A Work Project, presented as part of the requirements for the Award of a Master's degree in Impact Entrepreneurship and Innovation from the Nova School of Business and Economics

SERENEO'S ENTREPRENEURIAL JOURNEY IN BUILDING A GUIDED HEALTH PLATFORM FOR WOMEN DISCONTINUING HORMONAL BIRTH CONTROL

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(Sereneo's entrepreneurial journey in building a guided Health Platform for Women discontinuing hormonal Birth Control – Problem, Impact & Business Model Canvas)

Work project carried out under the **supervision** of:

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Abstract

In our collaborative work project, we, Zeynep Nisan Gündüz and Luiza-Madleen Alice Pechel, explored the initial steps towards solving an identified problem relevant to society by addressing it with impact entrepreneurship and a lean startup approach. Our project focuses on developing Sereneo, which can be seen as a holistic digital health platform designed to assist and guide women in managing their hormonal fluctuations after discontinuing hormonal contraceptives. Our work encompasses an examination of the concrete problem, its impact on women's lives, the ideation of a potential solution and its prototyping in form of the MVP. While Zeynep was responsible for the first part, focusing on researching and validating the problem, Luiza looked at the ideation process and was responsible for the prototype and its testing and adaptation. We extend our appreciation to the medical professionals, test persons, and IT experts who generously shared their time and expertise with us, providing invaluable feedback that has enriched our understanding of this complex field and guided our venture's development.

Keywords: Women's Health, Digital Health Platform, Impact Entrepreneurship, Health Care Innovation, Hormonal Imbalance,

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Part I: Group Part

1 Introduction

Research has consistently highlighted that hormonal imbalances can significantly disrupt the daily lives of women, manifesting in a spectrum of physical and emotional symptoms that can affect personal well-being, professional productivity, and social dynamics (Subhadra 2023). It is estimated that approximately 80% of women worldwide experience some form of hormonal imbalance in their lives (Baarck, D`Hombres, and Tintori 2021). Similar to how social distancing during the COVID-19 pandemic has been shown to contribute to heightened loneliness and isolation, thereby triggering a range of physical and psychological disorders, the struggle with hormonal imbalances can lead to a sense of solitude too and thereby lead to worse health outcomes (Altemus 2010). Having personally encountered hormonal imbalances and listened to the similar experiences of close friends, we concluded that there is currently a lack of support & guidance mechanisms for women, despite the significant importance of the topic. The discontinuation of the birth control pill, in particular, can exacerbate hormonal imbalances and trigger a spectrum of symptoms ranging from physical discomfort to deep emotional distress (PharmD 2023). Women who need to navigate that time alone, often face the challenge of helplessness and loneliness, feeling disconnected and at the mercy of their body's unpredicted nature, while seeking desperately more information (Borst, Borst, and SingleCare 2022). Since we have personally experienced this distressing time and acknowledging its profound impact on women's lives, we embarked on a mission to address this gap by developing Sereneo, a startup in the ideation stage, that empowers women with knowledge, resilience, and imperative support. Through a combination of design thinking and the lean startup framework, we aim to create an innovative platform that goes beyond mere information provision, offering personalized guidance and fostering a supportive community for women on their hormonal health journey after post-pill discontinuation.

2 Objective

Within the scope of this project, the team is focusing on building a product that meets user needs. Our main goal is to create a prototype and test it, but not to widely distribute it yet. As Sereneo was founded at the beginning of the Fall Semester 2023 and was not extensively developed during the master's program, it is in the very early stages of ideation. Therefore, the team is not aiming to build a full and stable business model at this stage yet; instead, our priority is to identify the market need, understand the users wants and needs, and explore the opportunity it presents, specifically in terms of designing a solution that improves the status quo in every possible way. The Social Business Model Canvas is used to have a first outlook on how our solution could be structured and scaled in the future and helps us sketch out key elements, such as our unique value proposition, possible revenue model, and more.

