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Women in Crisis Situations: Empowering and Supporting Women through ICTs

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Abstract. Women are more likely to experience poverty than their male counterparts, through negative life events that can potentially place women in a crisis situation. Past studies highlight that there is a need for a better understanding of the tools that could both support and empower women in crisis situations. We respond to this with a study that illustrates how we may be able to generate ideas for designing technologies that are both empowering and supportive. In collaboration with a non-profit community care center in Australia, we undertook a qualitative study of thirteen women in crisis situations to better understand the issues they faced. We took an in-situ approach, where we provided video and disposable cameras to these participants letting them record their experiences. Through an analysis of their videos and photos followed by semi-structured interviews, we show that while each participant had different life experiences that initially appear unrelated, there are three common challenges they face. These are: their living conditions, social isolation and stigma. As our findings are from an exclusively female perspective, through this research we contribute to the HCI literature on understanding the specific issues faced by women in crisis situations and aim to inform designs for technology that can support and empower women in challenging circumstances.

Keywords. Women, crisis situations, life disruptions, empowerment, ICTs.

1 Introduction

An estimated 13.9% of all people within Australia live below the internationally accepted poverty line [1, 8]. Within Australia, women are overrepresented in key poverty indicators [8, 21] and are relatively more likely to experience poverty than men (14.7% for women compared to 13% for men) [1, 8].

Certain adverse life events have the potential to place women in crisis situations, making them vulnerable. In this paper, we aim to develop a better understanding about the lives of women in crisis situations and how we can design technologies to both support and empower them. We use the term ‘women in crisis situations’ to refer to any woman who is struggling financially and has gone through any number of adverse life events. These life events can be divorce, becoming a widow, domestic vio-

lence, homelessness, and suffering from mental health issues or disability [2, 8, 51]. Factors such as the wage gap, and lower education and employment rates also disproportionately affect women and exacerbate their crisis situations [21].

Previous research has focused on supporting vulnerable communities of people [17, 44, 52, 53, 55], and, in particular, there have been several distinct HCI and CSCW projects that have explored how we can support women both during and after an adverse life event, which Massimi et al. [36] have termed as ‘life disruptions’. Recent studies on life disruptions have contributed to a better understanding of technology use in difficult circumstances, and how women have adapted them in certain practices [9, 36]. For example, Clarke et al. [9] explored the potential of photography in rebuilding lives of victims of domestic violence.

While a majority of research in this area has focused on a singular life disruption, such as domestic violence, this paper will focus on a broad range of these adverse life events to uncover the similarities they share. Within an Australian context, we aim to understand and explore the common issues women in crisis situations face. We chose to focus our study on women specifically as this group is more likely to find themselves in low socio-economic positions, and we were interested in finding the issues specific to them. There is growing evidence that suggests that certain crisis situations such as domestic violence have triggered an increase in women’s homelessness in Australia [37].

In order to do this, we carried out a qualitative study in collaboration with a non-profit community care center. Due to the services they offered, the center drew in people from all walks of life. As we were interested in recruiting participants with a diverse range of issues and backgrounds, we worked with social workers and volunteers of the community care center to be able to recruit appropriate participants. Our study involved using self-reported experiences [8] where each of our thirteen female participants were given a self-reported probe kit containing a video camera and disposable camera with a set of task cards to complete over a period of one to two weeks. We then completed a semi-structured contextual interview with each of our participants based on the videos and photos returned in the packs.

Our findings show that there are three common challenges our participants share: their living conditions, social isolation and stigma. In this paper, we will elaborate on these challenges providing empirical evidence and discuss the implications for design. Through this research we contribute to the growing understanding of the specific issues faced by women in crisis situations and aim to inform designs for technology that can support and empower them.

2 Related Work

2.1 Women in crisis

Women experience poverty in greater numbers than their male counterparts due overall to lower education, rates of employment, and pay [21]. While gender pay gaps are not always an indication of direct discrimination, they do represent poorer outcomes for women regarding economic and personal freedom [12, 21].

Economic disadvantage and poverty place women either in, or at risk of significant housing stress, and also limit the housing options available to them [21]. While the data would suggest that men are slightly more likely to experience homelessness and housing stress than women, this may not paint a holistic picture of women's experiences of homelessness. For example, before sleeping rough, women will often seek temporary accommodation with friends or family members, or will even couch surf between places. There are also more women residing in church group accommodation or rented State or Territory housing authority accommodation.

In an effort to retain a home, women are also more likely to sustain financial or other pressures across other areas of their lives. For example, women will remain in unsafe accommodation, or enter into or continue a relationship in order to have a place to live [50]. Consequently, domestic violence places women in crisis situations and remains the most significant cause of this group becoming homeless.

