

ID 7

RESEARCH REPORT
MULTI-MORBIDITY IMPACTS
ON WOMEN'S HEALTH AND
EVERYDAY LIVES

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EXECUTIVE SUMMARY

Chronic health conditions such as endometriosis, migraine, chronic fatigue syndrome, polycystic ovary syndrome (PCOS), and chronic pain affect millions of women worldwide, yet remain systematically under-recognised in healthcare and design. These conditions impose significant physical, psychological, and social burdens, with overlapping comorbidities, long diagnostic delays, and inadequate support systems. Despite the scale of the issue, interventions remain fragmented, reactive, and insufficiently tailored to the lived experiences of women.

This report combines primary and secondary research to address this gap. Primary data was gathered via an online survey of twenty four women aged 18-54 living with chronic health conditions. Participants reported widespread multimorbidity, symptom unpredictability, extreme disruption to education, work, and social life, and high levels of anxiety. Nearly all respondents described the invisibility of their conditions as a source of stigma, often compounded by healthcare dismissal. These challenges underpin several design implications.

AI ACADEMIC INTEGRITY STATEMENT:

I confirm that most of this assignment is in my own words and that the large portions of the text have not come directly from Generative AI sources. However, Generative AI has been utilised in this report to assist in various ways outlined below:

- Chat GPT was used to create the Executive Summary, by copying my written report into the AI, and asking for the 5 key dot points. I then took these dot points and wrote the executive summary myself, based on the main points that it created.
- Chat GPT was used to generate the reference list, by copying all websites into the AI and asking for APA the 7th referencing.
- ChatGPT was used to search the web, in conjunction with my won Google searching, the prompt to ChatGPT was " Help me find sources to discuss the following topics that are about migraines, PCOS, endometriosis, chronic conditions, chronic fatigue, and chronic pain. Then provide me with a list of sources that discuss the link between these different conditions in women. Also provide me with sources that discuss anxiety and mental health with these women." This prompt was used to generate a list of sources that I then researched information from to create my research document.
- The whole report was put into ChatGPT and asked it to help me structure the discussion section, providing me dot points and headers that I can expand on myself. I then used this framework to write the discussion.
- Chat GPT was also used to conduct a spell check of the final report, and reduce the wordiness of my longer sentences but no large portions of rewriting was done. The prompt I used was "Please conduct a final spelling and grammar check on my research report. Cut out any unnecessary sentences and cut out sentences that are too wordy and confusing."

AUTHENTICITY STATEMENT

I confirm that most of this assignment is in my own words and that the large portions of the text have not come directly from Generative AI sources. However, Generative AI has been utilised in this report to assist in various ways outlined below:

Name	Student Number	Date of Acknowledgement
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INTRODUCTION

Chronic health conditions represent one of the greatest public health challenges globally. Within this context, women's health conditions such as migraine, endometriosis, and PCOS are particularly prevalent yet persistently marginalised. Migraine alone affects more than one billion people, disproportionately women, and remains a leading cause of disability worldwide (Ashina et al., 2021; Steiner et al., 2020). Endometriosis affects approximately 190 million women of reproductive age globally, equivalent to 10% of the population, and is associated with chronic pain, fatigue, infertility, and significant reductions in quality of life (World Health Organisation, 2021).

Despite their high prevalence, these conditions are characterised by under-diagnosis, delays to treatment, and fragmented care. Research highlights an average diagnostic delay of 7-11 years for endometriosis and 7 years for migraine, often leaving women in pain without adequate recognition or support (Agarwal et al., 2023; Morotti et al., 2017). Beyond physical suffering, these conditions carry a high psychosocial burden, including stigma, anxiety, depression, and disruption to work, education, and social participation (Krasnov et al., 2024).

The invisibility of symptoms contributes to dismissal and disbelief. Women report being told their pain is "normal" or psychosomatic, a pattern that reflects systemic gender inequities in healthcare and research (Criado-Perez, 2019). These inequities extend into design, where tools and services often fail to consider the lived experiences of women.

At the same time, multimorbidity is common. Multimorbidity and comorbidity refer to the co-occurrence of multiple health conditions in the same individual. Many women experience this in the form of overlapping diagnoses, such as endometriosis, migraines, chronic fatigue, and psychological disorders including anxiety or depression (Petrelli et al., 2023). Yet most interventions remain isolated, addressing conditions individually rather than acknowledging their overlaps.

Figure 1

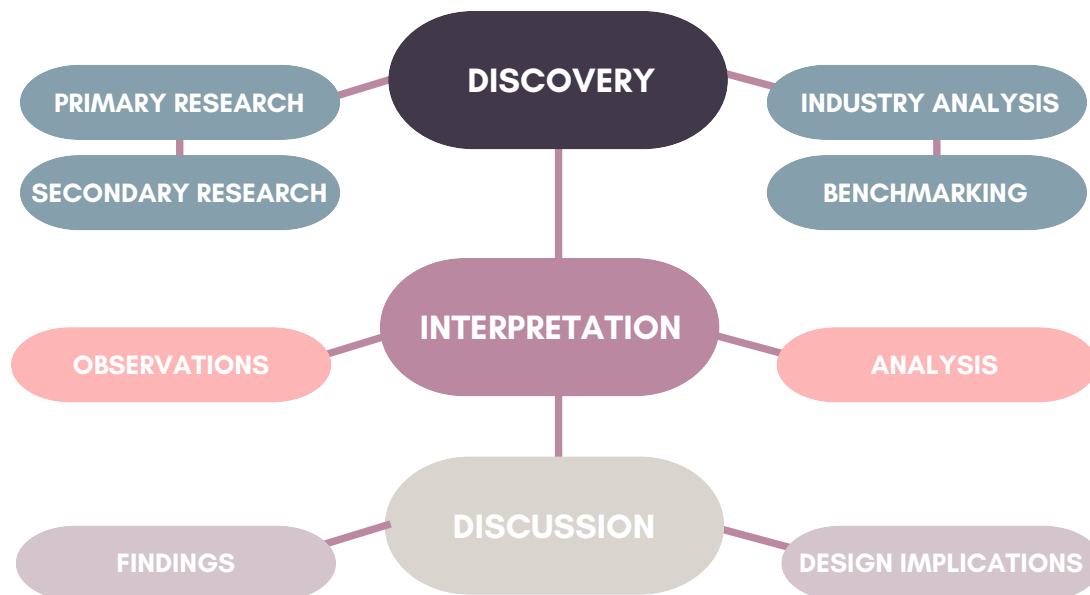


Figure 1 – Report structure and process.

