Investigating Identity in Reproductive Health and HCI: A Systematic Review

ZAIDAT IBRAHIM, Indiana University Bloomington, USA
KATIE SIEK, Indiana University Bloomington, USA

We report our work-in-progress systematic review of women's reproductive health and HCI over 15 years (2007-2022) with a corpus of 57 papers.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**.

Additional Key Words and Phrases: Women's Health, Reproductive Health, Systematic Review

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1 INTRODUCTION

Research on women's health has proliferated over the last decade encompassing different phases of women's reproductive cycle (see Figure 1). Exemplar research includes menstrual tracking practices [4], spanning designing self-tracking technologies for the changing body [6], re-designing the breast pump to improve the lactation experience [2], fertility tracking [7] and Feedfinder [1] to support safe and public breastfeeding. Although there is a rapid increase in women's health, the politics of women's health, especially as it relates to reproduction has also increased. For example, On June 24, 2022, the supreme court in the United States overturned Roe V. Wade– the constitutional protection for abortion rights. This mandate resulted in more discussions on *reproductive justice*–the right to decide whether or not to have a baby– and *privacy concerns*–that period-tracking apps could potentially share their user's sensitive data with third parties [3] [1]. Given the emergent and increasing studies in women's health and reproductive health, it's, therefore, important to contribute a systematic review that explores existing research in women's reproductive health and HCI. We have chosen to undertake this task of contributing a systematic review scholarship on women's reproductive health and HCI. In this systematic review, we intend to answer the following research questions: What types of studies in HCI are conducted regarding women's reproductive health? What demographics are studied? Where are researchers focusing their efforts? What theoretical frameworks are researchers using in these studies? What types of technologies are being used, designed, or implicated?shoptagr:installed

2 METHODS

We conducted a systematic review of full-research papers published in the ACM Digital Library from 2007-2022 to gain an exhaustive overview of HCI research studies on women's [2] reproductive health. Our goal was to identify,

[1]See: https://theconversation.com/no-submitting-junk-data-to-period-tracking-apps-wont-protect-reproductive-privacy-186257
[2]Women: Any individual who experiences the phases indicated in Figure 1

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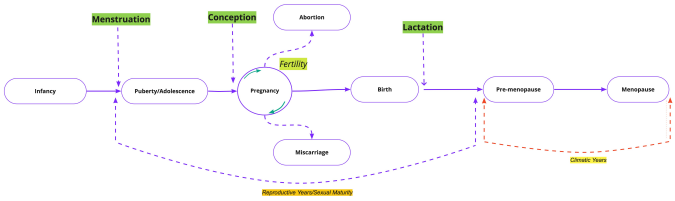


Fig. 1. Reproductive Cycle Phases

collect, and understand the direction of health-related HCI research, and design efforts whose primary population of focus experienced some part of the reproductive cycle and participated in technology design or evaluation. Authors brainstormed and iterated on eleven search terms that were related to the reproductive cycle[9]: *"women's health"*,*"puberty"*,*"fertility" "conception"*, *"menstruation"*,*"pregnancy"*, *"miscarriage"*,*"abortion"*, *"birth"*,*"lactation"* and *"menopause."* We chose "menstruation" instead of "period" because a period is broadly defined (e.g., *"time period"*).

2.1 Inclusion & Exclusion Criteria:

Inclusion criteria for papers were: (1) published between 2007-2022; (2) published in English; (3) engaged with people who experience the reproductive cycle directly (e.g., interviewing women) or indirectly through their methods (example: a content analysis of women's conversations on Reddit); (4) discussed a technology used by people who experience the reproductive cycle specifically for their reproductive life/health cycle or a study to design such technology system; (5) informed the design of future technologies for reproductive health. We excluded papers that were (1) not peer-reviewed full papers (2) not directly engaged with people who experience the reproductive cycle as their primary population; or (3) focused on technology used by or designed for caregivers and healthcare professionals; (4) studies with no actual interaction with participants.