As the numbers of women in the older population increase, there is also growing concern around the increasing numbers of older, single women experiencing homelessness and housing stress [13]. With longer life expectancies than men, it means that the majority of older women are widows, which can lead to unwanted and unplanned changes in social and economic circumstances [14]. In addition to the emotional toll, widows often face a decline in their financial situation due to the loss of spousal income. The consequences of these losses may force the widow to make major changes to her lifestyle, including living arrangements.

Divorce is also a key life-course risk that can have significant economic impacts on women [16]. Female-headed households are at greater risk of homelessness or housing stress due to systemic poverty and gender inequality [21]. Women are more likely than men to be living in rented households receiving Commonwealth Rent Assistance. Over one-third of those living in rented households who were receiving a form of housing assistance were under 18 years old. This reflects the high number of one parent families, which are largely headed by women, receiving such assistance.

For certain groups of women, there are additional forms of disadvantage. For example, culturally and linguistically diverse (CALD) women require access to appropriate language or cultural support services, and may also be affected by ongoing "queue jumping" stigma [21]. For Indigenous Australian women, lower levels of education and life expectancy paired with higher unemployment rates all contribute to greater social and economic disadvantage, as well as homelessness [21].

From these studies one can clearly see that there are a range of reasons that lead to women being in crisis situations.

2.2 Low income and HCI

The field of Human Computer Interaction has seen a recent increase in the number of studies focusing on people from a low socio-economic background and the positive role technology can play in improving their lives [55]. Consequently, there is much research around the importance of technology use in these low socio-economic groups [17, 44, 52, 53].

Different socioeconomic classes can reflect and reinforce how technology is used in everyday life [3, 57]. Studies around the use of technology within the homeless youth population found that technologies such as mobile phones were used for staying connected with others and managing identity amongst friends and case workers [32]. These digital tools were also used in finding employment, creating videos to portray their lives on the street via story-telling, and constructing online identities [52, 53].

It is evident that financial resilience in low-income communities is influenced and shaped by both social networks and social skills [17]. Engaging in meaningful activities with Information and Communication Technologies (ICTs) may be related to socio-economic security, social inclusion, empowerment and increased social capital. For example, Dillahunty [17] explored how individuals within low income communities with limited social capital use technologies in order to increase social capital and achieve socioeconomic security. Similarly, Grimes et al. [25] studied the use of a system called EatWell, which allowed African Americans with low incomes to create and share nutrition related voice memories on their phones with their neighborhood.

The emergence of the peer-to-peer sharing economy has also shown potential in this area. There have been some early studies performed around these ideas of peer-to-peer interventions that could support low income communities [6, 18, 35]. Early observations of peer-to-peer sharing mechanisms to support disadvantaged communities have elicited success factors such as balanced reciprocity, collective efficacy and employment generation through vertical capital [18].

The research suggests that these community-centric ICTs can help in reducing stigma and empower low income communities in creating their own social infrastructure [45, 55]. There is much potential for creating community-centric, socially inclusive technologies to assist with alleviating the stigma associated with hardship.

2.3 Technology and women's empowerment

Although there is extensive research on the nature of women's use of ICTs at school and work [34], it is only recently that the HCI and CSCW communities have begun to explore the role technology plays in personal, rather than professional settings [20, 36]. Part of this work has looked at addressing certain types of adverse life events that are uncontrollable, unpredictable, and destabilizing, which have been referred to as life disruptions [36]. While each disruption is unique, Massimi et al. [36] found patterns of social and technical reconfigurations that occur in a variety of different contexts. This research contributes to understanding how women in particular use and relate to technology during these times of personal crisis [26].

Studies around the use of technology for women who have experienced domestic violence show how technology can support the rebuilding of lives [5, 9, 19]. For example, Clarke et al. [9] explored the potential of photography in rebuilding lives of victims after domestic violence, and; Conde et al. [29] focused on the safety concerns of domestic violence survivors. They presented a system which warns potential victims and law enforcement organizations about the physical proximity of the aggressor [29]. These technologies provide survivors of violence the access to social connections and public resources in a time of isolation and change [26]. However, while

technologies such as mobile phones can support a sense of security, they can also be used to enable the continued control associated with abuse. These types of situations illustrate a need for designers to consider both physical and emotional safety along with functional usability.

There have been studies performed around designing technologies to foster social connection with women who are isolated [10, 33, 39, 49]. This has highlighted the rising importance of online coping. For example, Ingen et al [54] explored how individuals use online coping strategies after experiencing a negative life event.

Fox et al. [23] studied forms of hacking in feminist hackerspaces which are workspaces that support the creative and professional pursuits of the women who utilize the spaces. They found the member bases of these spaces were typically Caucasian, well-educated and well-paid, which did not always represent the group's desired membership or set of ideals. Ethnic and socio-economic diversity within the groups was both encouraged and sought after. There remains little research into how these spaces could attract marginalized women such as those in crisis situations, and the potential of maker and hackerspaces in terms of women's economic empowerment.