This report addresses these issues by combining primary research with benchmarking and literature reviews. By synthesising lived experiences with current solutions and academic articles, the report identifies opportunities for design innovation that prioritise women's autonomy, dignity, and holistic wellbeing.

BACKGROUND

MIGRAINES

Migraines are a neurological disorder characterised by recurrent, pulsating headaches lasting 4-72 hours, and comprising of six different difficult phases (see Figure 2), including symptoms of nausea, vomiting, light sensitivity, and sound sensitivity (Headache Classification Committee of the International Headache Society, 2018). Chronic migraines, defined as occurring at least 15 days per month, affects approximately 2% of the global population. Migraine is the second leading cause of years lived with disability worldwide, particularly among women aged 15-49 (Steiner et al., 2020).

Figure 2

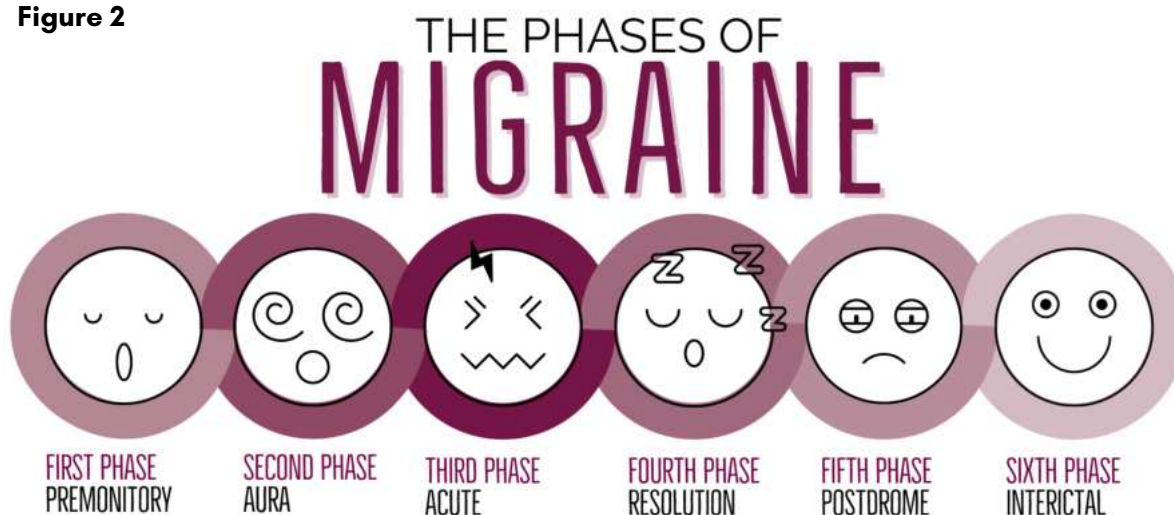


Figure 2 - The six phases of a migraine attack. Adapted from Migraine Australia (n.d.).

More recent data demonstrate distinct gender disparities. Between 1990 and 2021, female migraine statistics increased from 39.5 million to 55.4 million, while male cases increased from 24 million to 34.7 million, illustrating the high burden it has on female (Yuan et al., 2024). Fluctuating estrogen levels during the menstrual cycle are strongly linked in worsening symptoms, with the DOI foundation showing that up to 70% of women report having menstrual migraines (Allais et al., 2018).

ENDOMETRIOSIS

Endometriosis is an inflammatory disorder where tissue that is similar to the endometrium tissue grows outside the uterus (see Figure 3), causing pelvic pain, dysmenorrhoea, fatigue, and possibly even infertility. According to the World Health Organisation, endometriosis affects around 10% of women who are of reproductive age (WHO, 2021). It also has been found to have a significantly negative psychosocial impact, as women with endometriosis are significantly more likely to develop anxiety and depression (Agarwal et al., 2023).

Women typically do not even get diagnosed with this condition for at least ten years after they first experience symptoms, partially due to procedures such as laparoscopy being invasive as well as the medical industry's constant under-recognition and minimisation of women's pain (Morotti et al., 2017). Treatment remains inconsistent, with hormonal therapies and surgery providing partial or temporary relief, but more often than not, are ultimately accompanied by side effects (Buse et al., 2020).

Figure 3

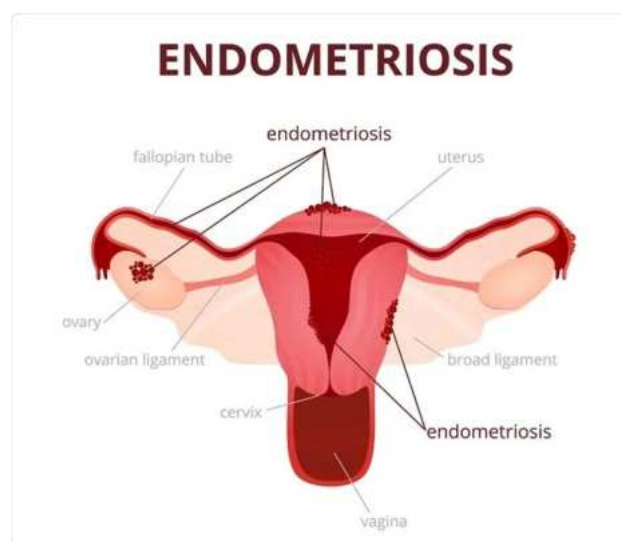


Figure 3 - Locations where endometrial tissue is commonly found, (Marochkina, n.d.).