3 Methodology

The team used a blend of primary and secondary research methods to gain a thorough insight into the problem Sereneo is addressing as a business. The team also adopted a mix of design thinking and the lean startup framework to guide the decision-making process. The following sections will detail these aspects.

3.1 Primary and secondary research

The first goal was to thoroughly understand and validate the underlying problem, a task that was accomplished through a mix of secondary and primary research. In the quest to tailor the Sereneo solution to the unique needs of women navigating the complexities of hormonal imbalances post-pill discontinuation, an online survey was conducted and deployed in addition to 1:1 interviews with doctors. The insights derived were used to inform the development of our prototype and the prioritization of potential features tested in the prototype. Data collection and results are discussed in Chapter 3.

The Secondary Research has added a base layer to the problem discovery. We primarily relied on academic papers and online health websites to understand the broad scope of the problem. In addition, the book from Eric Ries and online articles for the design thinking framework and the social business model canvas played a crucial role in deepening our understanding of the latter.

3.2 Approach (Lean Start Up Framework & Design Thinking)

Design Thinking and the Lean Startup framework have changed the way companies develop innovations and successfully bring products to market. Design Thinking is a creative, user-centered approach that helps to understand user needs, generate ideas and design innovative solutions (Razzouk and Shute 2012). In contrast, Lean Startup emphasizes rapid experimentation, continuous learning, and adaptation (Ries 2011). By combining Design Thinking and Lean Startup, we aim to utilize the advantages of both approaches and create a comprehensive innovation process, grounded in user-centric principles.

Moreover, since our project is in the very early stages of ideation, adaptability and flexibility are crucial. Incorporating these two frameworks allows us to refine our understanding of the problem and quickly adapt our solution based on iterative feedback. The team placed particular emphasis on integrating the design thinking approach, since our solution aims to be shaped by the real experiences and needs of women it aims to help. Similar to the patient innovation theory, which emphasizes the crucial role of patients in understanding their needs and driving innovation in healthcare, our project depends on the valuable insights and opinions of women to create the most effective solution for their post-pill discontinuation journey. Taking into consideration the above, we adapted the following process:

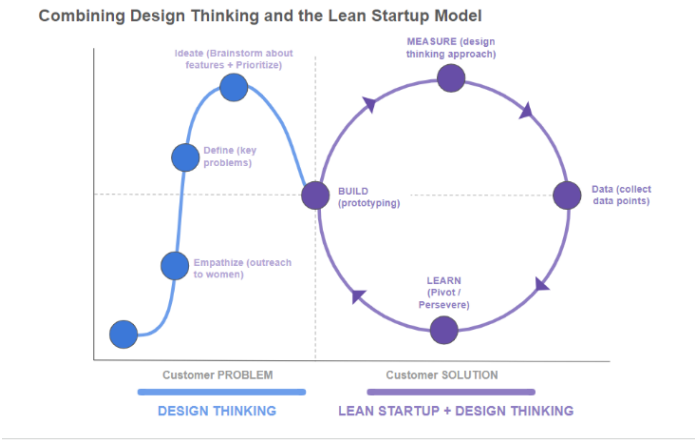

Figure 1: Combining Design Thinking and the Lean Startup Model

In the upcoming chapters, we will start by empathizing with affected women, listen to their stories, and derive a problem definition. Moving to the ideation phase, we will brainstorm key features tailored to the needs and desires of these women. Transitioning to the Lean Startup framework, we will prototype and maintain flexibility by incorporating Design Thinking for feedback measurement. After completing the first feedback loop, we collect the lessons learned and decide whether to pivot or persevere and start the cycle all over again.

4 Understanding the status quo

This section focuses on understanding the status quo of hormonal contraceptives, particularly the birth control pill, and delves into the phenomenon also known as 'Post-Pill' syndrome.