The literature shows that there is an opportunity to improve worldwide economic conditions through a better understanding of women's situations and the design of tools that can empower women [4, 27, 41, 43, 45, 46].

3 The Study

We applied a bottom-up approach to investigate the everyday lived experiences and practices of women in crisis situations in a metropolitan city of Australia. We collaborated with a community care center in the city to be able to recruit a diverse range of participants. From an ethical point of view, we carefully considered our recruitment, interaction and data collection with such a vulnerable group. Due to the sensitive nature of the research, we worked closely with the community care center to mediate contact between ourselves and the women who were relying on their services. Our research processes and activities were informed by our institute's ethics guidelines and we gained approval from our institute's ethics committee prior to commencing this research.

3.1 Participants

We visited the drop-in sessions organized by the community care center twice a week in order to recruit participants for our study. At the beginning of each of these drop-in sessions an announcement was made about our research activity, with members of the research team present to informally discuss the scope of the research and the role of participants. Our study flyers were also attached to the center's noticeboards. Table 1 shows the list of participants recruited from the community care center. Over the course of three months we recruited thirteen women who relied on the center's weekly pantry, where they were able to pick up fruit, vegetables and bread free of cost. Our participants came from diverse backgrounds and represented different age ranges and

levels of crisis situation. They were all struggling with severe financial hardship and eleven of the thirteen were unemployed.

Age	Crisis Situation
20s	P8 (Refugee)
30s	P3 (Anxiety, Depression), P10 (Recovering Addict)
40s	P4 (Divorcee, Depression), P12 (Health Issues, Disability)
50s	P1 (Homeless, Health Issues), P5 (Bipolar Disorder, Divorcee), P6 (Unemployed), P9 (Recovering Addict, Domestic Violence), P13 (Unemployed, Caring for ill husband), P11 (Depression, Unemployed)
60s	P7 (Caring for ill husband, Depression), P2 (Widower, Ex-Offender)

Table 1. Participants involved in the study.

3.2 Methods

In the first part of the study, we used a self-reporting probe kit [8, 47]. Each participant was given a pack that contained a disposable camera and video camera to capture certain experiences of their lives over one to two weeks (Figure 1) [8]. The participants were asked to record a short 10-15 film about how they live well on a low income using the video camera provided. They were encouraged to share their experiences and stories, give advice to other women, show some of their favourite places to visit, as well as any other information they wanted to share.

The pack also included cards designed to prompt the participant to take certain photographs with the disposable camera [8]. These cards were used as a means to encourage them to record their everyday experiences and things that were important to them. For example: “these are my five favourite possessions” and “this is the best part of my week”. They were also free to use the camera to capture anything else they wanted to share with us.

The use of photography in sensitive settings is well documented [8, 9, 22, 32, 40], however video remains relatively underutilized in comparison when researching such settings [8, 28], but has proven successful when used in other domestic settings in full control of the participant [47]. This kind of activity represents a useful means of engaging participants and encouraging creativity and honesty in their responses. Due to their vulnerabilities, they may not be comfortable discussing their issues in person with the researchers; hence this provided them a way to reflect on their lives without us being there. It also allowed us to gather longitudinal information whilst having minimal impact on their actions, as the participants were in full control of what was captured [22].

The self-reporting probe kit itself shares similarities with and is inspired by self-authored video prototypes [47] and cultural probes [24] adaptations of which have

been previously reported to work well in other settings [11, 56]. As it is somewhat of a hybrid, we refer to it as a self-reporting probe kit. The task cards guided the interaction between the probe and the participant, with an intent to gather both data as well as inspiration. The video and images that resulted from the return packs were also reviewed by the researchers with a view to use the material to inform a follow-up semi-structured interview.



Fig. 1. The video and disposable camera with task cards used in the study.

Subsequently, we visited our participants in their existing accommodation for the semi-structured interview based on the understanding and insights gained from the returned content. We were mainly interested in the issues they struggled with and how they were coping with their existing situations. These interviews were recorded and later transcribed. At the conclusion of the interview, each participant was provided a \$20 gift voucher for their participation. Aside from the monetary incentive, many of the participants expressed that their reason for getting involved in our study was in the hopes that by sharing their experiences they may be able to help other women in a similar situation.

3.3 Data Analysis

We analyzed our data by carefully reading field notes and interview transcripts, and reviewing the photo artefacts created by our participants. Using thematic analysis [7], we identified common challenges across all of our participants to illuminate the similarities that these life disruptions share. Once this process was completed, we discussed our findings with the social workers of the community care center to corroborate our results with their knowledge and experience.

4 Results

We gained invaluable insight from the videos and photos that the participants captured and the findings extended beyond what would have been possible from the interviews alone. Allowing them to take the camera packs away enabled the participants

the space and time to think through and reflect on the things they wanted to share with the research team.

The types of photos that were captured were largely informed and influenced by the statement cards provided with the camera, as was our intention. Through these photos they shared parts of their identity and experiences, including images of their favorite possessions and other items that were important to them, places they liked to visit, and where they lived.