BACKGROUND

OVERLAP

Research outlines a significant overlap between chronic migraines and endometriosis. Women with endometriosis are 1.7 times more likely to experience migraines (Morotti et al., 2017). A study by Petrelli suggests that shared genetic polymorphisms in oestrogen receptor genes is the common mechanism which causes this strong overlap between the conditions (Petrelli et al., 2023). Comorbidities including irritable bowel syndrome, chronic fatigue syndrome, and fibromyalgia also are prevalent, and further complicate management of these issues (Krasnov et al., 2024).

IMPACTS

The inability to see the suffering of these chronic conditions compared to another clear physical disability makes the whole medical process much more difficult for these women. Women often report dismissal by medical practitioners, leading to mistrust, isolation, and delays in treatment (Ballard et al., 2006). Stigmas associated with 'invisible' conditions also affect the women's relationships, work, and education. The WHO's International Classification of Functioning, Disability and Health (ICF) highlights that disability arises from the interaction between health conditions and social barriers (WHO, 2002). This framing makes clear the need for interventions addressing both medical and social obstacles, as one inherently leads to the other.

DESIGN GAPS

Existing interventions remain under-researched and single-minded. Pharmacological treatments often provide inconsistent relief (Buse et al., 2020). Non-pharmacological strategies, such as heat therapy and exercise, have shown to offer temporary support but are rarely sufficient, and definitely not a cure. Health apps, such as Clue or Migraine Buddy focus on tracking rather than prediction or integration in conjunction with clinical care (Femtech World, 2024). Whereas wearables such as the Oura Ring or Apple Watch provide physiological data but are costly and poorly tailored to multiple conditions (Embr Labs, 2022).

Figure 4

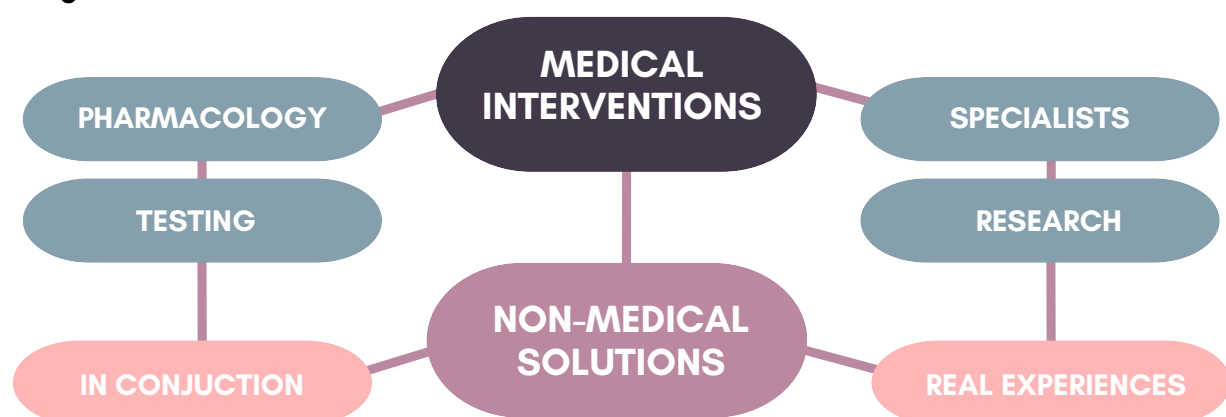


Figure 4 - Solution needed for women with multi morbidity.

Together, these gaps in both medical interventions and non-medical solutions highlight the need for design-led innovation that integrates health knowledge with women's real lived experiences, providing predictive, multimorbidity-aware, and socially supportive solutions.

BENCHMARKING

Benchmarking involved a complete review of existing tools and currently available products that address chronic health management, focusing on apps, wearables, and physical aids. These products have been marked against the criterion of: quality, pricing, aesthetics, technology, positioning, reputation, service, usability, sustainability, accessibility, effectiveness, and availability. This ultimately created Figure 5, the rating of each benchmarked product, and Figure 14, the detailed overview of each product.

Figure 5

Criteria	Clue (App)	Migraine Buddy (App)	Oura Ring (Wearable)	Cove (Wearable)	Heat Packs	Portable Stools	Migraine Cooling Caps	Endometriosis Heat Packs	Occipital Release Tools	Anxiety Support Products
Quality	4	3	5	4	3	3	3	4	3	4
Pricing	4	4	2	2	5	3	3	4	4	3
Aesthetics	4	3	5	2	2	3	3	2	3	4
Technology	5	4	5	4	2	2	3	2	2	3
Positioning	4	4	4	5	3	3	4	4	3	4
Reputation	5	4	4	3	4	3	3	4	3	3
Service	4	3	4	3	2	2	2	3	2	3
Usability	4	3	4	3	3	3	4	3	2	4
Sustainability	4	4	3	2	2	3	3	3	3	3
Accessibility	4	4	2	2	5	3	4	4	4	4
Effectiveness	3	4	3	4	3	2	3	4	3	3
Availability	5	5	4	2	5	3	4	3	4	5

Figure 5 - Benchmarking scores.

Clue (Figure 6) and Migraine Buddy (Figure 7) are both popular apps to track chronic health symptoms, but they differ in purpose (see Figure 14). Clue is evidence-based and uses predictive cycle algorithms, to help with anticipatory anxiety and the unknown, yet it is limited in addressing multiple chronic conditions simultaneously, and the pattern between them (Mishra et al., 2022).

Figure 7



Figure 7 - Migraine Buddy app interface.

Figure 6



Figure 6 - Clue app interface.