4.1 Hormones and hormonal contraceptives

In men, hormonal patterns tend to follow a more stable and consistent trajectory throughout their lives. On the other hand, women have a more complex hormonal system, with progesterone and estrogen constantly fluctuating depending on the phase of the menstrual cycle (Reed 2018). While a woman's cycle lasts 28 days on average, a man's cycle lasts 24 hours - the woman’s body is a complex interplay of hormonal dynamics (Hormonology 2021). This inherent complexity contributes to a unique set of challenges and experiences, influencing various aspects of their physical and emotional well-being (Jhajj and Duchesne 2022). The birth

control pill is used to regulate and stabilize hormonal fluctuations in a woman's body. By providing a constant dose of synthetic hormones, the pill overrides and suppresses the natural hormonal fluctuations (Cooper 2022). Essentially, the pill is used to control the hormonal cycle for various reasons such as contraception, regulating menstrual cycles, and the alleviation of other problems such as acne (Rosenberg and Waugh 1998). The pill is among the most used contraceptives in the US and Europe today. On average, 19.1% of women of reproductive age (15–49) use the pill in Europe and 18 million women in the US alone (Niemann et al. 2022). It is said that 80% of all women will use the pill at some time during their reproductive years (Westhoff et al. 2007). Meanwhile, the discontinuation rates have been on the rise with more than 40% of women discontinuing within the first year of use. This rise can be attributed to increasing awareness and experience of the pill's adverse side effects (Ali 2012). Videos on social media have circulated featuring women comparing the size of the side effect leaflet to sleeping blankets. Indeed, the number of possible side effects has surpassed the hundreds, with anxiety, depression, and weight gain being the most prevalent (Kingsberg et al. 2022). Although women find great relief in discontinuing the pill, the resulting hormonal imbalances after discontinuation can be overwhelming and reflect an uncertain period for many women (Westhoff et al. 2007).

4.2 The post-pill syndrome

The term “Post-Pill” syndrome was introduced by Dr. Aviva Romm in her book Botanical Medicine for Women’s Health in 2008. Although it is not a medically recognized term or a condition as a whole, many women around the world have reported similar experiences after discontinuation with only a handful of studies researching individual symptoms, mostly infertility as a post-pill effect. Brighten says that “for as long as the pill has been around, it’s actually surprising we don’t have more long-term studies about its effect [...] after discontinuing” (Sharkey 2020).

When coming off the pill, the woman's body experiences an imperative hormonal shift - while the synthetic hormones are getting flushed out, the body starts relying on its natural hormone production once again (Mayo Clinic Staff 2019). This phase of "withdrawal" from the synthetic hormones can cause hormonal imbalances, leading to a range of adverse symptoms such as acne or hair loss (See Appendix 2 for more symptoms), as it tries to readjust to its natural hormonal balance - a process that may vary in success among women. In fact, depending on how you support your body throughout this readjustment phase plays a crucial role in the duration of it (Preston 2022). Studies have shown that changes in lifestyle and dietary factors might have a great influence on hormonal regulation in women and on minimizing certain symptoms related to hormonal imbalances (Zehravi, Maqbool, and Ara 2022). Regular physical activity, blood sugar control, and effective stress management have been amongst the most important pillars in managing hormonal imbalances apart from medication (Shahid et al. 2022). For example, engaging in specific types of exercise (e.g., low-impact exercise) enhances insulin sensitivity, reduces inflammation, and triggers the release of feel-good endorphins. A high anti-inflammatory diet contributes to hormonal balance by curbing inflammation and stabilizing blood sugar levels. Meanwhile, stress management techniques, like mindfulness and relaxation practices, prevent the overproduction of stress hormones such as cortisol, fostering overall hormonal regulation. These lifestyle factors, when combined, form a holistic approach to supporting the regulation of women's hormonal health (Preston 2022).