For example, P4 took a photo of the animal shelter where she volunteers. This was one of her favorite places to visit as she enjoys looking after and spending time with the animals. *“I love animals they give such unconditional love, they don’t have the ego that humans have. They’re such a joy to be around and animals have been my lifeline I think.”*

The video aspect of the pack was particularly well-received. Through the videos the participants shared and emphasized aspects of their lives that we may not have been exposed to otherwise. It also enabled the participants some agency within the research, for example P11 used the video camera to interview a friend in a similar situation. As previously mentioned, many of the women involved themselves in the study in order to help other women and were eager to pass along their knowledge of living well on a low income. Some of the videos captured were a way for the participants to share their stories and experiences, but they also provided a means for imparting advice they had for other women who may be in a similar situation. For example, P5 filmed a cooking demonstration to show other women how she cooks on a budget using the items she collects from the community center’s pantry. In order to be able share advice and good practices, P9 suggested a noticeboard to be implemented in a space within the community center, where bite-sized pieces of information and advice pertinent to women could be displayed and shared. Figure 2 shows some examples of the images and video clips captured.



Fig. 2. From left to right: A photo of the animal shelter P4 volunteers at, the food P5 was using to cook, and a still frame from P1’s comedy sketch.

Based on the data analysis, we organized our findings into three challenges. In the following, we discuss these challenges and provide examples from the field.

4.1 Living Conditions

This challenge refers to our participant’s living conditions. Many of the women involved in the study felt insecure within their current living situations. While this reflects how close many of our participants are to becoming homeless, we detail some of the existing practices they had in place to prevent this from occurring.

4.1.1 Housing Insecurity

All participants felt, or had previously felt, insecure within their living environments, where five of the thirteen participants had spent some time in a homeless shelter. P1 was living in a boarding house at the time of this study and feared being kicked out by the owner as she had seen it happen to other tenants. Consequently she kept to herself to avoid getting in any trouble. P1 believed she had been taken advantage of financially by friends as well as by boarding house type accommodation owners. This was due to her being so desperate for a place to stay as she did not think women were safe on the streets. *“Going to stay with people that took advantage of me like I’ve even got a girlfriend and she let me stay and I used to just pay her more and more so she wouldn’t throw me out on the street, constantly giving money to her just to keep a roof over my head. She’d want this and she’d want that, so I’d have to lie and say that I didn’t have any more money...One more thing I’ve noticed in boarding houses and similar situations I’ve been in, sometimes you feel like the landlord and that is sort of taking advantage of people and stuff like that like, just because they know that no one wants to live on the street and so they put up the rent or conditions aren’t the best or you know, I’ve seen traumatic situations and it’s kind of scary.”*

Hygiene was also a huge concern for her as part of her safety. She recalled numerous occasions where she was unable to access facilities required to keep herself and her clothes clean. While the boarding house provided a washing machine, it was coin operated and she often could not afford the money required to use it.

In order to stay off the streets, a common practice we saw was couchsurfing (practice of moving from one friend's house to another). For example, after her divorce, P5 was unable to stay in her marital home and couch surfed between friends and family members until she was able to secure a place of her own. P6 had recently moved and was living in a caravan in her mother-in-law’s front yard until she could find suitable housing. P9 was forced to leave her home due to domestic violence between herself, her daughter and her daughter’s partner and was staying with a friend. *“I don’t have a stable place to live because of what’s happening in my life, with my daughter. She has attracted a dysfunctional partner which is inevitable because she was born and bred with me and I was with a dysfunctional partner for pretty much most of my life.”* One of P10’s greatest fears was to do with ensuring her and her young daughter had a place to live. *“One of my biggest fears is breaching my lease and basically having housing, issues with paying for housing and that kind of thing and keeping housing, that’s something that worries me a lot.”* As a single mother, she expressed her desire to be able to share housing with other single mothers in order to cut down on rent and other household expenses. She mentioned this would also help alleviate some of the social isolation that comes with being a single parent.

4.1.2 Interacting with people

Nine of the thirteen participants felt unsafe due to the people they came into contact with both in their living environments and at community services. P1 found many of the community services she relied on to be *“full of junkies and other scary people”*, and was apprehensive about interacting with unsafe people at the drop-ins she goes to. She also mentioned that she finds being on the streets scary due to the people she may

meet. P9 had similar feelings regarding the unsafe people at the services she relied on. *“Some of these places can be really quite difficult...because you’re exposed to some serious mentally disturbed issues.”*

For both P4 and P12, the biggest safety concern they had was around where they lived, due to the people they were surrounded by. P4 felt constantly on edge where she was living. *“You’ve got people turning up who are wanting drugs, who aren’t of sound mind who could do anything and then there’s people within there who are dealing and trafficking. I think that’s my biggest concern, where I’m living, I don’t feel safe there. And I haven’t felt safe there since I moved in there. But the past six months I’ve felt very unsafe to the point where I want to get out.”*