Migraine Buddy, while it is popular among chronic migraine communities, it remains and less research-validated and heavily relies on trusting user inputs (Buse et al., 2020). Both rely on 'freemium' pricing, raising concerns about data privacy in femtech platforms if some models are available at no cost, how else is a user paying for the service (Royal Holloway, 2024).

In terms of some of the health wearables on the market, the Oura Ring (Figure 8) and Cove (Figure 9) highlight contrasting approaches to this sector (see Figure 14). Oura offers clinically validated biometrics, minimalistic aesthetics, and wide wellness applications but it is expensive and not designed for chronic multi-morbidity (Stone et al., 2023). Cove, however, is a migraine-specific device shown to reduce attack frequency, yet it is bulky, niche, and largely restricted to America (Embr Labs, 2022). These differences reflect a trade-off between general use but aesthetically pleasing wellness tracking and condition-specific but limited use.

BENCHMARKING

Figure 8



Figure 8 - Oura ring.

Figure 9



Figure 9 - Cove device.

Figure 10



Figure 10 - Heat packs.

Everyday products such as heat packs, migraine caps (Figure 11), weighted blankets (Figure 12), and portable stools (Figure 13) provide immediate relief but remain temporary solutions (see Figure 14). Heat packs (Figure 10) and migraine caps are low-cost and widely available, but can be conspicuous and often lack sustained relief (Brown & Farquhar, 2014). Weighted blankets (Figure 12) show some clinical evidence for improving sleep and reducing anxiety, yet are expensive and not effective for everyone or every condition (Gringras et al., 2014). Portable stools (Figure 13) increase accessibility for fatigue sufferers but are not a complete solution.

Figure 11



Figure 11 - Migraine cap.

Figure 12



Figure 12 - Weighted blanket.

Figure 13



Figure 13 - Portable stool.

Everyday products such as heat packs, migraine caps (Figure 11), weighted blankets, and portable stools provide immediate relief but remain temporary solutions (see Figure 14). Heat packs (Figure 10) and migraine caps are low-cost and widely available, but can be conspicuous and often lack sustained relief (Brown & Farquhar, 2014). Weighted blankets (Figure 12) show some clinical evidence for improving sleep and reducing anxiety, yet are expensive and not effective for everyone or every condition (Gringras et al., 2014). Portable stools (Figure 13) increase accessibility for fatigue sufferers but are not a complete solution.

Innovative aids such as occipital release devices and dizziness management tools are becoming more widespread, but still they are under researched, therefore evidence remains limited. They claim to, and have somewhat been shown to provide targeted relief but have barriers in affordability and distribution. Unlike digital platforms, these tools often lack clinical evaluation and medical frameworks.

BENCHMARKING

Figure 14

Criteria	Clue (Menstrual Cycle & Symptom Tracker App)	Migraine Buddy (Migraine-focused Tracker App)	Oura Ring (Wearable for Sleep/Recovery)	Cove (Wearable for Migraine Relief)
Quality	Evidence-based menstrual and reproductive health tracking; partnerships with research institutions (Mishra et al., 2022)	Large user base, detailed migraine logs; strong community input but less peer-reviewed validation (Buse et al., 2020)	Clinically validated biometrics (sleep, HRV, temperature) (Stone et al., 2023)	FDA-cleared; promising results for migraine relief (Embr Labs, 2022)
Pricing	Freemium model; premium AUD \$7–12/month	Freemium model; premium features at ~AUD \$8–10/month	AUD \$450–600 plus subscription	Around AUD \$500 one-off cost
Aesthetics	Clean, minimal, gender-inclusive design	Clinical, data-heavy interface; less emphasis on aesthetics	Sleek, jewellery-like, discreet	Bulky headband; less discreet in public
Technology	Predictive algorithms for cycles, integrations with wearables	Tracks sleep, weather, triggers; limited predictive analytics	Advanced sensors; app integration; long battery life	Gentle vibrations to stimulate trigeminal nerve
Positioning	Menstrual and reproductive health	Specialist migraine diary tool	Wellness, sleep, recovery, fitness	Medical-grade migraine-specific device
Reputation	Globally recognised; strong in women's health research	Highly regarded in migraine communities; limited broader reach	Popular in wellness and sports markets	Niche but growing credibility in migraine research
Service	Articles, community support, health reports	Symptom reports for healthcare consultations	Regular app updates; sleep coaching	App-based guidance; customer support
Usability	User-friendly; some find features overwhelming	Quick attack logging; can feel repetitive	Comfortable; simple to use; cost barrier	Easy during attacks; fit can be awkward
Sustainability	Fully digital; low footprint	Fully digital; low footprint	Rechargeable, durable; resource-heavy manufacturing	Limited recyclability; electronic waste concerns
Accessibility	Available worldwide; multiple languages	Global availability; strongest in English	High cost limits accessibility; available online	Expensive; limited global shipping
Effectiveness	Helpful for cycle-related symptoms; limited for multimorbidity	Effective for migraine pattern tracking; limited for other conditions	Useful for long-term tracking, not immediate relief	Shown to reduce frequency and intensity of migraines
Availability	iOS and Android app stores	iOS and Android app stores	Widely available internationally	Primarily US-based; limited shipping

