

Invisibility or Visibility in Intimate Care at the Workplace? Examining the Use of Breast Pumps

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ABSTRACT

Advances in intimate care technologies and on-body wearables are disrupting how and where we think about and care for our bodies. The boundaries between private and public are increasingly porous. This offers new sites for studying intimate care as technology-use-in-practice. We present a qualitative study on the use of breast pumps in the workplace, based on semi-structured interviews with 19 individuals. Through this, we contribute an illustration of the complexities in carrying out intimate care work at the workplace and what it means to be pumping at the workplace. Our analysis unpacks (in)visibility as a crucial tension in the use of breast pumps in the workplace. We discuss how (in)visibility of personal medical devices plays a mediating role in how individuals exercise bodily rights, and the norms of who fits into professional settings.

CCS CONCEPTS

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

KEYWORDS

Body, breast pumps, intimate care, breastfeeding, invisibility, visibility

ACM Reference Format:

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1 INTRODUCTION

Intimate technologies have been classified as technologies which are close to the intimate body [6, 7] and/or which relate to intimate body processes [20, 38, 45, 65]. In recent years, there has been a marked expansion in the availability of commercial intimate technologies, such as insulin pumps, glucose meters, smart menstrual cups, digital contraceptives, and breast pumps. Devices have also become smaller, smarter, and more wearable. This has inevitably changed how and where people look after their body: Caring for the

self is increasingly fluid and it traverses private and public spheres. This paper focuses its exploration on what happens when intimate technologies move from a private space to a professional setting, drawing on a qualitative study that examines breast pumping¹ in the workplace.

We situate our research in a social setting, where multiple technological advancements, along with the effects of a global pandemic, precarious working conditions, a cost of living crisis, and an ageing workforce will likely lead to an increasing need to utilise intimate technologies, and other assistive technologies, in the workplace. The use of intimate technology in the workplace falls at a sensitive intersection of the embodied self [57], stigma against bodily acts [32], and the use of bodies to produce capital [77]. As such, we argue for the need to study intimate technology use in professional settings in a sustained and detailed manner. This will allow us to better understand the stories, negotiations, complications, and emotions entangled in this activity. We present a qualitative analysis of 19 individuals' experiences of using a breast pump at work, in altogether 11 different countries. Our analysis highlights how the move of intimate technology use to the workplace opens a complex territory where social norms, stigma of the intimate body, body needs, human rights, and capitalist regimes are called into question. By doing so, we showcase how the introduction of intimate technologies into the workplace disrupts visions of industrialized, standardized bodies.

Our contribution builds upon research in HCI and Interaction Design which has designed, developed, and studied intimate technologies in varying socio-cultural settings. This includes qualitative research examining the experience of using technologies for managing Type 1 diabetes [55], probe packs that encourage touching and examining the menstruating body in the home [20, 66], bespoke devices enabling fertility monitoring through observing changes in saliva in the home [38], through to examining people's general use of breast pumps [17, 24, 41]. To date, studies in HCI and Interaction Design have also examined people's varying experiences of using intimate technologies at work in a general sense. For example, Catherine D'Ignazio et al. [24] and Aisling O'Kane et al. [55] examine the breast pump and self management of Type 1 diabetes technologies at work, respectively, as part of larger studies focusing on the use of these technologies in general. D'Ignazio et al. [24] highlight the lack of appropriate spaces and dignity as well as how pressures to be productive are entangled with the experience



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¹We acknowledge that the use of language such as breast, breast milk, breast pumping, and breast feeding is gendered, and that some parents produce chest milk, chest feed, and use chest pumps. We use breast feeding / pumping in this paper in-line with the language used by the participants in our study.

of intimate technology use. O’Kane et al. [55], on the other hand, show how individuals hide or show-off their use of an intimate technology, depending on the social particulars of a situation. We extend on this body of work, by highlighting how the (in)visibility of devices, spaces, policies, and practices causes specific tensions in intimate technology use in the workplace. Our analysis unravels technological visions and desires that strive for small, discrete, and wearable intimate technologies. We suggest, instead, that intimate technologies, and the workplace technologies that surround their use in professional settings, could be designed to make visible and make space for intimate care and even to create feminist sensations [3]. We argue that taking such an approach may increase access and justice for all those who have intimate care needs in the workplace.

2 RELATED WORK

Our study cuts across multiple fields of scholarly work around the body [39, 67], women’s health [4, 37, 44], disability [36, 42], and care [10, 74]. We limit our review here to, first, a historical perspective on the breast pump and its use in the workplace, and second, current perspectives on intimate technology more broadly within HCI and Interaction Design.

2.1 Breast Pumping

The breast pump is a mechanical device that is used to extract milk from the breasts of a lactating body. It may be a manual device operated by hand or foot, or an electric device [25]. A lactating parent may use breast pumps for a variety of reasons: to provide breast milk to an infant who is not able to suckle sufficiently from the parent’s breasts, to improve milk supply, to deal with over milk supply and relieve engorged breasts, or to continue providing breast milk to the infant in cases of separation, such as when a newborn needs to be in an intensive care unit or when the parent is at work [23, 25]. While the first patent for a breast pump dates back to 1854 [53], the first electric breast pump for home use was not launched until 1991 [51]. A typical electric pump consists of a suction cup that is placed over the breast, a motor that generates suction, and a collection bottle or container where the milk is collected. The suction created by the motor causes the milk to be released from the breast and for it flow into the collection container. The figure 1a shows a widely used model of double electric pump from Medela company. The cups are fitted on top of the milk bottle and attached to the motor with tubes. This kind of breast pump requires a power source, and the user needs to hold milk bottles and flanges. The recent range of breast pumps is light-weight and battery-operated which makes breast pump use comparatively convenient. Some pumps can be used hands-free, with the help of extra gear such as a special pumping bra and lanyard to hold the pumping machine. Wearable pumps, as a subcategory of these, are compact and cordless. They are designed so that they can be worn with the entire unit securely inside the bra (see figure 1b). Two examples of high end luxury wearable pumps are Willow and Elvie; they also contain smart features such as monitoring of the milk volume and related data. Figure 1b shows the photograph of Elvie pump. Reports analysing the global market size for breast pumps project a compound annual growth rate of more than 8% from 2022 to 2030, with heaviest growth for wearable pumps [27, 58].

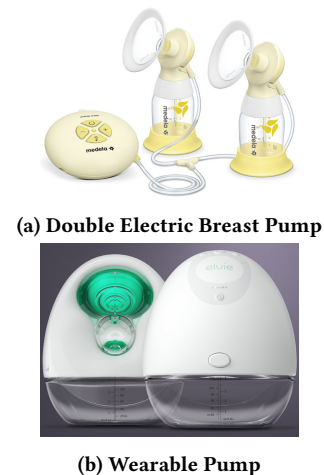


Figure 1: Two examples of commercial breast pumps

The technological development offers contemporary parents new alternatives on infant-feeding. Depending on the situation, a lactating parent can choose to begin pumping as soon as their baby is born, to pump exclusively from the beginning, or to breastfeed often and only pump once or a few times each day. Breast pumping is seen as a practical solution particularly when breastfeeding does not work, where a lactating parent needs to return to the workplace early, or when parents want to have more flexibility in their parenting duties [23, 31]. The increasing number of working women is listed as the most prominent factor for breast pump use in the market analysis about breast pumps [58]. This is also evident in the ways companies promote and advertise breast pumps, e.g. with models sitting at the office desk or travelling with a business luggage bag. Companies’ tag lines include *"It's time to pump smarter and not harder"* (Elvie), *"Embrace every challenge, love every moment"* (Philip) and *"Pump anytime, anywhere, around anyone"* (Freemie).