P4 had recently started to house sit in order to remove herself from the situation for short periods of time. *“So then I started doing house sitting, and people would let me stay there so I can take myself out of that negative environment for a couple of weeks and then go back feeling like my tank’s a little bit fuller and I can handle it. You’ve got to come up with some really interesting strategies when you’re living in circumstances you normally wouldn’t choose for yourself.”*

4.1.3 Protection from the elements

Having spent much of her life as a homeless woman, P1 was also concerned for her safety from the elements and would constantly be on the lookout for cover from rain and insects. *“It’s really scary with rain and insects...you look at buildings and think is that empty, where’s a thing I can crawl under...is there an underneath the house, is there a veranda, who’s living there? Just in case you might become homeless I find I look at buildings in that way.”*

4.1.4 Ensuring safety

All participants reported using their phones as a means of ensuring their safety. This includes being able to call for help if someone were to approach them, or if they found themselves in an unsafe situation. For example, P1 finds her phone important in case she had to call the police if someone approached her on the streets. Whereas P3 would use her phone if she was stranded somewhere and needed help with money. One example was when P3’s travel card was overcharged and she had to call a family member to send her money for a bus fare so she would be able to be able to catch the bus home. P3 also mentioned that her phone helps her to know that her son is safe when at school as he can get in contact with her if something were to happen. For P9, her phone was a way for her daughter, who was in a volatile relationship, to contact her or the police if needed. *“I always hated phones but now I realize how essential they actually are in this world at the moment as a safety device.”*

4.2 Social Isolation

This challenge refers to the ways our participants have felt isolated due to their situation.

4.2.1 Family and Friends

All of our participants felt isolated from friends and family due to their circumstances. For example, P1 was separated from her family at a young age and feels isolated from society. She would use her phone to ring friends, however when her phone was stolen she had no way of getting in touch with them until she was able to replace her phone. P2 lost contact with family and friends when she went to jail, and P4 feels isolated from friends as she does not believe they could understand what she is going through.

Since her divorce, P5 struggles to stay in contact with family members from her ex-husband's side of the family. *"I've got two stepsons, whom I'm still in contact with but I don't see as much because I'm not invited to the family do's obviously, so I don't see as much of them and it's a bit hard, they've got lives of their own, they're both married now so it's a bit hard to see as much of them as I would like."* Due to her isolation, P5 was used to doing activities alone. Figure 3 is a photo of the park outside her home that she would visit by herself. She would take a cup of tea and sit at one of the tables to get herself out of the house.

P8 is a refugee woman who had recently arrived in Australia. She is raising three young children and is unable to work due to her visa conditions. She relies on a few friends she has in Australia to come and visit her at her home. Many of her friends and family remained in her home country. P9 would often decline invitations from friends to go out to eat as she wasn't able to afford a meal out. *"They'll say 'let's go catch up, we'll go to so and so for a bite to eat'. I'll often decline or I'll say I ate something before I came. It's because there is no way I can put \$10.90 on a panini and then \$4.90 on a coffee, I just couldn't. That's the effect."*

4.2.2 Changing Communities and Networks

Over the course of their life disruptions, our participants both lost and gained different communities and networks of people. While these did have the potential to lead to negative experiences due to some of the people they would come into contact with, there were also positive aspects to finding new support systems. In one case, P3 felt like she was going through her mental health issues alone, so a friend encouraged her to join a mental health group on Facebook where members are able to share information and stories. She finds it helpful to talk with others who are going through a similar situation she is. *"You are made to feel very alone, very isolated, and to know that you're not the only one; it's a relief."*

After becoming unemployed, P4 has felt the need to reach out to community groups to help with her emotional mental state. As she is a divorced woman she often feels like she is on her own. *"It's difficult when you are on your own, because you've got to do everything on your own. There's so much responsibility on your shoulders to manage everything and so I think when I was married that was a lot easier on so many levels: financially, emotional support. If I had a choice I wouldn't be single, I would have that support, that connection and that ability to rely on someone else. I think the single person does it tough in many ways because there might not be as much support out there compared to families...I've just sort of felt over the years that it's really hard being single."*

Due to the amount she has had to move, P5 had lost many of her networks of friends and feels she doesn't have a lot of people around her that she can go out and do things with. Consequently, she stated that she goes to a lot of places by herself. However, she is trying to participate in community activities during the week which she finds through community centers and her caseworker. Figure 4 is an example from a knitting workshop organized by the community care center.



Fig. 3. A photo taken by P5 showing a park she often visits.



Fig. 4. A photo taken by P5 showing a knitting workshop she attends at a community center.