Criteria	Heat Packs (for menstrual/muscle pain)	Portable Folding Stools (for fatigue/mobility)	Migraine Cooling Caps	Occipital Release Tools (manual massagers)	Anxiety Support Products (weighted blankets, calming devices)
Quality	Simple, reliable; reusable or disposable options	Varies by brand; some sturdy and lightweight	Cold therapy offers rapid relief for acute migraine episodes	Targets neck tension and muscle tightness contributing to headache pain	Evidence suggests weighted blankets can reduce anxiety and improve sleep (Gringras et al., 2014)
Pricing	Very low cost (AUD \$5–30)	Moderate (AUD \$20–80)	AUD \$40–120 depending on brand	Low to moderate (AUD \$15–60)	AUD \$50–300 depending on size/materials
Aesthetics	Bulky; often visible under clothing	Functional; some discreet but many appear medical	Discreet but bulky under hair; often limited style options	Simple, portable, not very discreet	Neutral, home-friendly design; less portable
Technology	Basic heat retention; some battery-powered versions	Foldable frames; some modern materials	Gel or ice pack technology; some allow rotation for continuous cooling	Manual pressure point design; non-digital	Simple textile design; some use integrated cooling or vibration features
Positioning	Pain relief for menstrual or muscular discomfort	Outdoor events or mobility support	Targeted migraine symptom relief	Wellness and musculoskeletal support	Stress and anxiety management
Reputation	Long-standing, widely trusted	Niche but valued by those with fatigue or mobility limits	Positive reviews in migraine communities; limited clinical trials	Niche but positively reviewed in pain communities	Growing popularity; positive consumer reviews; limited clinical validation
Service	Minimal; easily replaceable	Some warranties offered	Simple product support; replacement gel packs available	Basic usage instructions included; limited ongoing service	Standard retail customer service
Usability	Easy to use; restricts mobility	Provides rest anywhere; carrying can be inconvenient	Easy to use; requires freezer access	User-dependent effectiveness; requires physical effort	Comfortable for home use; limited portability
Sustainability	Disposable versions add waste; reusable are more sustainable	Generally reusable; plastic versions less sustainable	Reusable; longevity depends on material quality	Durable; usually plastic or wood-based materials	Reusable; some products sustainable, others resource-heavy
Accessibility	Highly accessible in pharmacies and supermarkets	Available online; less common in retail shops	Widely available online; some pharmacy stock	Easily accessible online; some available in stores	Widely available online and in stores
Effectiveness	Reported as mostly or somewhat effective	Helpful for fatigue; not for pain	Effective for short-term relief; limited long-term impact	Helpful for tension relief; not condition-specific	Reported to reduce anxiety and aid sleep for some users
Availability	Widely available	Moderate availability	High availability online	High availability online and in stores	Widely available

Figure 14 – Benchmarking details.

RESEARCH

The study involved twenty-four participants who identified as women living with chronic health conditions. Recruitment was conducted via a LinkedIn post, as shown in Figure 15, where the survey link was shared and reposted in relevant survey and support groups. Eligibility was based on self-identification and participation was voluntary and anonymous, with respondents given the option to provide their email address should they wish to be contacted for follow-up questions. The research process was undertaken as per Figure 16.

Figure 15

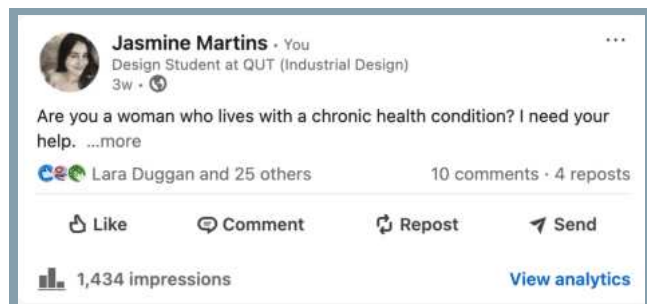


Figure 15 - Call to action LinkedIn post.

Figure 16

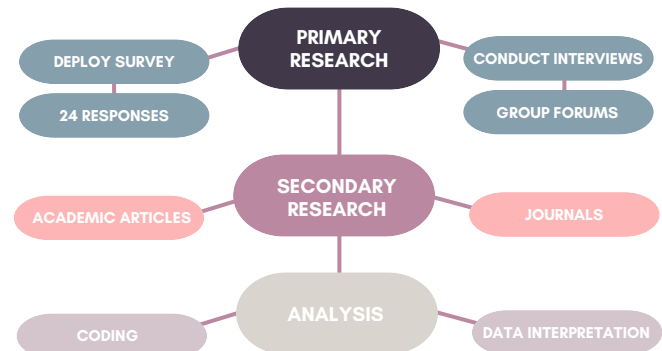


Figure 16 - Research process.

PARTICIPANT DEMOGRAPHICS

Figure 17 shows that participants ranged from 18 to 54 years. Most were young adults aged 18-24, (58.3%), with others in the 25-34 (20.8%) and 45-54 (12.5%) age brackets.

This distribution highlights that chronic conditions frequently affect women at all life stages, impacting education, career trajectories, and family planning. Research confirms that women's health conditions carry significant economic and social costs, particularly during reproductive years (Krasnov et al., 2024).

Figure 17

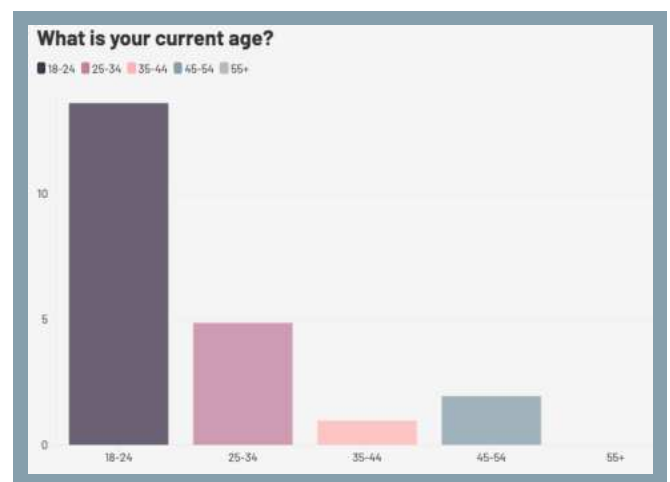


Figure 17 - Participant demographics.

