo, Senette, and Buzzi (2018)	Italy [Tuscany, multi-disciplinary consortium]	HCI Design conference proceedings
Trujillo and Buzzi (2018)	Italy [Tuscany, multi-disciplinary consortium]	HCI Design conference proceedings
Bardzell et all. (2019)	USA (Indiana University)	HCI Design conference proceedings
Gkrozou et al. (2019)	Greece (University of Ioannina)	Medical journal
Homewood (2019)	Denmark (University of Copenhagen)	HCI Design conference proceedings
Bardzell et al. (2019)	USA (University of Maryland, University of Indiana)	HCI Design conference proceedings
Tutia et al. (2019)	USA (University of Washington)	HCI Design conference proceedings
Almeida et al. (2020)	Denmark, USA, Netherlands (IT University of Copenhagen, KTH Royal Institute of Technology, Indiana University, Aarhus University)	HCI Design journal
Almeida, Balaam, and Comber (2020)	Denmark, Sweden (IT University of Copenhagen, KTH Royal Institute of Technology)	HCI Design journal
Arseneau et al. (2021)	USA (University of Utah)	Medical journal
Backonja et al. (2021)	USA (University of Washington, University of Utah, Indiana University–Purdue University, Northwestern University)	Medical journal
Ciolfi Felice, Juul Søndergaard, and Balaam (2021)	Denmark, Netherlands (KTH Royal Institute of Technology)	HCI Design conference proceedings
Homewood et al. (2021)	Denmark, USA, Netherlands (IT University of Copenhagen, Malmö University, Roskilde University)	HCI Design conference proceedings
Moline (2021)	Australia (University of New South Wales)	Art and Design conference proceedings
New et al. (2021)	UK, Sweden (Lancaster University, Uppsala University)	HCI Design conference proceedings
Warke (2021)	Canada (Simon Fraser University)	HCI Design conference proceedings
Yeganeh et al. (2020)	Australia (Monash University, RMIT University, Monash Health)	Medical journal
Morrissey, Peelo, and Warren (2022)	Ireland (University of Limerick)	HCI Design conference proceedings
Yeganeh et al. (2022)	Australia (Monash University, RMIT University, Monash Health, University of Melbourne, Women's Hospital)	Medical journal

The uneven distribution of authors' geographic locations

Of the 24 articles, 20 (83%) emanated from the Americas and Europe, three from Oceania (13%) and one from Asia (4%) (Figure 1).

Our analysis shows an uneven distribution of literature on design research for menopause across countries with different socio-economic characteristics. Given that more than half the global population will experience, is

experiencing, or has experienced menopause, and increasingly while employed, there is an opportunity for design research to generate more inclusive understandings of the social and cultural contexts of menopause in Oceania, Africa and Asia. Generating research in these regions is consistent with social justice research in design (Constanza-Chock 2020) and the decolonization of design research for greater equity, inclusion, and recognition of diversity (Tunstall 2023).

The concentration of publications in design conference proceedings and journals

Articles were predominantly published in peer-reviewed design conference proceedings or journals (71%). Seven articles (29%) were published in medical journals (Figure 2).

Of the articles published in design sites, the *CHI Conference on Human Factors in Computing Systems* featured regularly, such as those hosted in Scotland in 2019, Japan in 2021 and the United States in 2022 (Table 1). This suggests a growing cluster of interest in research for menopause in design and technology studies. The overall concentration of publications in design conference proceedings, however, limits access to design research for menopause by medical practitioners and sociologists who are interested in multidisciplinary research teams but may be less familiar with design research.

The diversity of research methodologies and approaches

Research methodologies and approaches described in the articles reflected those well-established in design, the social sciences, and methodologies common across these disciplines (Figure 3). They included design methodologies, such as participatory and codesign (4.2%), speculative critical design (8.4%), or a combination of both (16.6%); social science methodologies, such as interviews, surveys and focus groups (8.4%); HCI design methodologies, such as persona development and user testing (20.8%), or a combination of HCI and social science methods (8.4%) or HCI and participatory methods (12.6%); and methodologies common to all disciplines, such as critical essays and reviews (20.8%). Overall, almost a third of the studies (29.2%) combined multidisciplinary methodologies.