4.2.3 Learning new technology

Our participants also felt like they were isolated from learning new technologies which left them further behind. For example, P2 lost contact with family and friends when she went to jail. Her daughter helps her use Facebook to try and find people she has lost touch with as she doesn't know how to use a computer. She also creates artistic LED lights that can be used on the outside of buildings for festivals like Christmas, and wished she was able to share and sell her work. P3 is unsure how to use a computer so she relies on word of mouth and community notice boards in order to find out about community resources.

While P4 was technologically savvy and would often use her phone and laptop, she felt isolated from having access to learning new technologies. She felt this would disadvantage her when she went to re-enter the workforce. P9 also mentioned she felt "handicapped" as she did not know how to access technology in order to be able to learn how to use it. *"It's daunting to me really, 'cause I'm old school. I wasn't born into it like the young people are. It is not normal to me, I don't know how to access it...I know it would benefit my life if I started to study it I'd be able to be a bit more fluent on the computer. But I do feel a bit handicapped, not knowing that knowledge."*

4.3 Stigma

Many of our participants felt stigmatized due to their circumstances and the crisis situations they were in. For example, P1 felt the stigma attached to being a homeless woman. She recalled numerous occasions when she was called derogatory names. *"For me personally it was more...the hygiene situation because of smell and dirty clothes and getting thrown out of places cause I stink and it's just been so full on. I can think of numerous occasions where I was called names and stuff and been re-*

ferred to as a 'bag lady' or 'pigeon woman' is another one. It's just human dignity to have a place to stay." However, through the videos she shared with us that she had the desire to be comedian, and provided us with video clips of her performing stand-up routines and telling jokes about her situation. This was one of the ways she coped with the nature of her situation.

In P3's case, the stigma she felt around her situation was abetted by both her mental health and her husband. She had suffered from depression and anxiety since she was a child and consequently felt like an outcast both at school and at home with her family. Due to this she had felt stigmatized by her mental health since she was young. *"My depression was under control until I met my husband and he just had an ability to make me look and behave like when I was younger, like it was all my fault, I'm psycho, I'm crazy, there's something wrong with me, normal people don't get upset like this, normal people don't panic or worry like this, so it got worse."*

P2 felt the stigma attached to being an ex-offender, despite being wrongly convicted and having her charges dropped. Even though she was in a poor financial position, she had been prioritizing paying a lawyer in order to be able to clear her name, which was something that was very important to her. *"I just want to go back to normal, living normally like I was living before I was arrested. The whole thing has just been absurd...It's been really hard since they released me from jail."*

P4 felt stigma around being unemployed, referencing the common misconception that people who rely on unemployment benefits are "dole bludgers" – someone who chooses to receive welfare rather than work. *"It's not like I'm sitting there being a bludger so I think people have that stigma attached to people who aren't working, it is not fun at all living off that small amount of money."* P11 felt similar stigma attached to being unemployed. *"You don't feel part of the working community, you sort of hang out with people who are similar circumstances, which is fine but at times you start feeling like you're a loser."* Many of our participants still had issues around having to ask for help and attend community centers in order to get food. However, P6 felt the community center was one of the places where she did not feel judged. *"You don't feel like people are looking down on you, and they don't make you feel that way. They make everyone feel comfortable there, no one is judging. People get judged so much these days and people are having a hard enough time as it is."* Being a part of her community had helped P10 go back to university to study, and eventually gain employment, which had helped improve her self-esteem. This shows some of the positive sides of connecting women in crisis back into their community. While P5 had bipolar disorder, she believed that being part the community helped her gain self-esteem. *"I went to a concert at QPAC and it was just great, you were with the mainstream people and I felt like a mainstream person, 'cause when you're mixing with people with disabilities you feel like you're labelled with that so it was really nice to get out of that circle."*

5 Discussion

This paper has attempted to understand the common issues shared by women who are in crisis situations. We used a bottom-up approach to investigate the everyday lived experiences and practices of women in crisis situations.

Past studies highlight that there is a need for a better understanding of the tools that could both support and empower women in crisis [4, 27, 41, 43, 45, 46]. We respond to this with a study that illustrates how we may be able to generate ideas for designing technologies that are both empowering and supportive. We involved a highly diverse demography of women in crisis situations – representing widows/divorcees, single mothers, the homeless, ex-offenders, refugees and a range of health problems. As our findings are from an exclusively female perspective, we contribute to the understanding of the issues faced by women in crisis situations. Our findings show three common challenges shared by our participants: their living conditions, social isolation and stigma. Similar studies focused on homeless men have found nuanced differences between the issues women and men in these types of crisis situations face [38, 42]. While the men involved in the studies also faced housing insecurity, the impact this had on their physical and mental health was more of a concern. Similar to the women involved in our study, men felt socially isolated from friends and family, and would often attend community centres for social interaction.