Figure 18

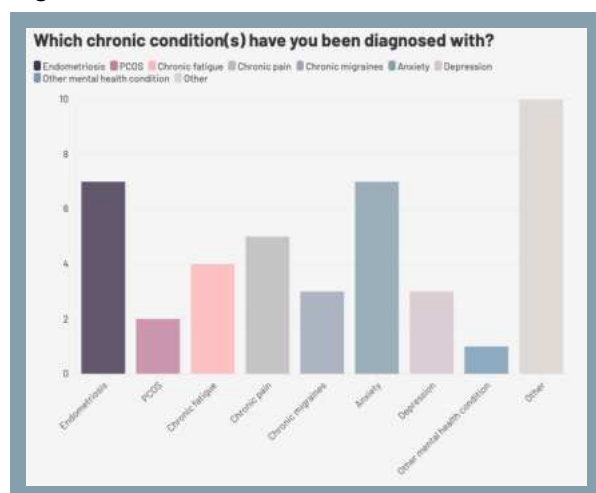


Figure 18 - Participant diagnosis.

The survey results used to create Figure 18 illustrate how women were not solely diagnosed with one condition, but instead many simultaneously. Endometriosis was the most common condition (33.3%), followed by chronic fatigue (25%), chronic pain (20.8%), and migraines (16.6%). Many participants reported multiple overlapping diagnoses, including PCOS, Hashimoto's thyroiditis, fibromyalgia, and anxiety disorders. One respondent even listed twelve separate conditions, reflecting the extreme complexity some women face.

This pattern aligns with evidence that women with endometriosis are significantly more likely to also experience migraines and anxiety (Petrelli et al., 2023). The clustering of conditions underscores the inadequacy of disconnected interventions.

RESEARCH

SYMPTOMS & IMPACT

Three-quarters of respondents showed that they have lived with symptoms for more than five years, and over one-third for more than a decade. Such large amounts of their lifetime, especially for the 18-24 year olds, without adequate recognition or support. These women, further show the diagnostic delays of 7-11 years most experience (Agarwal et al., 2023). Because of this, participants described frustrations like, "It feels like I have been ill forever, and doctors still cannot tell me why."

Figure 19

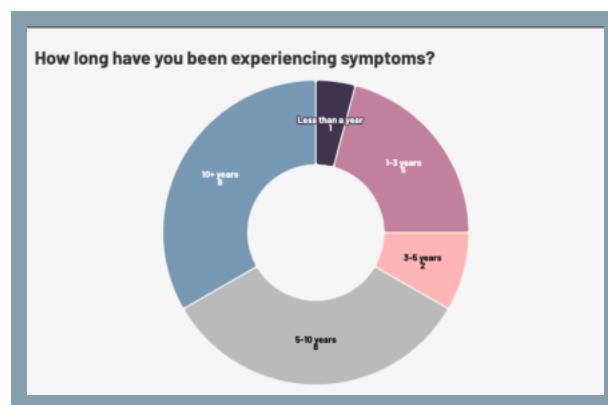


Figure 19 - Participant symptoms.

Figure 20

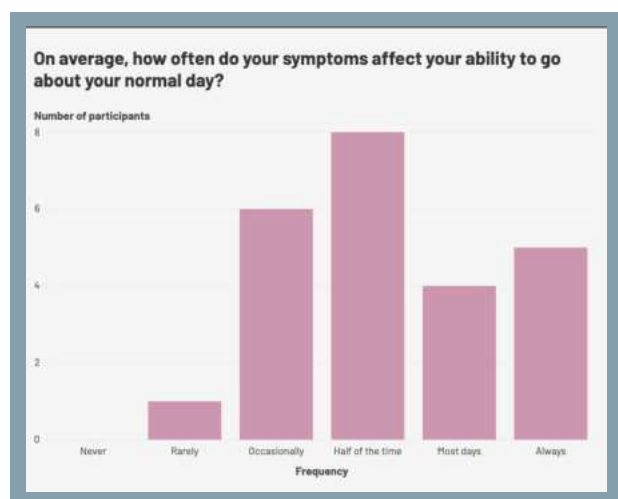


Figure 20 - Participant symptom effects.

Symptoms have been described to regularly disrupt their daily life, with not a single survey respondent selecting 'never' for How often their daily life is affected by their chronic condition(s). One-quarter reported being affected "always," one-third "half the time," and one-fifth "most days." Only a minority reported occasional impact. Participants described restrictions in mobility, work, and social life. One wrote that "public transport is inaccessible for people with noise and light sensitivity." Another explained that she "cannot drive because [she] never know[s] when [she] will collapse from pain."

Such unpredictability restricts women's ability to be independent aligning with the WHO ICF model where it states that disability arises from the interaction of symptoms and environmental barriers (WHO, 2002).

Anxiety was reported universally. Nearly half (46%) experienced anxiety "all the time," while another 46% experienced it "some of the time." Reported symptoms included panic attacks, racing heart, sweating, and cognitive impairment. See figures 21 and 22, to support this.

Figure 21

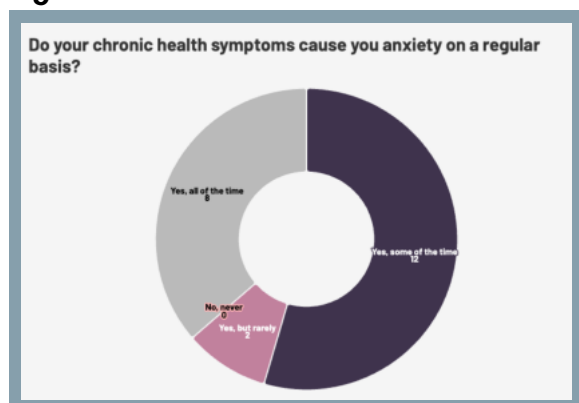


Figure 21 - Participant symptom anxiety.