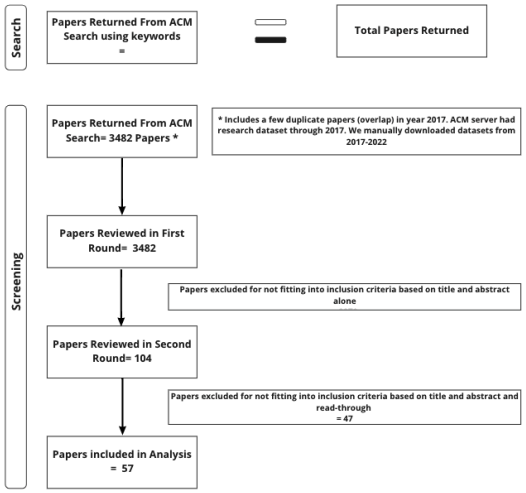


Fig. 2. Search and screening procedure

2.2 ACM Digital Library

The ACM Digital Library provided an Extensible Markup Language (XML) dump of all papers from 2007 through 2017. Our lab created a Python script [3] to convert the XML into curated comma-separated values (CSV) file based on search terms. We searched papers from all 24 SIGCHI-sponsored conferences[4]. XML keyword searching of ACM SIGCHI and TOCHI papers from 2007 through 2017 resulted in 1,975 papers - 1,899 SIGCHI and 76 TOCHI. Based on this review, 51 papers were eligible for a second review. This initial review also helped us refine our search terms for subsequent use in our manual curation of a corpus from 2018-2022 via the online ACM Digital library. We removed *"Conception"* and *"Birth"* from our search terms, as both words came up frequently on

[3]GitHub With Parsing Files: `https://github.com/4umModi/ACM_XML_Scraping`
[4]Full list of SIGHI-Sponsored Conferences can be found here:https://sigchi.org/conferences/conference-history/

CODES	DESCRIPTION
Abstracted Types	
Categories	Exploratory, Evaluative, Generative, and Survey as defined by [5]
Design Cycle	Any research that spans the entire length of design life cycles - from conception, design, test, launch
Mixed Method	Including one or more of the abstraction types described above e.g Design cycle
Study Methods Uses	
Categories	Interviews, Focus Groups, System Evaluation/Usability Study, Cultural Probes, Others(Specify)
Population density	
Urban	A population of at least 5,000
Rural	By definition, all populations, housing, and territory are not included within an urban area.
Suburban	This is defined by the author or stated within the paper
Online	Asynchronous online communities (ARC), Facebook, Reddit, Twitter.
Not Reported	
Country of Study	
Categories	USA, UK, India, Pakistan, Asia, Africa(specify), other(specify), Mixed (multiple countries),
Funding Categories	
Categories	University, Industry Funding, Foundation, Federal Grant, Not Reported
Reproductive Phase	
Categories	As defined by phases in Figure 1 and Mixed (combination of multiple reproductive phases)
Compensation	
Categories	Yes, No, Not Reported
Compensation Vehicles	Source: [8]
IRB Ethics	
Categories	Yes, No, Not Reported
Publication Year	
2009-2022	The year marked on the publication/research article

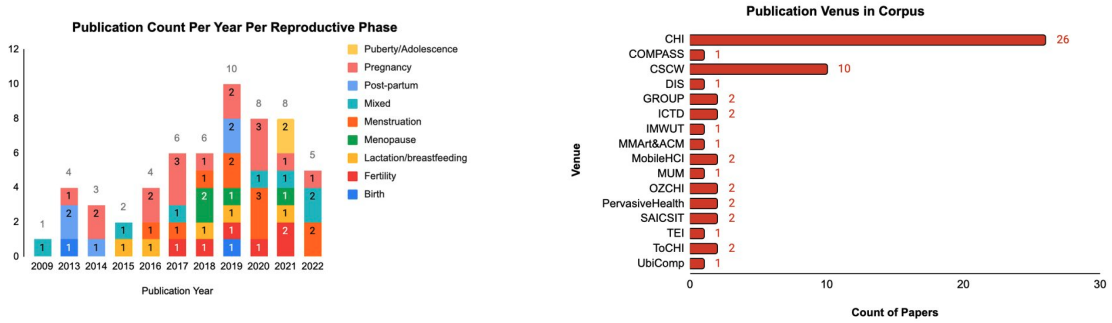
Table 1. Codes For Systematic Review & Descriptions

papers that were not relevant to our eligibility criteria. Upon review and filtering through our eligibility criteria, our final corpus consists of 57 papers (See Figure2).