However, the commercial landscape is contested in how they depict care labour. Several feminist scholars have raised concern and called for examining whether breast pumps can be considered a feminist technology and for whom [16, 52]. Boyer underscores that the heavily promoted portable pumps risk reinforcing the culture of multi-tasking and promoting neoliberal motherhood [16, 17]. At the same time, policies for lactation breaks [2] have invited critique for the risk of producing yet more work or judgements for new parents [15, 17, 33]. The politics of combining care-work and wage-work through exercising the rights to take reasonable break time resonates with concerns long raised by disability studies on crip temporalities [42, 61, 62, 70]. Taking a break to attend to bodily needs in the workplace is stigmatized and the implications of doing so are deeply impacted by the person’s socio-cultural context, leading frequently to self-consciousness and efforts to hide one’s condition(s) [32, 55]. Scholars like Boyer and Lee [17, 48], adopting a focus on breastfeeding bodies at work, have called for the need to reconceptualize what bodies are acceptable at work and to move towards a broader range of living, both at work and at home. Lee

also reminds that breastfeeding is a form of embodied, relational work that goes largely unvalued and individualized [48].

With these concerns as a backdrop, our study examines breast pumping at the workplace as a case of intimate care practice and intimate technology use. Boyer's [16, 17] and D'Ignazio et al.'s [24] research is highly relevant to our work and includes important findings related to the policy challenges and social-cultural barriers users face in the workplace. Yet, this prior work is situated in the US context as well as in settings where breast pumping was reported to be largely conducted in concealed ways. We contribute to this emerging body of literature with a broader empirical grounding, covering global contexts and situations when users might appropriate breast pumping in (semi)visible ways. Further, studies that have evaluated breast pumps have mostly compared models within specific categories, relying on usability metrics in isolation from the contexts of breast pump use [11, 14, 28]. While we do not evaluate breast pumps, we contribute by examining the situated use of a range of different breast pumps – manual, electric and hands-free – and how these technologies are fitted into breastpumping parents' overall experiences at the workplace.

2.2 Technology, Body, and Intimacy

Advancements in electronics, computing, and medicine have generated space for new dimensions of interaction between technology and the human body. One dimension that has gained attention is intimacy. In the field of HCI, the term *intimate technology* is often used when a technology is applied to an intimate part of the body [6, 7], and/or to an intimate bodily process [30, 37, 65]. This resonates with psychological perspectives where intimacy is considered the degree of physical proximity between actors [76]. The breast pump, then, is an intimate technology because of its contact with breasts, a part of the body which is often sexualised. As the breast pump touches the body, it produces physical, sensory, and emotional stimuli, leading to the stimulation of the milk ducts and the ejection of milk. The intimacy between the breast pump and the breasts has also a significant number of external factors acting upon it which play an important role in the process of milk expression and the experience of breastpumping. Only when the individual is fully relaxed does the let-down (start of milk ejection) begin [25]. Thus, the efficiency of a breast pump does not depend solely on the technology per se, but also on how the individual using it is feeling in the moment-of-use and their overall mental well-being. Psychological stress, poor lactation environment, and negative socio-cultural norms have negative impact on milk supply [15, 29].

Kannabiran et al. [43] and Almeida et al. [5] play an influential role in calling for taking intimate care as an agenda for HCI. One of the exemplar works in this direction is Labella which uses an augmented system to improve awareness about the anatomy of the vulva and pelvic floor for reproductive health and sexual well-being [6]. Labella engages users in the act of touching and looking as a way of self-discovery, to construct new knowledge about one's bodily functions. Homewood et al. concord the theme in the design of Ovum, a fertility tracking device designed to aid in conception [37, 38]. Ovum takes saliva samples to determine ovulation windows in a menstrual cycle and is designed with an aim to solicit

participation from both of the partners together as way to inquire into shared and domestic settings. Along similar lines, Woytuk et al. explore the act of touching and being in touch with one's body, invoking how one feels about boundaries between one's body and the outside world, and what could be in-between [20]. There are interesting more-than-human elements entangled with lactating bodies which Helms captures well in her pictorial about attending to bodily transformations through design explorations [34]. Following the somatic turn [49], HCI research around the body has touched upon a more intimate dimension by taking into account *the soma* as the starting point for design whereby the whole subjective self takes the central position in the understanding of sensing, feeling, and perceiving [39, 64]. The soma takes primacy in informing the aesthetics of sensory exchanges that the body performs. Designs, such as Pelvic Chair, Soma Mat, and Breathing Wings, illustrate how somatic design processes stimulate 'performative intra-actions' that involve intimate bodily movements and sensations to develop awareness at a deeper level [68, 69].

As these intimate technologies develop, it is important to know how they will shape lived experiences and what kind of spatial-temporal and cultural re-configurations will be required to incorporate the new normal of intimate care practice outside the home. While designing for intimate technologies, the key challenge is the sensitivity attached to social norms on body parts. Prior research on intimate care related to menarche [20], menopause [21, 47], and the fertility cycle [37] has acknowledged that self-discovery and notions of self are continuously impacted by normative views on the body. Prior studies around the use of assistive technologies and medical devices have also reported the impact of socio-cultural context on one's attitude in adoption of personal medical devices [13]. O'Kane et al. [55] examined the use of diabetes management devices – glucose meter and insulin pumps – and observed users undergoing different acts of concealing and showing-off depending on who they were with in their immediate social setting when they were using the devices. From these studies, we can conclude that a person might use the same device in very different ways at home, at work, and in public places. Related to the subject position of a person (the social roles that one takes) and subjectivity (the felt experience and creative agency within a situation), Bardzell et al. expands the definition of "user" as a subjectivity of information, using the case study of sex toys [8]. Through their critical-empirical analysis, the authors describe how products reify ideologies, express socio-cultural contingencies, inscribe social relationships, or resist attitudes in their designs, and, thereby, design subjectivities. The development of an intimate technology might itself push the boundaries of "legitimate knowledge" to create space for social and bodily values. For example, Bardzell et al. showed how the development of a menstrual cup, called the Formoonsa Cup, led in Taiwan to a change in the legal status of menstrual cups [54]. D'Ignazio et al. demonstrate a participatory design approach to address the complex social problems related to breastfeeding, using hackathons as a site for re-imagining products, services, systems, and policies to support breastfeeding in the US [40]. Our study furthers this research direction which has, so far, been limited in the context of intimate technology. We aim to understand how the use of intimate technology in the workplace is enacted; how intimate care practice in the workplace is embedded into spatio-temporal networks of

actors, policy and culture; and how the design of intimate technology does or does not live up to the promises of wearability or portability in the workplace.

3 POSITIONALITY

Our focus on the use of breast pumps is influenced by our interest and experience of working in women's health and intimate care. All three authors are parents and identify as women. Author 1 was born and brought up in India; Authors 2 and 3 in Europe. Author 1 has no personal experience of breast pumping but has experienced balancing breastfeeding with the academic workload. Most of her breastfeeding time overlapped with the COVID-19 pandemic, allowing her to manage work from home. However, she understands the anxiety that comes along with work pressure and parenting demands. Author 2 has first-hand experience of using a breast pump at work following the birth of her two children. Her work-place breast pumping experiences span two European countries. She has breast pumped at her desk and also in small office spaces. In both cases she stopped pumping at work earlier than she wanted because of the difficulties of trying to juggle the demands of work with the demands of being a parent. Author 3 has limited first hand experience of pumping at work: her early motherhood coincided with the early parts of the COVID-19 pandemic. Upon returning to work, she worked primarily from home for an extended period of time, and quickly discovered that making time for breastfeeding rather than pumping worked better for her and her family. However, Author 3 has brought a breast pump along for work-related travel – an experience that has highlighted the costs and discomforts of work travel as a parent as well as the difficulty of making space and time for pumping in professional settings.

We identify as feminists and stand for a pluralistic view of knowledge production and life in general. Having experienced and seen others being marginalized repeatedly on accounts of their gender, body, and position, we feel strongly about this subject and aim to bring out the distress that participants experienced. Our professional practice embodies feminist thinking and attempts to recognize and utilize marginal perspectives of knowledge. Recognizing the limitations of our personal experiences, our aim with this empirical study has been to cover diverse experiences by recruiting participants from different parts of the world and from diverse work settings. Yet, we want to note that the findings do not generalize beyond the participants in the current study. While presenting and interpreting the data, we strive to preserve participants' stories as they were told.