Figure 22

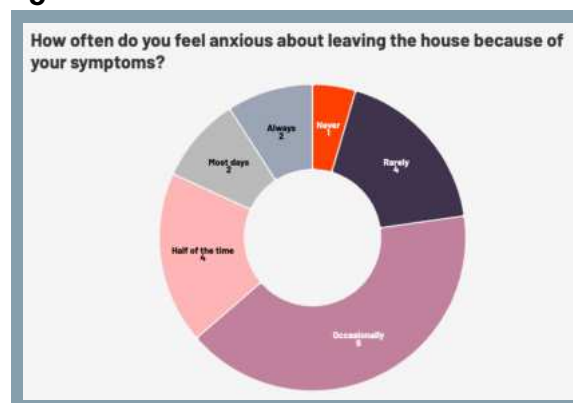


Figure 22 - Participant anxiety in public.

Several participants described anticipatory anxiety, describing feelings such as "I feel anxious leaving the house because I never know when a flare will happen." Such uncertainty reflects the disabling role of unpredictability. Reviewing literature confirms that psychiatric comorbidities are also highly prevalent among women with chronic conditions (Petrelli et al., 2023).

RESEARCH

Hormonal cycles were the most frequent trigger for symptoms, with flare-ups clustering around menstruation. Environmental triggers that participants also noted included weather changes, being in crowded areas, and seasonal variation. Dietary triggers also affected participants, with some describing gluten, dairy, and caffeine as triggers. These findings reflect hormonal and environmental sensitivities documented in the secondary research investigated (Allais et al., 2018).

CONDITION MANAGEMENT

Management approaches among respondents were varied, and once again had inconsistent reports of effectiveness. In the open-ended questions, sleep, and heat therapy were commonly relied upon, but medical interventions were not all tested by each participant. Figure 23 shows eight participants reported that combined hormonal birth control caused them added harm, while three rated it as mostly effective - what works for one harms another. Progestin-only contraceptives demonstrated a similar pattern, with six identifying harm and only two reporting benefit. Pain management medications showed mixed outcomes again, with six participants rating them as somewhat effective, yet two finding them ineffective.

This distribution, visualised in Figure 23, highlights the gap of a universally reliable treatment in the form of a medical intervention, and the ineffectiveness of a 'one size fits all' solution to multiple condition management. Some interventions provided relief for a subset of women, yet the same approaches were simultaneously reported as ineffective or even harmful by others. Such contradictions highlight the individualised and unpredictable nature of chronic condition management, furthering once more that efficacy varies widely across women (Buse et al., 2020).

Figure 23

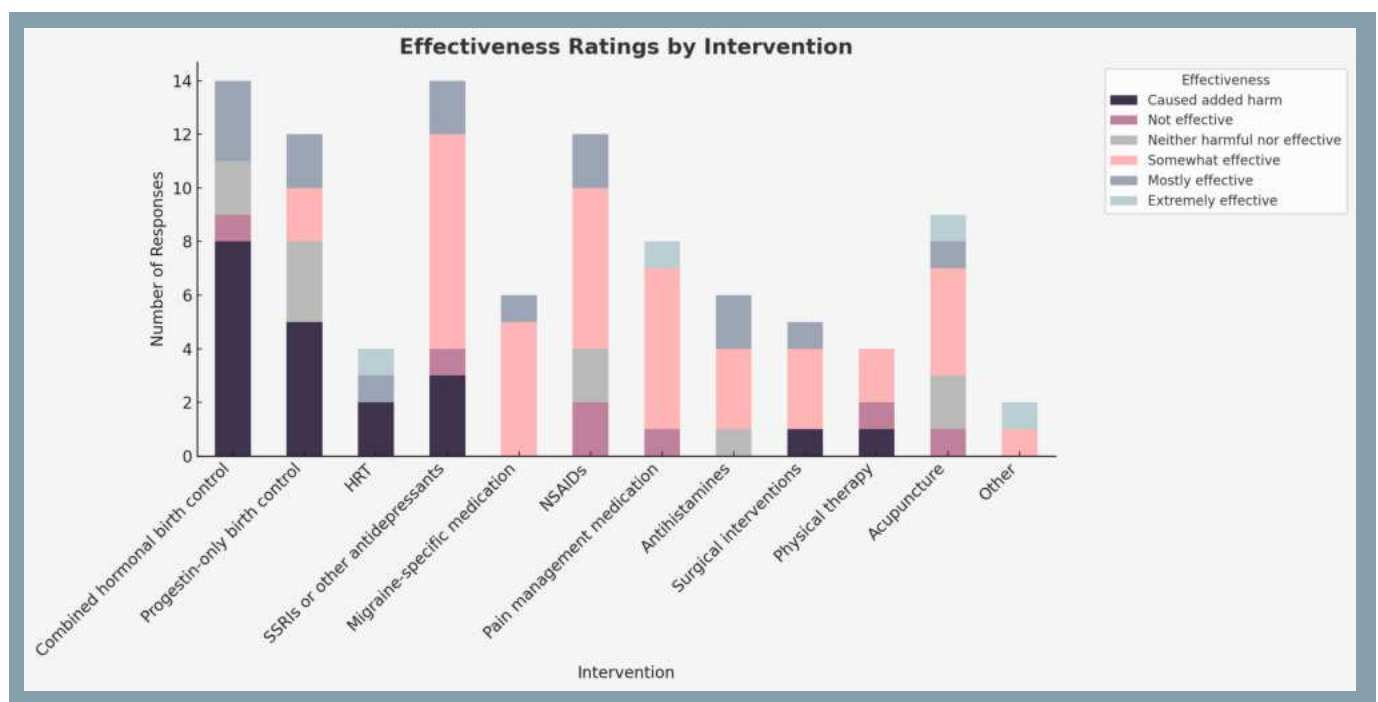


Figure 23 - Participant ranking of medical interventions.

In the open-ended survey questions, participants consistently described having needs that remained unmet. These include predictive tools to reduce uncertainty, discreet comfort aids, platforms addressing multi morbidity, and communication tools to validate and help explain seemingly invisible conditions. Suggestions included wearable heat packs, lightweight stools, predictive apps, and tools for sharing capacity with employers or peers.