The diversity of research methodologies and approaches suggests multidisciplinary crossovers that are promising for the increasing adoption of design methodologies in research for health (Knutz, Markussen, and Thomsen 2019) and for ageing populations (Gaver [2001] 2020). The array of mixed methodologies in the articles represents several nuanced perspectives. Despite the challenges of presenting mixed methodologies in a diagram, we

have tried to convey these nuances in Figure 3. The methodology that all approaches share is critical reflection and review, which we have titled 'All' due to space constraints. Rigorous methodological descriptions in most of the articles suggest that the design research for menopause literature is credible, transferable, dependable and confirmable (Shenton 2004).

The spread of design research for menopause across medicalization, natural and demedicalization frameworks

Our mapping of the articles according to their affinity with the sociological framings of medicine (Figure 4) shows a relatively even distribution of research across the frameworks of medicalization (41.7%) and demedicalization (37.5%), with a smaller proportion reflecting the natural framework (16.7%) and only one that drew on both medical and natural framings (4.2%). We interpret the uneven distribution, in part, as reflective of the prioritization of evidence-based research and the higher levels of funding in the fields of medicine and technology. Further exploration of the disparities in grant allocations, however, is beyond the parameters of this review.

Mapping the articles onto the three sociological framings of medicine—medicalization, natural and demedicalization—facilitated our understanding of the implicit conceptualizations in design research for menopause and affinities with the sociology of medicine. The results show that ten of the articles reflect a medicalization framework. Of these, eight elicited requirements for, or developed and tested, mHealth apps in collaboration with medical practitioners to coach behavioural change and reduce negative health outcomes during menopause (Gkrozou et al. 2019; Ismail et al. 2016; Lee et al. 2015; Manson et al. 2015; Senette et al. 2018; Trujillo and Buzzi 2016, 2018; Trujillo, Senette, and Buzzi 2018). Two of the articles modelled multidisciplinary codesign to translate evidence-based research into the development and evaluation of digital resources to improve people's agency during premature and early menopause (Yeganeh et al. 2022; Yeganeh et al. 2020). Notably, the single article aligned with both the medicalized and natural framings (Backonja et al. 2021) was due to a collaboration between medical and complementary therapy practitioners.

The significant proportion of design research focused on medicalizing menopause through digital technologies in our findings reflects the widespread promotion of medical apps. MHealth apps are commonly perceived as useful for providing timely medical information with which people can make decisions about the risk factors of menopause (Senette et al. 2018; Trujillo, Senette, and Buzzi 2018; Trujillo and Buzzi 2016) or seek pharmacological treatment (Manson et al. 2015). Despite the perceived benefits of mHealth apps, their effectiveness in assisting the development of socially-situated understandings of menopause

and the health literacy needs of people during hormonal transitions is debate-able (Backonja et al. 2021; Gkrozou et al. 2019).

Four articles were mapped within the natural framing of menopause because of their engagement with complementary therapies, such as soma techniques, the Feldenkrais Method and bio-feedback. While one argued against mHealth apps due to the risk of perpetuating negative sterotypes (Homewood 2019), three promoted natural framings of menopause as a technique that provided menopausal people with greater agency (Ciolfi Felice, Juul Søndergaard, and Balaam 2021; Homewood et al. 2021; Warke 2021).

Nine articles were mapped within demedicalization because of their fram-ing of menopause as socially situated and subject to gendered social norms. Of these, two applied speculative design methodologies to explore 'What if' scenarios based on physiological and social experiences of menopause (Bardzell et al. 2019) and to explore the 'intersections of experience' in rela-tion to class, race, sexuality and age within families (Morrissey, Peelo, and Warren 2022, 1). Three combined speculative critical design with participa-tory codesign to develop design provocations that sparked conversations around intimate and thoughtful computational systems for menopause (Tutia et al. 2019), include older women in designing for thermal comfort in the workplace (New et al. 2021), and probe the socially situated subjectivities of menopausal transitions in the context of workplaces (Moline 2021). Two articles analysed social media channels to argue for the expansion of under-standings of menopause beyond medicalization, framing the transition as a social justice issue related to gender, ageism and marginalization (Lazar et al. 2019) and dissonances between experiential accounts and the medical and computer science literature (Arseneau et al. 2021). Two articles contributed to critical debates, ranging from the relationships between HCI, feminism and gender (Almeida et al. 2020), to the need for 'Woman-centred' design in HCI (Almeida, Balaam, and Comber 2020).