4 DATA COLLECTION AND ANALYSIS

We were interested in capturing diverse pumping experiences at the workplace. We wanted to gain insight into how breast pumping parents in different settings use their pumps in the workplace, convey their pumping requirements upon returning to their workplace, and talk about pumping with co-workers. Before we proceeded to approach potential participants, we aimed to develop a general sense of the pumping experiences and common breast pumping issues women face. The first author joined four private Facebook groups related to breast pumping and breastfeeding to gain insight into what parents share in the pumping groups and what sort of support

they seek. These groups were admin controlled and required to fill a form to give details on the eligibility and interest. The first author passed the eligibility criteria because she was breastfeeding at the time, but she also shared details of her position as a researcher and her purpose of joining. The first author noted that parents shared day-to-day experiences and situations of pumping, queries on pumps and pumping issues, baby activities, concerns on milk supply, storage logistics, and pumping space in different settings. Based on this initial understanding and literature review, we then created a semi-structured interview guide with questions on workplace pumping routines, experiences, and logistics. Example questions include: *"Tell me more about your pumping schedule and a typical routine of it?"*; *"How did you communicate your pumping requirements to your supervisor when you joined office?"*; *"How are your everyday interactions with co-workers? Have you felt any sort of awkwardness with your pumping activity?"*; *"How has been your experience of pumping at your workplace? Please elaborate"*, and *"What do you expect workplaces should do to provide support to lactating parents? And if given the power to change what kind of change would you like to make in your workplace?"*. We also asked about the type of pump the participant used and how they had experienced its use. We asked the questions in an order that would cover basic questions related to the child's age and the duration of breast pumping, first, and, only then, go deeper into workplace experiences. We only asked questions related to the feeling of awkwardness after the participants had already shared an experience related to this feeling. To provide the participants a sense of the interviewer's position, the first author often shared her personal identity of being a parent.

We searched for participants by floating our study advertisement on multiple online spaces, including Facebook groups, Twitter, WhatsApp, Meetup groups, and the Babycenter online community. The study advertisement was posted in the closed social media groups the first author had observed only after going through another admin approval which also included sharing additional documents related to project information and data management. We also approached some individuals who are involved in promoting and supporting breastfeeding and breast pumping, either individually or through an institution, and they helped us by distributing the study advertisement on their online forums. In a span of one and a half months, we received interest from 174 individuals, of which 153 were from the US and the rest from the UK, Canada, Singapore, South Africa, and various countries in the EU. (The unexpectedly high interest from the US came after our study advert was shared on a popular Instagram page by an individual who supported our study.)

We stratified our selection process to draw out a diverse mix of participants by first reaching out to all the non-US participants. We conducted 19 interviews in total which covered a good variety in the professional background and workplace pumping setting. The participants were teachers, an occupational therapist, a licensed social worker, academics, managers, software developers, a researcher, a nurse, a counselor, and a finance pay technician, falling in the age range of 22-39. Pumping settings mentioned in the interviews included pumping in a shared space, an open space, a car, a personal

room, a designated lactation room, by a work desk, and in an accessibility restroom. Table 1 provides an overview of the participants' demographics, breast pumps, and workplace pumping space.

We conducted interviews online, using the Zoom interface (video calls, except for two that were audio-only). Participants were informed about the study purpose, their rights, and participation details including how their data would be processed and protected. They were told they could choose to not answer any question if they felt uncomfortable or discontinue their participation at any point without needing to justify themselves. The first author obtained written informed consent before each interview. The interviews ranged from 30 minutes to 60 minutes. All interviews were conducted in English by the first author. They were recorded and later transcribed while anonymizing and removing all identifiable information. We use pseudonyms when referring to participants in this paper.

We followed reflexive thematic analysis to produce the findings [18, 19]. Our analysis was performed in multiple iterations of coding and interpreting the interview data, leveraging both digital and physical materials to support the process. As the first author continued interviewing participants, she simultaneously maintained a note book for jotting down salient points, pumping settings, and self-reflections. During the process of transcription as she listened to the audio recordings, she made high level of annotations to the data while giving attention to participants' expressions. After coding a couple of transcripts, the first author met with the second and third author for a collective coding activity to share sense making and reflect on our interpretations. This activity helped the first author to understand the second and third authors' outlook on the different layers of the data and, then, take a step back and revisit literature to augment her analysis process. After this, without assigning labels according to any pre-defined theory, the first author completed the coding process in a consistent way. After completing the coding process, the three authors met to discuss, generate, and reflect on the potential themes which were eventually co-constructed through the writing process.

We acknowledge that the use of language such as breast, breast milk, breast pumping, and breast feeding is gendered, and that some parents produce chest milk, chest feed, and use chest pumps [50]. Regardless of gender identity and sexual orientation, it is always an individual who decides how they want to feed their child. We used the terms breast feeding / pumping in our early research and in our recruitment materials. As such, we recruited participants who similarly used these terms to describe this act of intimate care. So while we use the terms breast feeding / pumping throughout this paper because it reflects the language used by our participants, we also acknowledge that our data in relation to this intimate care act has been biased by the language we used to recruit participants. We see a need for a further study of pumping in the workplace that focuses on those experiences that are not captured in our present dataset.

5 FINDINGS

Participants often expressed their experiences during the interviews as stories. Keeping the holistic accounts intact, we cover salient elements repeated across participants' stories. We start this section

by sharing narratives from participants regarding what it means to be pumping at the workplace. We follow this with an analytical exploration of how visibility and invisibility of intimate bodily care and rights, such as claiming pumping space and making time for pumping during the workday, are connected with the surrounding work culture and the resulting pumping experiences.

5.1 Pumping at the Workplace

Breast pumping at the workplace is structured around attending to bodily needs by figuring out where to pump, squeezing one's pumping schedule into the workday, and performing logistical work, such as storing the milk and cleaning the pump. Unlike private homes, where breast pumps can be used anywhere upon need and where the device merges into the background of household items and personal belongings, the presence of the breast pump in the workplace can be something new and odd. Introducing the pump into a professional setting brings with it awkwardness in various forms. We begin with one participant's account to help gain an understanding of what is involved in pumping at the workplace and what the experience can be like for the breast pumping parent. We, then, describe different experiences of using or claiming a space for pumping and how the associated activities intersected with others.

5.1.1 A Pumping Account. *"You know what, sometimes I just sat there in pain and terror because you also know you'll start leaking at some point and it's like, is it going to happen, is it not going to happen."* Mila is an academic and worked in a male-dominated work environment at the time when she was pumping. She pumped in the workplace without revealing this activity to anyone except three women colleagues in her department. She never felt comfortable in approaching anyone for support or talking about her needs, *"I think my suffering, if you want to call it that, wasn't bad enough for me to be willing to take that step. And I think a lot of it like in hindsight, of course, I would now say yes, I should have gone and I should have asked something better. But when you're caught up in the moment, there's a million other things and there's also just the struggles of getting used to going back to it's so overwhelming that it's really hard to ask for them I think."* Returning to work was a difficult journey for Mila and she did not continue pumping for as long as she had originally wished, *"Ending it so early wasn't intentional. That was by circumstance, basically. So as that wasn't a choice that I had made"*. She reported how the awkwardness of pumping at work was sufficiently high that she tolerated the physical discomfort of refraining from pumping on multiple occasions.