Part II: Individual Part (Zeynep Nisan Gündüz)

5 Our entrepreneurial journey in building Sereneo

We know exactly what it is like, to be in the shoes of those affected women, because we have been there and felt the sense of helplessness and loneliness ourselves. As learned and read in various entrepreneurial literature, podcasts, and articles, the best ideas come in response to a great problem that the founder experienced himself. Indeed, the urgency within oneself to solve

the need is greater than if it were an unmet problem of a close by. Often, the most innovative outcomes are driven by individuals who have experienced a crisis first-hand and are eager to find a solution. For years and years, I took the highest dosage birth control pill to cure the acne I developed when I was 15 years old. Little did I know that the pill was just masking my acne, burying the root cause, and leading to a revengeful comeback of my acne once I discontinued the pill. The overwhelming flood of information online exacerbated my sensations of loneliness and suffocation during that period, especially as doctors seemed detached and relied on re-prescribing the pill as a quick solution. Out of long-lasting despair, I started taking the pill again and have continued to do so, constantly fearing my acne might appear again if I were to discontinue. Unfortunately, I have come to realize that this journey is not unique to me alone.

5.1 Understanding the impact of hormonal imbalances after discontinuation

To foster a more comprehensive and empathic exploration of the problem, we opted for a two-folded approach, seeking insights from both medical professionals and the target audience, thus combining both clinical expertise with the experiences of those directly affected. We found qualitative outreach to be the most effective for this.

5.1.1 Data collection & qualitative outreach

The semi-structured survey was active from October 15th until November 30th, providing a substantial window for data collection. A total of 63 women who have had or are currently struggling with their post-pill journey, completed the survey. In addition, the survey comprised 22 questions, striking a balance between multiple-choice and open-ended questions to capture both quantitative data and richer, qualitative insights. That way, we wanted to give women the chance to express themselves freely and anonymously. Throughout the survey, we aimed to gain deep insights into the nuances of their challenges, symptom severity, coping mechanisms, and wishes for a better solution. In this way, we were able to uncover hidden aspects of the problem, providing a solid foundation for subsequent analysis and prototype development.

Google Forms served as the survey's operational backbone, with distribution channels including social media, personal networks, academic circles, community channels, and forums dedicated to women's health. Standard criteria for data integrity included the removal of incomplete data sets where respondents did not engage beyond preliminary questions. Our focus was on women who have experienced or are currently grappling with hormonal imbalance symptoms for a minimum of four weeks following post-pill discontinuation. The following table gives an overview of the participants' characteristics.

	Participants (N = 63)	Absolute	in percentage
	Average Age	27	
Type of hormonal contraception	Pill	60	95.20%
	Patch	3	48%
	Hormonal IUD	7	11%
	Vaginal Ring	9	14%
	Other	0	0%
	Average duration of intake	5.4 years	

Figure 2: Sereno - survey characteristics

5.1.1.1 Outreach to women with hormonal imbalances

Our journey began by connecting with the women closest to us - friends and friends of friends. In an impromptu move, we shared our story on Instagram, and within just one day, a remarkable 16 women reached out to us with similar stories, all willing to support our project. As we listened to each of their stories, we realized that the shared problem we all faced was even more significant than we initially imagined. Therefore, we decided to increase our outreach efforts. Both secondary research findings and our firsthand experience confirmed the existence of the problem already before, however, our goal was to transcend the surface-level understanding and dig deeper. The team was committed to gathering as much information as possible to unravel a common problem pattern among women who discontinued the pill, thereby deriving a clear journey for this specific target group. That way, we aimed to mitigate the influence of

our assumptions on the quality of the initial prototype and overarching solution, thus identifying key areas to tackle.

5.1.1.2 Outreach to medical professionals

For the dual perspective, we conducted one-on-one interviews with a diverse group of medical professionals through our extensive health tech network. The interviewees comprised three gynaecologists, one dermatologist, and one general practitioner, - overall 5 medical professionals (See Appendix 3).