FINDINGS

1

OVERLAPPING CONDITIONS

Women live with multiple overlapping diagnoses, demanding comprehensive solutions.

2

PROLONGED DIAGNOSIS

Long-term suffering without recognition reflects systemic failings and disheartens.

3

UNPREDICTABILITY RESTRICTS INDEPENDENCE

Uncertainty undermines independence and fuels anticipatory anxiety.

4

ANXIETY IS PREVALENT

Emotional strain exists as part of and as a reaction to the condition.

5

CURRENT MANAGEMENT IS INADEQUATE

Reliance on temporary relief reflects systemic gaps.

6

UNMET NEEDS CREATE DESIGN OPPORTUNITIES

Women want predictive, discreet, and socially supportive tools.

DESIGN IMPLICATIONS

1

PREDICTIVE SYSTEMS

Tools forecasting flare-ups using hormonal, lifestyle, and environmental data.

2

MULTI-MORBIDITY-AWARE PLATFORMS

Integrated platforms addressing overlapping conditions.

3

CLOSED-LOOP WEARABLE INTERVENTIONS

Devices paired with digital prompts for proactive relief.

4

COMMUNICATION TOOLS

Indicators legitimising invisible symptoms for employers, peers, and clinicians.

5

PORTABLE AIDS

Discreet ergonomic tools for public comfort.

6

HOLISTIC FRAMEWORKS

Addressing physical and psychological needs simultaneously.

DISCUSSION

The survey results show that women living with chronic conditions often experience challenges that furthers what the literature researched already highlights, while also adding new insights. The overlap of migraines and endometriosis reported by participants (see Figure 8) shows that it is common for women to live with more than one condition at the same time. This reflects research that has found strong genetic and hormonal links between endometriosis, migraines, and anxiety (Petrelli, Fattori, & Bruni, 2023). It is also supported by broader studies that describe multi-morbidity as a normal experience rather than a rare occurrence (Ashina et al., 2021). The survey also showed that 75% of women had lived with symptoms for more than five years, with over a third living with them for more than a decade (see Figure 7). This finding connects directly to evidence that women with endometriosis often face 7-11 year delays before receiving a diagnosis (Agarwal et al., 2023; Ballard, Lowton, & Wright, 2006). The long wait for answers leaves many women feeling like their conditions are never-ending, which disrupts education, careers, and family life. Studies confirm that chronic conditions carry significant social and economic costs for women in their reproductive years (Krasnov, Pavlenko, & Mikhaylov, 2024; Steiner, Stovner, Jensen, Uluduz, & Katsarava, 2020).

The psychological burden was another key finding. All participants reported experiencing anxiety, with 46% saying they felt anxious all the time and another 46% saying some of the time (see Figure 11). Women described panic attacks, racing heart, sweating, and fear of unpredictable flare-ups. One participant explained that she avoids leaving the house because she does not know when she might collapse from pain. This highlights that anxiety is not only a comorbid condition but also a direct result of living with the uncertainty that these chronic conditions and symptoms cause. This reflects the studies found, showing that women with endometriosis and migraines are far more likely to experience psychiatric conditions like anxiety (Petrelli, Fattori, & Bruni, 2023). It also connects with the International Classification of Functioning, Disability and Health (WHO, 2002), which explains that disability arises when health conditions intersect with environmental barriers, such as workplaces or public spaces that fail to accommodate invisible symptoms.

Findings around management strategies showed just how inconsistent treatment outcomes can be. As shown in Figure 13, women reported very mixed experiences with medication and physical aids. While some found hormonal contraception or painkillers effective, others described them as only somewhat helpful or even harmful. For example, eight participants reported that combined hormonal contraception worsened their symptoms, while three found it mostly effective. These contradictions support wider evidence that pain and hormonal treatments for migraines and endometriosis show highly variable results (Buse, Greisman, Baigi, & Lipton, 2020). Alongside medical options, many participants turned to alternative strategies such as yoga, meditation, and supplements. Rest, sleep, and heat therapy were the most consistently used methods, with heat-based products like heat packs and migraine cooling caps rated as mostly effective in the graph, but again, not a cure (see Figure 13). Other strategies, including hormonal treatments, received more mixed or even negative ratings, showing that what provides relief for some women can exacerbate symptoms for others. This variability points to a deeper need for personalised and flexible solutions that respond to individual experiences.

Overall, the survey results and benchmarking (Figures 10-13) show that current interventions are mostly reactive instead of preventive, focusing on short-term relief after symptoms have started. Tools remain condition-specific rather than supporting women with multiple overlapping illnesses. Their effectiveness is inconsistent, as shown both in the survey results (Figure 13) and in existing literature (Buse et al., 2020). Issues of accessibility and sustainability also remain, with wearables like the Oura Ring priced beyond the reach of many users (Stone, Thompson, & Finomore, 2023) and physical products like disposable heat packs contributing to waste (Brown & Farquhar, 2014). These patterns highlight that women are often left to build their own patchwork systems of support instead of being offered integrated solutions. This confirms the importance of creating a multi-morbidity-aware, predictive, and socially supportive design that directly addresses the uncertainty and stigma surrounding invisible chronic conditions. All leading to the design question of: how might we develop a modular design solution to address multimorbidity symptom management and anticipatory anxiety in women with chronic conditions such as endometriosis and chronic migraines?

CONCLUSION

Women with chronic health conditions face overlapping burdens spanning medically, psychologically, and socially. Survey results confirmed multi-morbidity, delays in diagnosis, severe disruption, and anticipatory anxiety. Benchmarking demonstrated disconnected, reactive tools.

Design offers opportunities to close these gaps by creating predictive, integrative, and socially supportive interventions. By centring lived experiences, design can restore autonomy, reduce uncertainty, and embed dignity in women's everyday lives.

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