Breast pumping frequency and need changes according to the individual and over time as the infant grows. A breast pumping parent returning to their workplace before their child is six months old might need to pump as frequently as every few hours, five to six times a day, whereas one whose child is one year old might need to pump less often. Even when the child is not consuming all the pumped milk, the parent might still have to pump frequently to maintain their milk supply or to reduce the physical discomfort of engorged breasts. For example, Mila told us:

"The idea that I had was also that of course, I could express the milk and then give it to his daycare so that they could feed him back milk that didn't end up happening because he never really took a bottle. He just refused,

Pseudonym	Country	Occupation	Pump Type in Use	Pumping Space
Mila	Belgium	Academic	-	Personal office
Hannah	US	Occupational therapist	Battery-operated (hands-free)	Car
Jane	Switzerland	Researcher	Wearable	Shared office and meeting rooms
Maggie	US	Marketing manager	Battery-operated (hands-free)	Designated lactation room
Nina	Denmark	Consultant	Electric and Manual	Accessibility restroom
Michelle	US	clinical Social Worker	Electric	Personal office
Alice	Switzerland	Pattern Maker	Electric	Designated lactation room
Celine	Singapore	Teacher	Electric and Wearable	Open Seating Space
Branca	Sweden	Academic	Battery-operated (not hands-free)	Personal office
Talia	Luxembourg	Marketing manager	Wearable	Meeting rooms and calling booths
Diana	South Africa	Receptionist	Semi-wearable	Reception desk
Fia	US	Paediatrician	Battery-operated (hands-free)	Personal office, patients room
Garima	Thailand	Counselor	Battery-operated (not hands-free)	Personal office
Amelia	Canada	Nurse	Battery-operated (hands-free)	Shared office
Shuchi	India	Software Developer	Manual Pump	Designated lactation room
Emma	US	Teacher	Battery-operated (not hands-free)	Shared office
Noah	US	Manager	Battery-operated (not hands-free)	Designated lactation room
Joanna	US	Military pay technician	Electric pump	Designated lactation room
Tina	India	Software Developer	Manual Pump	Designated lactation room

Table 1: Overview of participants demographics and workplace pumping space. The participants belonged to 11 countries with different occupations and used breast pumps and their combinations from four types - manual, electric, semi-wearable and wearable. Fields marked as “-” indicate missing data.

flat out and was never convinced but that didn't change my personal problem of having to like, deal with the milk supply in a way that's more gently than just going from breastfeeding all day long and then suddenly, not feeding at all throughout the day. It took my body a very, very long time to adjust to that actually."

Like Mila, all the participants had their unique pumping stories. Every parent's experiences are personal, but structural issues, such as one's professional standing and the power dynamics of the workplace, play a significant role in shaping those experiences. In the following subsections, we cover salient elements repeated across participants' stories.

5.1.2 Awkward Workspaces. Workplaces can make intimate body work awkward. Breast pumping as a bodily act involves bodily fluids and breasts. It is often viewed with suspicion and disgust, seen as an activity "out of place" at work [16, 17]. This creates anxiety for many women, making them conceal their pumping activities and leaving them feeling awkward. In our study, instances of awkward moments shared by the participants related to the operation of breast pumps and related activities, such as storing expressed milk in the fridge or washing pump parts. For instance, Nina who pumped in the accessibility restroom remarked: *"Yeah, I mean, it feels a little bit awkward I think during the pumping itself, the motor of the pump makes quite a loud noise. So that one to me feels kind of awkward with the noise. I'm kind of thinking like, okay, if anybody's walking by the restroom, what are they thinking is going on?"* Nina also described the awkwardness of storing milk in the workplace, emphasising how she placed it in the back of the fridge to make it more discreet. Other participants shared tactics for avoiding the common fridge, such as using their own cooler bags or a separate fridge, if available.

Another common moment of awkwardness was when the participants needed to take a pumping break but could not do so because

they were in a situation that was difficult to interrupt. Such situations included being in a meeting that is running over time, visiting a new location where it was difficult to find a pumping spot, or being caught by overwork, dealing with clients back-to-back. Workplace policy and culture are two obvious factors that can make it hard to take a break in these situations. It also made a big difference who else was present in those situations and how they acted. In particular when it comes to long meetings, participants mentioned that it was difficult to bring up their need in front of people who they thought might not have any "clue" about pumping needs and to whom it could look "unprofessional" to take a 20-30 min break. Across the data, we observed that the comfort level of speaking up was higher with co-workers who shared the same office space and were somewhat familiar with pumping activities, among co-workers who had a friendly relationship, and in spaces with only 1 to 3 others present. Meetings, in contrast, were more often strictly formal and this made it intimidating to bring up body-related matters, even when some of the people present were known to be familiar with one's pumping needs.

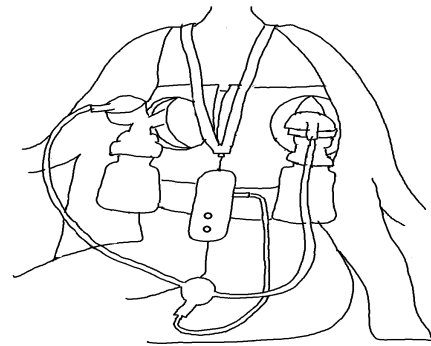
Further, unlike in prior studies [17], for many of our participants, trying to make pumping work at the workplace meant making a choice to *not* try to conceal their activities. In addition, for these participants, awkwardness had more to do with other people feeling or acting awkward. For instance, Celine is a school teacher in South East Asia. She pumps at her desk which is in an open office for 30-40 staff members. When we asked her if she ever felt awkward she replied: *"Not really. I only feel awkward when someone comes for me and want to check in something with me and then they get awkward seeing me pumping then I'm like, it's okay it's okay and they're like no no it's okay I can wait for you to be done. So when they become very self-conscious, it makes me a bit more self-conscious."* Likewise, Hannah's pumping is often more of a public pumping experience as she pumps in her car. Hannah is an occupational

therapist for children and drives all day to consult her clients. She has created a whole setup of pumping in her car and feels at home in her little mobile pumping space: *"Like at first I was kind of like, because sometimes I'll hook up at like a gas station just if I'm there. And at first I was like really nervous about, like, people seeing me or like there's cameras, but like I just lean over".* Talia works in a "small-tech male-dominated industry"; she was not provided any dedicated pumping room and managed by using meeting rooms and calling booths situated near co-workers' cubicles. In the interview, she recalled awkward moments: *"...and then my other colleague passed by and the first colleague was like, Oh, don't go there Talia is doing her breast thing. So there are moments like that and then when I'm cleaning in the kitchen; my pumps I sterilize them. People see what I'm doing and they get curious like, Oh so what I'm doing. I was like Oh! it's a mom related stuff. Like, all the guys get majorly like Uhh...hmm..okay."*

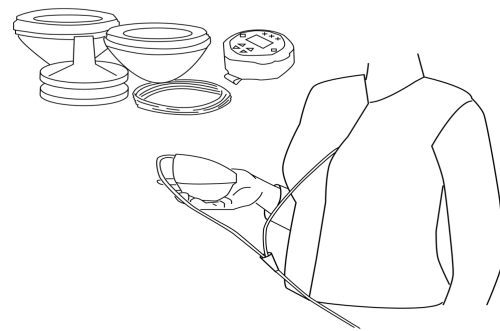
Awkwardness related to breast pumping exists in at least three forms: awkwardness of self, of others, and that of a space. The interplay of these three had an impact on how the experience of carrying out intimate body work unfolded in the course of everyday micro-situations, further influencing the degree to which this intimate body work could succeed.

5.1.3 Breast Pumps and Pumping Space. As one aspect of how participants' negotiated breast pumping at work, it is interesting to observe the kinds of pumps they chose and how they used them. Most had used more than one type of breast pump, starting with manual breast pumps or electric hospital grade pumps at the time of their childbirth. We call these traditional pumps. As participants returned to their workplaces, more than half of them switched to either portable pumps or chose to alternate between portable pumps and traditional pumps, preferring to use traditional pumps at home and portable pumps at work. The portable pumps which are battery-operated were mainly of three forms: completely wearable (the pump with its entire unit can be worn inside the bra), semi-wearable (the pump cups and the motors are attached together and can be worn inside the bra but the pumping machine and attached tubes have to be carried (see Figure 2b)) and easy-to-carry but not wearable (some of these were 'hands-free' models (see Figure 2a)).

Participants made use of the portability and discreetness of these pumps in their workplace. Notably, the preference for using wearable pumps at the workplace was not solely motivated by wanting to hide pumping or the pumping body. Jane, Celine and Talia used wearable pumps, and shared different cases of using them at work. Celine decided to pump at her desk using a wearable pump because the room that she was initially allotted lacked air conditioning. Her pump was not totally discreet and made a level of noise that was quite noticeable if the room was otherwise silent. She was not very comfortable with the breast pump: *Initially, when I first used it I felt like the suction was too strong. Even on a very low power, I think it's probably also the comfort level of how it sucks. So I didn't like it much when I first tried it, but I didn't have a choice if I wanted to go out. This is the most comfortable for me to bring up as compared to the one with the regular flange and the bottle. So that one I use at home. But ever since I started to use it more regularly, I've gotten used to how it feels."* Despite using a wearable pump, Celine still arranged nursing covers and special clothes (only tops and bottoms,



(a) A hand drawn picture showing the user wearing a battery-operated pump in a hands-free fashion. The use of a special pumping bra and a lanyard helps in holding the pump cups, bottles and the battery securely.