Gynaecologists are the doctors most approached for reproductive health, hormonal imbalances, and overall female health topics. Since acne is one of the most common hormonal imbalance symptoms, talking to a dermatologist seemed to be an effective strategy to understand the patient's journey from that angle. Meanwhile, a general practitioner offers a broad perspective on health issues, looking at the problem from a wider angle, whereas alternative practitioners often approach health concerns from holistic perspectives, considering lifestyle, nutrition, and stress management. By tapping into specialized expertise, we aim to access their knowledge, enriching our understanding of the medical side of the problem and providing a well-rounded view of potential solutions and features. This strategy is aligned with our objective of developing a solution that not only adheres to specific expert standards but also caters to the diverse needs of struggling women.

5.1.2 Qualitative outreach analysis

Our qualitative outreach reflects the first steps of the design thinking approach that places a strong emphasis on empathizing and defining the problem. During this stage, we delved deep into the lived experiences of 63 women who shared their stories regarding hormonal imbalances post-pill discontinuation (See Appendix 4 for all survey questions and answers).

5.1.2.1 Common symptoms

Our approach went beyond mere data collection; it was an empathetic exploration into the details of their everyday lives during that specific period. By carefully looking at what they shared, we started to see patterns that showed the ups and downs - both physically and emotionally — that hormonal imbalances can unleash. According to the results, more than half of the participants reported having problems with acne after discontinuing the pill. Out of 63 women, 41 were struggling with the problem, closely followed by 42.9% reporting irregular periods and 34.9% having strong period cramps and heavy periods (See Figure 3).

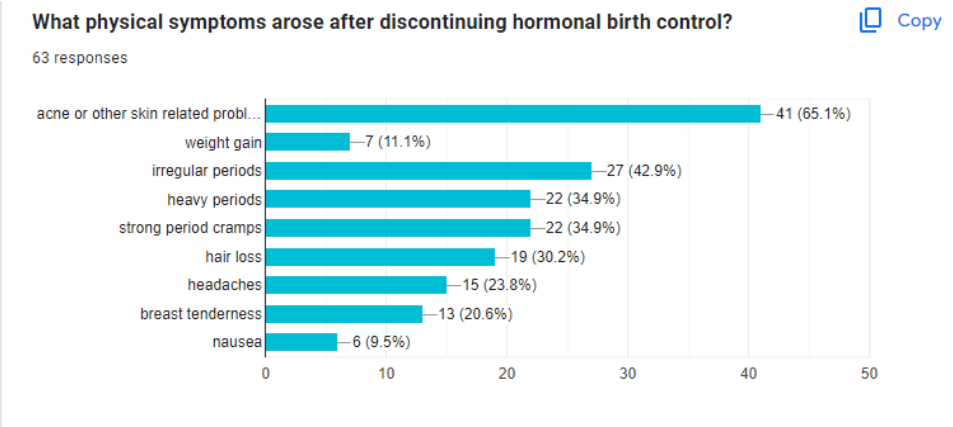

Figure 3: Survey results for physical symptoms

One respondent reported: "*Every time I woke up, my face would have another pimple and my heart would sink one centimetre lowe*r". Another anonymous respondent struggling with hair loss reported "*all of the hair kept on coming out and out and I did not know how to stop it - it was one of the worst times of my life*". This vivid description not only outlines the physical struggle but also hints at the emotional weight carried by women facing such challenges. Regarding the mental symptoms: mood swings, anxiety, and irritability were leading the way: "*I did not feel like myself anymore - it felt like I lost control over my body from one day to another, experiencing these symptoms that I never had experienced before*" said Anna, 24 years old.