Finally, in recognition of intersectionality and menopause, eight of the 24 articles included or called for more research in relation to queer and trans experiences of menopause (Arseneau et al. 2021; Backonja et al. 2021; Ciolfi Felice, Juul Søndergaard, and Balaam 2021; Homewood et al. 2021; Lazar et al. 2019; Morrissey, Peelo, and Warren 2022; Almeida et al. 2020; Almeida, Balaam, and Comber 2020).

Conclusion

Overall, our findings highlight the breadth of design research for menopause and the value of the contributions of design research to inclusive under-standings of the transition. We propose that the mapping of design research onto three conceptualizations adapted from the sociology of medicine

demonstrates affinities between the fields of design and the sociology of medicine and provides an overview for menopause research that involves design beyond the translation of medical data into mHealth apps. We emphasize the importance of our findings for multidisciplinary research teams focused on both new menopause technologies and on understandings of the socially situated lived experiences of menopause and the wider historical and contextual issues that influence research for menopause.

Our scoping review identified the growth of design research for menopause, and the predominance of studies emanating from Europe and the Americas. Our findings pointed to conferences and journals as the primary sites for the publication of these studies, and a wide diversity of research methodologies and approaches. Our adaptation of frameworks from the sociology of medicine facilitated the mapping of the reviewed literature across medicalized, natural and demedicalized understandings. We propose that showing the affinities between design research for menopause and the sociology of medicine may offer design researchers a more nuanced understanding of debates in gender and health. This is important because although the traditions of endocrinology (medicalization), complementary therapies (natural), and public health (demedicalization) have implicitly framed design research for menopause this is rarely acknowledged. We hope that showing the connections between design and sociology research supports the growth of design research for menopause, as increasing numbers of people continue employment during hormonal transitions. Multidisciplinary research presents considerable potential for collaborations and knowledge exchanges concerning gender and health, and gender and ageing more broadly.

Limitations

Several limitations impact this review of the literature on design for menopause. We acknowledge our review may be incomplete because of the diverse sites in which design research is published, and that our findings reflect our interpretation of framings adapted from the sociology of medicine. Further research on the drivers and consequences of design research for menopause, such as funding priorities and omissions that serve to stigmatize people impacted by menopause, is necessary, although beyond the scope of this review.

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Disclosure statement

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Notes on contributors

Katherine Moline is Associate Professor at UNSW Arts, Design and Architecture. Her research focuses on the dynamics between technological and social forces in art and design. Her analyses of experimental design are published in Undesign: Critical Practices at the Intersection of Art and Design (Routledge, 2018) and Food Democracy: Critical Lessons in Food, Communication, Design and Art (Intellect, 2017). Her innovations in research methods have been documented in Uncertainty and Possibility: New Approaches to Future Making in Design Anthropology (Bloomsbury, 2018) and The Routledge Companion to Digital Ethnography (Routledge, 2017). Katherine led the curatorial team for the touring exhibition The Data Imaginary: Fears and Fantasies, for Griffith University Art Museum with Angela Goddard, Amanda Hayman and Troy Casey (Blaklash Creative), and Beck Davis.

Teena Clerke is the Project Officer for the Maternal and Women's Clinical Academic Group of Maridulu Budyari Gumal, SPHERE and currently works as a researcher on a number of projects, including women's lived experiences of the peri-/menopause transition, maternity care clinician training in shared decision making around the timing of birth, and critical thinking in the context of transdisciplinary learning and inquiry. Her professional background is in visual communication design in the business, government and community sectors, exhibiting art (30 years), and lecturing in the fields of design, art and curatorial, adult education, workplace learning, public communications and global studies (25 years). Her research experience spans studies in primary health, child and family health, higher, doctoral and transdisciplinary education, and engineering workplace learning (15 years). Her PhD focused on women rewriting design scholarship as they move from navigating gendered practices in design to those in the university setting.

ORCID

Katherine Moline ⓘD http://orcid.org/0000-0001-6973-9784
Teena Clerke ⓘD http://orcid.org/0000-0002-5453-4820

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