(b) A hand drawn picture showing the user wearing a battery-operated semi-wearable pump. While the pump cups and the motor unit are worn inside the bra, the attached tubes and the pumping machine is being held in the hands outside.

Figure 2: Pictures of two kinds of portable breast pumps

no dresses) to better arrange her pumping. The nursing cover and the pump sound made her pumping visible to others to some extent; Celine explained that people coming to meet her would stop by and ask if they should wait and come again when she was done.

Jane, a researcher in Europe, used two kinds of breast pumps in parallel at her workplace: An electric breast pump for her first pumping break that she would take by going into a meeting room and a wearable pump for another pumping break later in the day at her desk. The breast pumping room originally allotted to her was situated in a different building which was 10 minutes away. The main concern for Jane was work time. In order to save time and be at her computer, she decided to bring an additional wearable pump to her workplace. Jane found her wearable pump to be less efficient in milk collection and more time consuming as compared to the electric one. Talia, on the other hand, used a wearable pump for its general carrying convenience and did not use it for pumping at her desk. She always booked meeting rooms or used separate call rooms. Diana who is a receptionist in a clinic and shares the

reception desk with her colleague, used a semi-wearable breast pump to pump at her desk: *"So sitting down the whole time, it's quite easy to then just pump because I have one of those hands free system. So I just put the cups in, I connect the pump under my shirt and then I pump as I go about my work", I can walk around while pumping. I just can't do a lot because I'm carrying the whole pumping system with me"*. Michelle, on the other hand, who was using an electric pump at the time of the interview, shared her dissatisfaction with breast pumps and in specific with wearable ones:

"I had an Elvie which is like supposedly top of the line, quiet, discreet, you can wear in your bra. And that was part of my plan. So maybe I could do it while I was maybe in a meeting or something like that. That was a terrible, terrible pump. You had to be very finicky regarding your placement with the nipple. And then like my supply, normally I would be able to pump four ounces at a session from each breast and at that point I would get maybe one or two. And then it was very uncomfortable. And so like the top of the line \$600 technology was just sitting there collecting dust. And even the pumps that I use which are very old fashioned pumps like nothing special pumps, they're just very noisy. And so I have to hide it in a drawer, kind of dampen the sound a little bit."

The four users of the battery-operated hands-free breast pumps used the same breast pump, Baby Buddha, and were quite satisfied with the pump's efficiency and portability. Their pumping experience included both private and not-private spaces. Hannah, specifically, appreciated the size of the pump machine which was less than 5 inches long and could be hung around the neck easily.

Experiences of breast pumping are individual-specific and difficult to compare. However, all four participants who used wearable and semi-wearable pumps desired further improvements in their quality, particularly regarding the noise level and the sturdiness of the pumps. Participants found the pumps to be best used only in sitting positions – pumping while moving was uncomfortable and the arrangement did not feel secure enough to not fall off or spill the milk. In contrast to the popular excitement for wearable pumps, we heard mixed experiences, with participants using spatial freedom afforded by the wearable pumps to some extent and creating different levels of visibility while managing trade-offs in comfort and efficiency. We now turn to consider the different forms of invisibility of intimate care needs.

5.2 You can pump but you still need to work

While juggling with the space-time commitments of pumping, participants' experiences involved meeting visibility challenges at all levels: institution level, supervisor level, and interpersonal level with co-workers. The ways participants compensated for invisibility resulted in negative outcomes for them in the forms of facing a reduction in their milk supply, having to tolerate engorged breasts for extended periods of time, and eventually having to wean pumping earlier than desired. There was a lot of vagueness regarding how one can actually take pumping breaks during the workday and it was mainly left for the individual to just fit them in somehow.

Fia is a pediatrician in a hospital in the US and sees patients back to back during her workday. She used to pump mostly during lunch breaks or whenever she could grab some time in-between seeing patients. Fia never thought of needing to discuss anything about pumping breaks with her supervisor, *"I think my direct supervisor, she has two children. She also pumped at work. We have a couple, probably about five people who have pumped in the last few years. So I think they knew that I would go pump. I never asked like can I have set time aside. I think that would have been hard to do and I know like for the rest of them the same thing. I think they just pumped at lunchtime or whenever they had breaks but didn't get set time aside to pump."* However, Fia did acknowledge the effect on her, *"my milk supply did go down when I went back to work just because I couldn't pump as often. It still was there, but not as much."*

Part of this also has to do with the country and the availability of relevant policies. The US is one of the countries that does not provide designated maternity leave and, while pumping breaks are covered under the federal law, the lack of company-level policy made it hard for participants to initiate any discussion. Further, even under the federal law in the US, the pumping breaks are unpaid, leaving the productivity pressure on the employees. Fia explains: *"My workplace is very supportive of it, but they're not going to say like, we're going to schedule less patients for you"*. Hence, participants tried to train their bodies to meet the productivity goals. In a similar medical setting in the US, Michelle described her experience as follows:

"I knew that I would have to prepare myself. So when I first started pumping, you know, is every 3 hours. And I think at that point I was maybe close to every four. But I realized maybe at like eight weeks, like I cannot sustain every 4 hours at work. That's just not going to be realistic for me. So I had to plan to wean a pump and I trained my body in order. I pump at 6 a.m. and then I don't pump again until noon. So that's, for most women, they would maybe lose supply or whatever because of that large gap. But I had to like do it because there was no other way. I would be able to take a break I'm already reducing my productivity like I can't further reduce it."

Even in the cases where participants and supervisors had prior communication on pumping requirements, no reassurance or clarity came from the supervisor side on how one would be appraised. This resulted in feelings of being judged for taking breaks or performing work simultaneously while pumping. For Jane, the most important concern related to pumping was her productivity. She was given access to a designated pumping room but that was in a different building, a 10-minute walk away. To save time, she preferred to use meeting rooms. She even altered the pump in use depending upon her productivity needs. For her two pumping breaks in the workday, she used a wired pump for the first break in the meeting room which was more efficient for her and a wearable pump for the second break at her desk in which case the pump was found to be less efficient. Jane expressed her concern in this way: *"Ideally, that (pumping) would be a moment that you really take to like relax and just focus, like do something else besides working and really focus on the pumping itself. But yeah, I mean, I always felt that there was too much work to leave my desk, so that's why I decided to use the"*

portable pump, so that I could work at the same time." When further discussing the policy in her country which allows 90 minutes of time per day for working mothers, she pointed out: *"If you take the time off to pump, it's not that someone else is doing your work in those 90 minutes. Right? ... But with my time, with my work, the work is just going to be there and it's just going to pile up. So that was for me the greatest barrier to fit the pumping in."* She also shared an instance that reflects how invisibility can impact work culture: *"I mean, I remember that I had expressed to someone higher up on the hierarchical ladder, saying like, oh yeah, like pumping breaks take a lot of time. So I really like struggle still with finding the right balance, you know, with work and private life and also pumping breaks. Sometimes it feels like my day is over in a second and then. This person, actually, oh, but are there no other options then to feed your child?"* Similar to Jane, Alice and Maggie too could recall receiving insensitive remarks from their co-workers: *"How much milk do you get when you pump?"* (Alice), *"Oh! there she goes again...oh! it must be nice to take a break"* (Maggie).