Housing security was one of the most important issues for our participants. Due to safety concerns, women are more likely to couch surf or stay with friends or family before resorting to sleeping on the streets [1]. We found this was not just due to concern for personal safety, but also because of hygiene needs and protection from the elements. Many participants also felt unsafe due to the people they interacted with, either in their living environments or within the community services they relied on. Consequently, their interactions with the different communities and networks gained over the course of their life disruptions provided both positive and negative experiences. Many of our participants felt isolated from their family and friends, and their situations had also caused many of them to feel stigmatized due to their circumstances. Our results did highlight the role of technologies such as mobile phones in crisis situations. All of our participants owned a mobile phone and ten of our participants had access to a smart phone. During the study, only one of the participants had her phone stolen and she was able to replace it with another phone within a few days of the event occurring. This particular participant would only use her phone for text and calls, and was using pre-paid credit loaded onto her phone. Other participants owned phones they were paying off through phone plans that include calls, text and data.

We showed how mobile phones assisted women in getting appropriate help when stranded or in an unsafe situation. In P9's case, she used her phone mainly to assist and advise her daughter who was in a volatile relationship. In turn we show that there is potential to better our understanding of the issues faced by women in crisis situations and build on the existing technologies [4, 27, 41, 43, 45, 46] that can support and empower women in these challenging circumstances.

In this discussion, we compare the demographic differences across our participants and their crisis situations. We end with three design implications for future technology that might assist in supporting and empowering women in crisis.

5.1 Differences in Crisis Situations

The greatest difference in terms of our participants' demography and their crisis situations was the participant's ability to *bounce back* from their life disruption. For example, while P4 and P6 were both unemployed and living on government support, they were taking steps towards finding suitable employment. However, due to her homelessness and health issues, P1 faced many more barriers in both finding employment, as well as being accepted as a member of the community.

The women exiting from a volatile and abusive relationship came with a different set of privacy and safety concerns compared to the women who were divorced or who had become widowed. Having left a volatile relationship herself, P9 was now concerned with helping her daughter leave her abusive partner while ensuring he would not be able to locate either of them.

In terms of age, we observed that younger women tended to be in a better position when it came to overcoming their crisis situation. For example, while 35 year old P10 went through a crisis situation in her late 20's, due to her age she was able to gain both a university degree and employment. However, P10 does remain underemployed and in an insecure housing situation. Our older participants mentioned that they found it more difficult to move around from place to place.

Each crisis situation had the potential to lead directly into another. For example, in the case of P3, her mental health had led her to enter into a controlling relationship, and P9's drug addiction had led her into an abusive relationship. For P5, her mental health issues had led to her divorce. Many of our participants were also close to becoming homeless. This underlines the importance in assisting women during these initial crisis situations, for example through education, helping them to re-enter the workforce, or ensuring vulnerable women have a secure place to live.

5.2 Design Implications

Based on our findings, we discuss three implications for designing technology that might assist in supporting and empowering women in crisis situations. These are:

- Sharing accommodation
- Engaging in social and community based activities
- Participating in an online creative community hub

5.2.1 Sharing Accommodation

We found many of our participants felt insecure within their current living arrangements. Several were close to becoming homeless and many feared for their personal safety due to the people they came into contact with. To ensure they had a safe place to stay, our participants would couch surf, sleep in a caravan, or stay with family and

friends. There is ongoing research into the potential of the sharing economy within vulnerable communities [6, 18, 35]. Certain peer-to-peer interventions have so far proved useful in helping individuals find temporary employment, increase social interaction, and access resources [18]. Well-known services such as AirBNB and couchsurf.com have been studied in regards to hospitality exchange [30, 31]; however, services such as these are not always a viable option for those from a low socio-economic background. An initial design opportunity would be to explore how we could build on this sharing economy in order to provide a system more accessible to disadvantaged women, where women could connect with each other to allow them to look for housing together. This system could also allow women who are living in accommodation they cannot easily afford to look for a housemate. This has the potential to allow women to share costs associated with both accommodation and household bills. As was mentioned by P10, this kind of system would be useful for single mothers looking for other single mothers to rent with. Challenges that would need to be considered include finding a place large enough to accommodate two families and supporting children who are unknown to each other in living together. As majority of our participants had access to a mobile phone, technology could play an important role in this design idea. It could enable the user to both search for and find the right place to live, and also the right housemate to share with. This type of system could also potentially be deployed amongst the women who attend the community center in order to further mitigate some potential risks involved in sharing accommodation. This would help to support and empower women by ensuring they feel safe both where they are living and who they are living with.

5.2.2 Engaging in Social and Community Based Activities

We found that many of our participants felt isolated in numerous ways due to their circumstances. Walker et al. [49] found that mobile technology could enhance interpersonal and community connectedness and there is potential to build on the existing technologies [10, 33, 39, 49] that foster social connection between women in crisis. We contend that design efforts should be spent on providing technology that better supports connecting women in the community. This could involve a match-making system in order for women to be linked with other women who visit the community center who are also looking to socialize. Once matched it could suggest free activities for them to do together, for example recommended walks around the area, and free events that they could attend. This could also be extended to allow them to organize ride sharing to different community services or activities. Another aspect to this design idea would be providing women with a platform to find out about community services and other activities that are available to them within their community that they may not know about.