3 PRELIMINARY DATA

We present preliminary data from our systematic review in Figures 3a and 3b. Within our corpus, there is an upward trend in publications focused on women's reproductive health with a peak in 2019. Notably, the majority of the research work is focused on pregnancy, menstruation, and fertility phases of the reproductive cycle. While literature is sparse in the other areas, the birth and puberty/adolescence phases had the least number of literature on the reproductive cycle.

45.6% of papers within our corpus were published at CHI, 17.5% were published at CSCW with 3.5% each at TOCHI, GROUP, Pervasive Health, MobileHCI, ICTD, OzCHI, SAICSIT (Figure 3b. More datasets will be available for presentation.



(a) Papers Per Publication Year &Reproductive Phase

(b) Papers per Publication Venue

Fig. 3. Papers in our Corpus by Publication Year and Publication Venue

REFERENCES

[1] Madeline Balaam, Rob Comber, Ed Jenkins, Selina Sutton, and Andrew Garbett. 2015. FeedFinder: A Location-Mapping Mobile Application for Breastfeeding Women. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (Seoul, Republic of Korea) *(CHI '15)*. Association for Computing Machinery, New York, NY, USA, 1709–1718. https://doi.org/10.1145/2702123.2702328

[2] Catherine D'Ignazio, Alexis Hope, Becky Michelson, Robyn Churchill, and Ethan Zuckerman. 2016. A Feminist HCI Approach to Designing Postpartum Technologies: "When I First Saw a Breast Pump I Was Wondering If It Was a Joke". In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) *(CHI '16)*. Association for Computing Machinery, New York, NY, USA, 2612–2622. https://doi.org/10.1145/2858036.2858460

[3] Zikan Dong, Liu Wang, Hao Xie, Guoai Xu, and Haoyu Wang. 2023. Privacy Analysis of Period Tracking Mobile Apps in the Post-Roe v. Wade Era. In *Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering* (Rochester, MI, USA) *(ASE '22)*. Association for Computing Machinery, New York, NY, USA, Article 203, 6 pages. https://doi.org/10.1145/3551349.3561343

[4] Daniel A. Epstein, Nicole B. Lee, Jennifer H. Kang, Elena Agapie, Jessica Schroeder, Laura R. Pina, James Fogarty, Julie A. Kientz, and Sean Munson. 2017. Examining Menstrual Tracking to Inform the Design of Personal Informatics Tools. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA) *(CHI '17)*. Association for Computing Machinery, New York, NY, USA, 6876–6888. https://doi.org/10.1145/3025453.3025635

[5] Christina Harrington, Aqueasha Martin-Hammond, and Kirsten E Bray. 2022. Examining Identity as a Variable of Health Technology Research for Older Adults: A Systematic Review. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) *(CHI '22)*. Association for Computing Machinery, New York, NY, USA, Article 265, 24 pages. https://doi.org/10.1145/3491102.3517621

[6] Sarah Homewood. 2018. Designing for the Changing Body: A Feminist Exploration of Self-Tracking Technologies. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) *(CHI EA '18)*. Association for Computing Machinery, New York, NY, USA, 1–4. https://doi.org/10.1145/3170427.3173031

[7] Sarah Homewood, Laurens Boer, and Anna Vallgårda. 2020. Designers in White Coats: Deploying Ovum, a Fertility Tracking Device. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–13. https://doi.org/10.1145/3313831.3376528

[8] Jessica Pater, Amanda Coupe, Rachel Pfafman, Chanda Phelan, Tammy Toscos, and Maia Jacobs. 2021. Standardizing Reporting of Participant Compensation in HCI: A Systematic Literature Review and Recommendations for the Field. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) *(CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 141, 16 pages. https://doi.org/10.1145/3411764.3445734

[9] Yuko Takeda. 2010. Understanding the Life Stages of Women to Enhance Your Practice. *Japan Medical Association Journal* 53 (09 2010).