The contingencies that may arise in intimate care work remain invisible in the workplace, too. For example, breast pumps are rather expensive devices and not always well covered by insurance. Yet, any damage or loss remain invisible in the workplace, partly because pumping takes place out of sight. Alice, a pattern maker in the fashion industry in Europe, felt always stressed about taking pumping breaks but the time her pump broke stressed her to the point of impacting her milk supply: Alice could not share this incident to her supervisor or her co-workers and was managing the search for another second-hand breast pump on her own. The lack of explicit interaction on intimate care needs and the invisibility of the material costs and the labour involved impacts negatively both those pumping and the workspace environment overall. This resonates with Lee's analysis of breastfeeding and work [48] that shows how workplaces have a conflict of interest between valuing worker's bodies and still continuing to fail in appropriately recognizing the corporeal realities of intimate care work.

5.3 Power Dynamics

Exercising the right to attend to intimate bodily needs may be very complex in a workplace. Some of the participants shared incidents where they were negatively judged for taking pumping breaks. One even reported facing aggression at her workplace.

Amelia who is based in North America, where she studies and practices nursing, experienced an intimidating relationship with two of her reporting supervisors. She sits in two hospitals; one for her practice and the other for conducting clinicals for her nursing school. At her clinical, she sits in a shared room with her preceptor (an experienced licensed clinician who supervises nursing students) and depends on her for entering as she doesn't have an access badge. She usually pumps in a call room outside of their shared room, but when busy with attending clients, she also pumps at her desk. She did not feel free in disturbing her preceptor frequently to go out of the room so she reduced her pumping visits to a minimum. For instance, she delayed her storing of the expressed milk: *"I just don't go out to the kitchen because to come back into the call room I have to ask my preceptor to badge me back in. So I don't like hassling her with that having to let me back in after, like, every time I pump..."*, "So

I do often leave it (expressed milk) like at room temperature for like an hour or 2 hours just sitting in my bag and then when we go out to see a patient again, I'll put it in the fridge at that point." She even avoided using the kitchen area to wash pump equipment, using the adjoining bathroom instead. At the hospital, Amelia works in the labour and delivery unit under other nurses. She manages her pumping breaks according to the ongoing work and who she is with. Her case particularly highlighted the precarity that junior employees face and how that interacts with their freedom to attend to their intimate body: *"I'll ask her (charge nurse) sometimes I'll ask when a good time is to pump, instead of me saying, Oh, I need to pump at this and this time I'll kind of approach it that way so that I'm just more well received."* Amelia had cooperative fellow nurses who helped in looking after the time she is away on pumping. Yet, her overall experience had been anxiety provoking: *"I'll look at the clock and I'll think oh! my gosh, it's been over 3 hours I have to do this and this I'll feel like worried about asking to go pump."* She also tried to relate her anxiety with others as: *"I would say it doesn't bother me. It's just I guess it depends on the person that I'm with. If I'm with someone that I feel like they are supportive then I feel very comfortable asking them. There's only like two people that I can think of that are a little bit more harsher, I don't know. I just think that I get the vibe from them that they think that I'm maybe pumping too much at work."*

Joanna works as a Military Pay technician for a government organization, on contract basis. She sits with her colleagues in the premises of the government organization where permanent workers sit, too. She reported about an incident where she was targeted by the government employees for taking breaks:

"So we didn't know it was an issue until they send it to the director of finance. The complained that we take too long and they recorded our times and they're like, it's never consistent on how long they're gone. So one time it took me like 45 minutes because I spilled milk and I was freaking out. You know, you kind of break down when you spill milk. So they recorded our times without telling us or addressing. And my contractor emailed me telling me that there's complaint about you and your co-worker and we need to address it. And I was like, that's fine, but why didn't you address what we don't know? So we went to talk to the director face to face and we asked what was said and what can we do to fix it? And what is she asking? She's asking for us to do just 15 minutes and that's it. And I was an oversupplier. So if I didn't pump, if I didn't pump out, I would start leaking."

On reflecting back on the policy protection, Joanna acknowledged the need of a company-level policy for the protection of contract employees: *"...we are contractors, we don't really have much to say. Our contract may end next month and we're out, so they don't really care about our needs that much. I think they try to say they do and try to help us out when they can. But nothing will change once we leave, they'll just go right back to normal, which is sad."*

Within these power dynamics the presence of peers helped in navigating participants' pumping journeys. Diana could do her tasks flexibly because her co-workers were cooperative. Diana is

a receptionist in a diabetic center and pumps at her desk which she shares with a head receptionist along with four women sitting nearby. Whenever there are customers coming while Diana is busy pumping, the co-workers around take over. She appreciated their support: *"Well, they've just being understanding to it and knowing, at this time Diana can't run to the other side. Go grab what we need, or she can't do the filing with moving all the files and running up and down to this cabinet and that cabinet like they understand in that moment and they don't say that, Oh! you have to do it. They say it's fine if you can do it later, just as long as it gets done at some point during the day. Them being understanding and them not forcing me to do it at that moment is actually really appreciated."*

The presence of someone alike or understanding became a source for venting out and stress-relieving as women juggled their pumping with work. The interaction between Joanna and her two comrades who work as contract workers in a military government organization showed that it was about creating a common sense of purpose and the mentality that we are in-it together: *"... my other co-worker, that was nursing as well. She understood. We don't ever pump at the same time. So anytime she knew I needed to pump, she took care. She took over my stuff. And then, <name1> was great and she hasn't been at work for a while. So my other contractor, <name2>, she has been like go do it, I'll take care of it. So she has been on top of it. She was so into all of this stuff about nursing and all of that. So she is keeping me on my toes about drinking water in my snacks, eating right."*

5.4 Making a Room of One's Own

With invisibility as the persistent background condition, and all the stress and anxiety related to pumping at work, the intimate care practice can become extremely overwhelming, putting individuals on the edge. Mila whose pumping journey had been primarily concealed and difficult (subsection 4.1), shared her feelings: *"I think when you're in a male dominated environment, and three women out of the entire department, there were so many awkward instances before and after the birth, as well, where people just have no clue that at some point you resign. And it's just like, I'm going to find my own workaround solutions. And I tried to somehow make it work for myself. But I'm not going to directly approach people anymore. And I have to say that our HR department was also so far removed from the work floor. Had I gone to them to ask for something, they wouldn't have known what to do. So yeah."*

In response, some of the participants took an active stance towards making their pumping journeys feasible for them. For example, dealing with all the struggle and the inability to pump at the right intervals, Mila reconstructed her agency as: *"I just really aggressively started like taking care of my schedule and just making sure I would lock those times. And if somebody wanted to meet, I just pretend and say, oh, sorry, I can do an hour because I have another meeting afterwards, which was kind of true, but not quite what they were thinking."* In another instance, she took a rather open stance in her agency, *"my office had a glass panel. I then went and I patched it up with paper because I didn't want anyone to see sure enough, like a week after the fire marshal was on my door saying this is actually a problem. I need to be able to see whether you're still alive and well in your office. But so I just never took it down. He never returned. Nobody*

ever made a formal complaint. So a lot of it is this like any formal push back, basically that you have to be willing to engage in to create the space that you need".

Celine, who is a high school teacher, never had any significant problems in her work environment and perceives her colleagues to be supportive. She has been very clear with her pumping times and could comfortably ask to set time aside in her teaching timetable. Most of the day-to-day coordination in her office happens informally over WhatsApp where she easily notifies other staff members when she cannot attend meetings or collective activity: *"It was over Zoom sometimes, and it's a requirement that all of us turn on our cameras so that the principal at the school can see that we are there. But when we just pump some time I will turn off my video and I notify my boss, my supervisor, that I am still on the meeting"*. On occasions when she could not avoid attending certain meetings and was asked to join, she showed her agency by showing up with her pump: *"If they say no, then I will just bring my pump where everyone is. But they usually say, okay, please, please go and be comfortable at your desk."* The coming together of her and her breast pump generated a visual sense of the importance of the body, however, at the same time, it also revealed how unusual this was for the co-workers – they could not feel comfortable with her sitting with the pump in the meeting.