Extending on this, designers could also explore how technologies could allow women in crisis situations to actively engage in activities such as volunteering. This could allow members to find and apply for volunteering opportunities in their community. For P4, volunteering at the animal shelter had been an important aspect of coping with her crisis situation. Another aspect of this design idea is allowing community members to complete tasks that help a fellow member of the community. Bel-

lotti et al. [6] explored how the concept of time banking could be enhanced to the point of being experienced as a ‘random act of kindness.’ Some examples of these ‘random acts of kindness,’ could include helping a homeless woman with her washing, or helping someone through a crisis situation they have been through themselves. Members should then be able to share their stories and experiences of these acts with the community, as this could help with motivating other members to contribute towards helping each other. This would be within a community center environment and would therefore directly help the community involved. Both aspects of this design idea would allow otherwise marginalized groups of women to connect back to their community which may lead to alleviation of social isolation, lift self-esteem, and assist with feelings of empowerment.

5.2.3 Online Creative Community Hub

Through the self-reported experiences we found that many of the women were trying to convey both their own stories and experiences, and also advice and good practices they could pass along to other women in similar circumstances. P9 suggested a noticeboard to be displayed within a space in the community center in order for this advice to be displayed and shared with other women. Both creating and sharing stories about personal experiences can be a powerful way for people in crisis situations to build connections with others who have experienced, or are experiencing, similar difficulties [15]. Davis et al. [15] created digital stories with participants who were housebound, and developed an interactive display to share these stories at a local community event. They found that each storyteller enjoyed seeing the other stories and felt a sense of relief that they were not alone in their experiences. Clarke et al. [9] explored the role of photography in re-building the lives of women who had experienced domestic violence, where the women involved in the study would bring in photos they had taken. These photos were put in a sequence with added words and sounds from audio recordings, and a final screening of these creations was shared and discussed within the group.

Building on this previous work and the suggestion from P9, an online community platform could be designed, where women could use text, voice over, photos and videos in order to not only share their stories and experiences, but also to impart advice and good practices to other women through a fun and engaging medium. There is also potential for the videos created for this research to be shared beyond the research team to the women they were intended for, with the permission of the participants involved. Involving women in such a platform would allow them to support each other and empower them to share their experiences in order to help other women. This could be moderated through the community center. There is also potential for this to be extended to allow women to showcase their creativity and create entrepreneurial activities, similar to the feminist maker/hackerspaces [23]. However, this online platform would also enable them to earn money off items they have created, such as knitwear, furniture or art, while also creating an online community hub to enable the exchange of ideas. For example, P2 could share and sell her LED light creations. P1 could use her comedic sketches and jokes to both show her skills as a comedian, as well as discuss how she uses humor to cope with her situation. There is potential for

such a platform to allow for the economic empowerment of women in crisis situations and may also attract marginalized women to the existing maker/hackerspaces. As many of our participants felt isolated from learning technology, it would also empower women to participate digitally and learn how to use the technology involved.

5.3 Challenges

Researching within a sensitive setting such as women in crisis situations comes with certain challenges. In regards to our methodology, their situations did not always afford them the time to take photos and videos, and as such some of the packs were returned half finished, and one has yet to be returned. Some of the participants took longer to complete the pack than we initially had expected and a few struggled to use the video camera and required additional assistance in learning how to use it. This required one of the research team members to work with them in taking the videos and photos and in some cases we became involved in parts of the video creation. We found the best approach in these instances was to work with them in learning how to use the cameras, then allow them to take the cameras away again and continue to use them without us being present. While this was not the intention of the self-reported probe kit, it did allow us to build more rapport with the participants that required additional help. The limitation of relying on the disposable camera was that some of the photos did not turn out well when the participant did not use the flash, especially the indoor photos. The participant would then have to remember the photo that had been taken. Another limitation of our study would be that all our participants were recruited from the same community care center. However, we believe that there is potential for this research to be extended by recruiting participants who rely on other services.

6 Conclusion

This paper focused on the issues faced by women in crisis situations and how we can design technology to both support and empower them. The self-reported photos and videos generated through the video and disposable cameras and semi-structured contextual interviews have provided us with unique insights into the issues faced by women in crisis situations. Our methods engaged participants and provoked more contextual, visual and longitudinal experiences which helped to inform our semi-structured contextual interviews. Our participants had different circumstances; however they shared three common challenges: their living conditions, social isolation and stigma. Based on our findings, we have proposed three implications for the design of a technology in this area – namely sharing accommodation, engaging in social and community based activities, and participating in an online creative community hub. We contribute to the growing understanding of the specific issues faced by women in crisis situations and how technology can be designed to support and empower women in challenging circumstances.

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