Michelle had a relatively powerful position in her organization. She works in the medical field and holds the health director position. She has always felt confident and direct in communicating about pumping with her colleagues: *"I sent an email to all the staff saying, hey, if my door is closed, do not enter, you're at your own risk."* She frequently uses messaging apps to coordinate with her colleagues: *"Most of the time we have Teams, so we message each other back and forth if we need to. If somebody does happen to knock on my door, I send them a message on Teams and that kind of resolves the issue the very few times it has happened."* The main challenge for her has been the management of pump times in her workday which is full with seeing patients back-to-back. Despite her being in a privileged position, she has faced ignorant behaviour from the administration department: *"So Thursday is the only day I really work late. So that evening pump is super important because if I don't get that one in, then it's going to be like from 12 to 8:00 at night when I get home that I don't pump. And that's just it gets uncomfortable. So I had to send several emails when I first got back regarding like, Hey, I need to do this, I'm going to do this. Nobody's responding to me. This is what's happening. Like whether you like it or not."* For Michelle, it was also important to show the importance of her needs using a language that according to her was well accepted and fits to the norms. For example, while communicating her pumping status she usually preferred to say medical necessity: *"Something else that has come up a lot is like, what do you say to people that you don't feel comfortable saying, Hey, I'm pumping. What I tend to use is if I really need to say something, but I don't want to say I'm pumping. Oh, I have to go use my medical device. And so having a set phrase like that in the policy itself, I think also would help give people the language and the empowerment that they need in order to kind of think about it."*

Different from the majority, Maggie worked quite proactively in getting what she wanted. She is an active member of social media breast pumping groups and had been preparing herself for her

return to the workplace. She generally described her supervisors and employers to be supportive and she steered that support in asking for what she needed:

"I knew that I needed to talk about it sooner than later with my company because they haven't had a new mom in their office...So I knew I needed to start that conversation early and have it nailed down or it was just going to continue to stress me out...I probably reached out to them at the end of January and said, Hey, like, I'm coming back, here's the day, I'm coming back. I don't want to think about this the week of or before. Here are my things I need. I need a space. I would like a fridge. I'd like a comfortable chair to sit in. Tell me the place and we'll design it together. And so they did. And so it worked out."

Noah took the decision of moving to another company partly because of the difficulty in managing her personal life with professional life. Earlier, she worked in a small manufacturing company, which was male-dominated. Even though, she had access to a personal office in her previous company, she found pumping difficult because of the rigidity of the work schedule and the overall lack of awareness. She noted a significant difference in terms of policy implementation and environment: *"But here there's an explicit policy which makes me feel really safe over there. I was like, Hey, I'm doing this but there wasn't a policy (previous company). Here because they have the room. You have access to the room up to three years after your child is born. They say that you have the right to use this room as frequently as needed. And so having those protections just makes it easier to have a conversation with anyone or be able to coordinate or if there's something I need in the room."*

Mila (academic), Celine (school teacher), Michelle (health director), and Maggie (manager) all provide examples of using one's agency to stand for one's rights – and through that, for others' rights to the same. Yet, it is important to note that they all held relatively privileged positions in their workplaces. Doing the same might have been very difficult or fraught with adverse outcomes for someone in a lower position in the workplace hierarchy or in a different type of work setting. Joanna's story of going through her nursing apprenticeship gave us a glimpse of this.

6 DISCUSSION

The participants' stories illustrated different elements of the use of an intimate care technology in the workplace. Breast pumps were used in concealed, shared, and open spaces, and were of different kinds – manual, electric and hands-free. Policies regarding breast pumping were unknown, formal, or somewhere between the two. Overwhelmingly, our participants attempted to fit their bodies, their breast pumps, and their intimate care practices into the rhetoric and practices of professional settings. They did so with more or less success, depending upon the specific socio-technical context. But, what should not be mistaken, is that it takes more than just one person and their pump for long-term breast pumping to be successful in the workplace. In what follows, we discuss why making technologies ever smaller and less visible, might be problematic for intimate care work and a reductive way of approaching the design of intimate technologies. Our discussion focuses not only on the

design of breast pumps per se but also the social configurations of workspaces in which breast pumps are used, and how other technologies, too, might play a role in increasing visibility.

6.1 (In)Visibility

Moore's law correctly predicted that there would be an increasing amount of computational power delivered on smaller and smaller computing chips since 1965. In HCI specifically, Marc Weiser and his colleagues' potent vision around "invisible computing" – although it has received critique from different perspectives – continues to inspire scholars in our community [35, 59]. The central tenet of this vision is that technology should disappear into the background, providing smart services and interactions at just the right time, so as to make life with technology as calm as possible. This tendency and ability for computational devices to be as small as possible has influenced also the design of personal health devices: from hearing aids, to breast pumps, insulin pumps, and glucose monitors, through to consumer, general purpose health products such as the Oura ring [56] and Apple Watch. In terms of breast pumps, specifically, we see a trend towards smaller, wearable, and quieter devices that enable breast pumping 'on the go'.

From D'Ignazio and colleagues' analysis of people's general desires and experiences of breast pumps [24], it is clear that for many, breast pumps are not fit for purpose, and that many users of breast pumps yearn for these technologies to be smaller, wearable, portable, and quieter. They wish for these things to be less visible, to interfere less in their day-to-day work lives and their ability to be productive. So, the move that is prevalent within industry to make breast pumps wearable and quieter is likely very well founded in what consumers say they want from these technologies. And, surely, a wearable and quiet breast pump that allowed someone to pump, on the go, and which was efficient and did not leak could be the perfect design response to some of the stories shared in this paper. A number of our participants illustrated the tensions inherent in having to reduce their own productivity by taking breaks to breast pump, or had the feeling that they were being surveilled in terms of the amount of time they spent breast pumping in the office. But just as D'Ignazio and colleagues [24] identify, along with Jack [41] and Boyer [16], it may not be that making the breast pump concealed and / or wearable solves the challenges that people are navigating when they return to the workplace with a need to continue breast pumping, or using any form of intimate health technology. Jack [41] explains that wearable breast pumps do not resolve the socio-technical configurations required to make breast pumping "work" – the wearer still has to reconfigure what they are doing and who they are with in order to succeed. For instance, the wearer may still have to use a separate room to pump or a nursing cover in shared spaces. Celine, when joining a staff meeting with her wearable pump, could not continue doing so because of the discomfort of others. Pumping still might have to be embedded in a rhetoric where lactating bodies are bodies out-of-place or bodies to be treated specially. Therefore, while achieving the 'dreamed for' wearable breast pump which works silently, it still may not alleviate the socio-cultural tensions associated with intimate care work. Further, as we observed in so many of the stories told by participants, multi-tasking while performing intimate body work

in a masked manner will only increase stress. For example, Jane brought an additional wearable pump to improve her productivity but she found that not only did it fail in improving the productivity but it also impacted negatively on her experience of expressing milk. Technological approaches which offer ‘invisible’ pumping may further lead workplaces to remain oblivious to people’s subjectivities and bodies.

Our analysis illustrates that persistent invisibility at different levels (e.g. invisibility of places to pump; invisibility of pumping activity, invisibility of policies to support breast pumping) seemed associated with less than optional working / pumping situations. As we observed, these less than optional configurations took a toll on participants’ bodies. For example, participants chose to stop pumping sooner than desired, or experienced a reduction in milk supply, or did not receive the time needed for their lactating body to adjust to a new routine. Finally, no support was offered for maintaining the breast pump itself.

This issue can be seen as an intersectional one: individuals in less precarious employments and with high status positions were better able to make ‘a room of one’s own’, adapting their environments or their schedules to somehow meet their pumping needs; while those in lower status jobs, or with precarious contracts, experienced less agency to request or make changes. This leaves us asking how technology might better play a role in creating access and justice for all who have intimate care needs in the workplace, regardless of their employment or social statuses. In contrast to Boyer’s earlier work [17], all but a few of our participants had shared their pumping needs to at least their supervisor and many went ahead and pumped in shared spaces. This led to a range of experiences from awkwardness to an experience of agency when able to navigate power dynamics and configure new interpersonal relations. More than concealing the pump or banishing the pumping body, we heard, instead, about how pumping intersected with other activities in the workplace and the micro-communications that happened during those intersections. We find these intersections to be fertile ground to exercising visibility that may come through the design of breast pumps, technologies for workspace design, or technologies for interpersonal/inter-corporeal communications – all domains where HCI scholars are poised to make valuable contributions. In this intersection, technology holds a potential to remind us of what might be going on at the workplace and how we might need to care for our colleagues and their needs.

6.2 Towards Visibility

Making intimate care acts visible in the workplace is riddled with tensions. Clearly, the socio-technical entanglements of breast pumping, as described in our analysis, showcase that not everyone would feel comfortable – nor even be able to breast pump – in highly visible ways. Similarly, it is evident from our analysis that not all co-workers would feel comfortable seeing / knowing about this intimate care work in the office. Beyond the question of whose momentary comfort and bodily needs get prioritised, there is also an issue in how these choices, when repeated over time, reinforce or change shared perceptions of what the workplace is like and who gets to feel that they belong. As a response to these tensions, we argue that visibility could also be enacted as an interactive process

between employers and co-workers, where technology holds the potential to play a positive mediating role. Often the gap in the implementation of pumping breaks arose because of the lack of visible knowledge around needs, practices, and policies – Mila, for example, doubts that even if she were to raise an issue with HR (visible knowledge) that they would know what to do about it (visible practices and policies). All these factors seem to come together to separate and subjugate breast pumping (and likely other intimate care practices) as separate from and, therefore, not a part of work culture. HCI and CSCW have a long history of exploring computer-supported methods for the well-being of workers [9, 12, 22, 70]. To invite conversations which raise the visibility of intimate care practices, or enable anonymous complaints regarding lack of support for breast pumping and other intimate care practices in the workplace, we might take inspiration from Abdugaliyev and colleagues [1] who identified Civility, Validity, Safety and Egalitarianism as the four core qualities for effective conversations between employees and employers. And, while their findings are particular to the context of Enterprise Social Network technologies, e.g., SocialBlue, Slack and Yammer, the types of intimate care conversations we envision as necessary to increase visibility will need to draw on these types of learnings to provide safety to employees (particularly those on precarious contracts), while also improving accountability of the employers in making provisions available and respecting employees’ choices.

We observed that participants used their digital calendars to block times for pumping, though without revealing exactly what they would be doing during this scheduled time period. We also heard of some workers who felt comfortable using breast pumps while on Zoom calls (with the camera off or limited camera view). This prompted us to think about how visibility can be improved through graceful integration of additional functionality into existing software and working practices to allow for visibility of different kinds of intimate care practices in ways which do not compromise comfort or constrain employees’ choices. For example, the availability of new iconography and, in particular, emojis / reactions to enable workers to expose intimate care work in calendars, within Slack, or Zoom calls could increase awareness of intimate care work without undue exposure. Such an approach would find synergies with the recent introduction of the ‘period’ emoji by Unicode in 2019 which reflected a desire to acknowledge menstruation rather than leave it as a hidden experience [71]. These responses resonate with the concept of social translucence as proposed by Erickson et al. [26] where the design of digital systems is aimed towards imbuing the properties of the physical world to let social information flow. They expand on three characteristics of socially translucent systems – visibility, awareness, and accountability – to make progress in redressing the social blindness that digital systems may contain. Erickson et al. [26] also caution that there is a fine boundary between social translucency and social transparency which creates an important tension between privacy and visibility. How individuals want to be in a space is contingent upon the unfolding context and who are in the proximity. In intimate care contexts, it is crucial to allow individuals to maintain their privacy while not having their rights violated or marginalised.

6.3 Towards Feminist Sensations

There is a long history of struggles and debates on the visibility of different kinds of work. Scholars such as Star, Suchman, Schmidt, and many more have discussed extensively the need to examine the relationship between invisible and visible work, and the tensions in negotiating what is visible and invisible work [60, 63, 70, 72]. The introduction of intimate care into the workplace brings added complexity, as it contributes the politics of combining care-work and wage-work. One response to such a position is found in D'Ignazio and colleagues' [24] work which suggests that the designer might focus on building technologies that help people who need to breast pump to create supportive networks that themselves, in turn, can enable them to collectively advocate for change. We wholeheartedly support this thinking. At the same time, what we learn at least from some of our participants is that the work of returning to work, and of navigating a new identity as a working parent, is already overwhelming in itself. We found ourselves asking, instead, how the visibility of pumping activities seemed to work for several of our participants as an implicit way of advocating for their needs, or having their needs better met by an organisation. Diane's story exemplifies this well. She describes her pumping context, where she feels comfortable to pump at her desk surrounded by her colleagues. This meant it was easily visible to her colleagues when she would not be able to handle queries from customers and so they were able to coordinate cover for her on-the-fly. However, we note that visibility does not have to solely come from the individual. Noah's example illustrates how having a room designed for breast pumping activities specifically, along with clear policies that sanction breast pumping for workers, made her feel that breast pumping was an acceptable (and visible) practice in the workplace, and that she did not need to feel ashamed or guilty about taking time out of her work day to breast pump.

The act of advocating for oneself and for others requires energy. It can also be risky, particularly for those who are in a minority, or have been historically excluded from a work-setting or a type of work [3]. It is often easier to muddle through by oneself, making adaptations as necessary, than it is to find ways of creating long-term change that would benefit others over time [46, 73]. This is especially true for large organisations. Regardless, in 'Living a Feminist Life', Sara Ahmed [3] urges us to be the killjoy at the table who argues and disagrees, and is not polite or quiet in the face of inequalities and injustice – "*if sensation brings us to feminism, to become a feminist is to cause a sensation*" [3, p.39]. So, while industry is focused on making intimate health technologies as discrete and invisible as possible, we ask, instead, what if these technologies were designed to make space for intimate care in the workplace, rather than actively seeking to hide it? What would it mean for 'workers' if it was normalised for people to care for themselves, their bodies, and their lives while working in ways which made visible their humanness? We see opportunities, for example, in the ways participants used their wearable pumps, even when adopted with the desire to be discreet. Celine used nursing covers, but the noise from the pump indicated that she was undertaking intimate work. Talia's use of her wearable pump in the calling booth could let her male colleagues know she was doing her "breast thing" and Diana's apparent visibility of holding the pump and tubes could alert her

colleagues that they would need to collect items for themselves. We have to also agree through Talia's and others' encounters with co-workers that visibility, in whatever limited ways, allowed for curiosity and education which, otherwise, remain repressed.

We find that our thoughts around the design of more sensational intimate technologies and spaces resonate with several other projects [7, 21, 66, 69, 75], leading us to imagine breast pumps which are deliberately visible, noisy, and attention-seeking as a way of creating social change. Can we deliberately leverage the materiality of intimate devices to increase the value of intimate care by allowing users to have the control to define visibility for themselves? This echoes notions of 'making space' raised by Juul Sondergaard et al. [66] through the design of personalisable physical-digital menstrual technologies in ways which might enable comfort and confidence in one's menstrual cycle, while also contributing to visibility and advocacy around menstrual cycles. Or, as Tuli et al. [75] argue, menstrual tracking applications should support people who menstruate in exerting control over their social-cultural context, rather than seeing these applications as a way of controlling their bodies so as to avoid accident and leaking of menstrual blood. In short, the design of technology sends messages about what kinds of actions, bodies, and emotions are acceptable in professional settings, and which kinds of bodies and acts are out-of-place or left out. Therefore, thinking about how technologies can combine with individuals and settings to create feminist sensations is one fruitful avenue for changing norms and values at workplaces.

7 CONCLUSION

This paper contributes a qualitative interview study and analysis examining the use of an intimate technology – the breast pump – in the workplace. Our data set comprises of the detailed narratives of 19 individuals, from 11 different countries distributed across the globe. We contribute a close examination of what it means and feels like to use intimate technologies as they traverse the boundaries from private to professional settings. We present visibility as a core tenet upon which HCI and Interaction Design might focus to support individuals in exercising and accessing their rights to bodily care and dignity. By considering feminist work as the creation of a sensation to expose inequalities and injustices, we argue that the move to create ever more discrete and invisible intimate technologies risks reinforcing the very ideologies, codes of conduct, societal norms, and values that make intimate care in professional spaces difficult. We propose examining the mediating role that technologies might play in making space for intimate care in the workplace, so as to create access and justice for all who have intimate care needs in the workplace, regardless of their employment or social statuses.

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