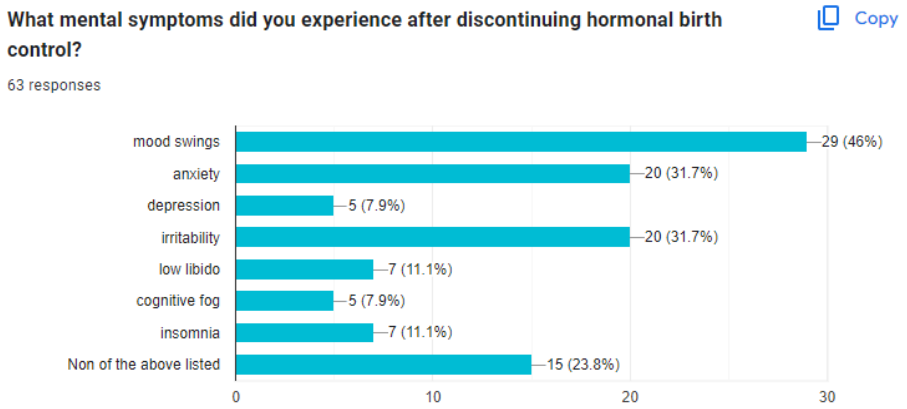

Figure 4: *Survey* results *for mental symptoms*

5.1.2.2 Common emotions / feelings

Transitioning our attention to the psychological realm becomes essential not only because of the emergence of these symptoms but also due to their enduring nature. It is crucial to dive deeper into the mental landscape experienced by the participants during this period, given that these symptoms persist over an extended duration, ranging from a few months to several years and ongoing.

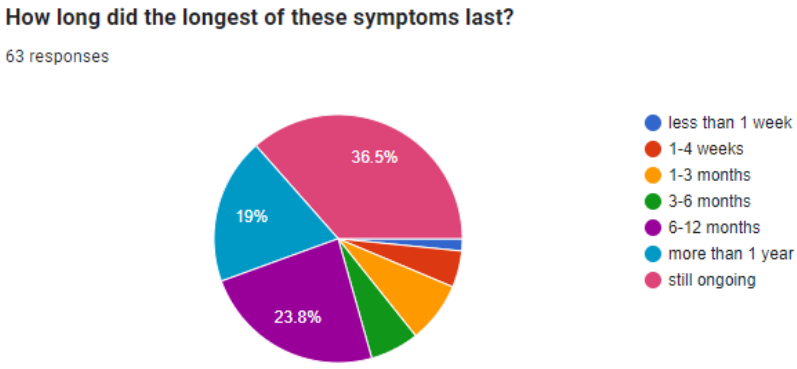

Figure 5: *Survey result for the duration of the symptoms*

After carefully examining the responses to the open-ended questions, it's clear that the biggest emotional burden comes from feeling lonely and helpless with these symptoms. The fact that none of these women knew how long these symptoms were going to last, what exactly was happening with their bodies, and which symptoms might appear next caused an array of worries

that left women navigating throughout that time with uncertainty and fear. The latter was validated during the interview with Dr med Malina Helms (Interview C) who stated “Many women do not understand exactly what is going on in their bodies and therefore feel helpless. There is also the question of how long such symptoms last”. This statement was backed up by the following testimonies from the survey: “*Everything was so unpredictable. Not knowing why things are happening was the most frustrating part and guessing the reasons did not help at all*”; “*The uncertainty is just horrible*”, “*The time I have waited feels like an eternity*”.

Furthermore, a common pattern that we identified and that caused a lot of frustration among women was, on one hand, the overload of information online: “*It is hard to filter the knowledge out from the internet*”, “*all the information online was just overwhelming*” and on the other hand the lack of support from the doctor’s side which was described as “*useless*”, “*nonsense*”, “*not helpful*”, “*irritating*”, “*confusing*”, “*worsening*” and more. Doctors oftentimes have a very rational and pragmatic view on this topic, failing to meet women at eye level. According to the respondents, most doctors had similar recommendations: "*Take the pill again, then you won't have the symptoms anymore*"; “*Wait and it will get better*"; “*Just be patient*”; “*That is normal, that is just how it is*”, “*take the pill again and come back once you want to get pregnant*”.

5.1.2.3 Derived common journey

In light of the survey answers, women embark on a journey marked by distinct phases, each filled with unique challenges and emotional nuances, yet revealing a very common pattern throughout. This process was crucial to pinpoint pivotal problem areas and key points we aim to address with our work project (See Figure 6).

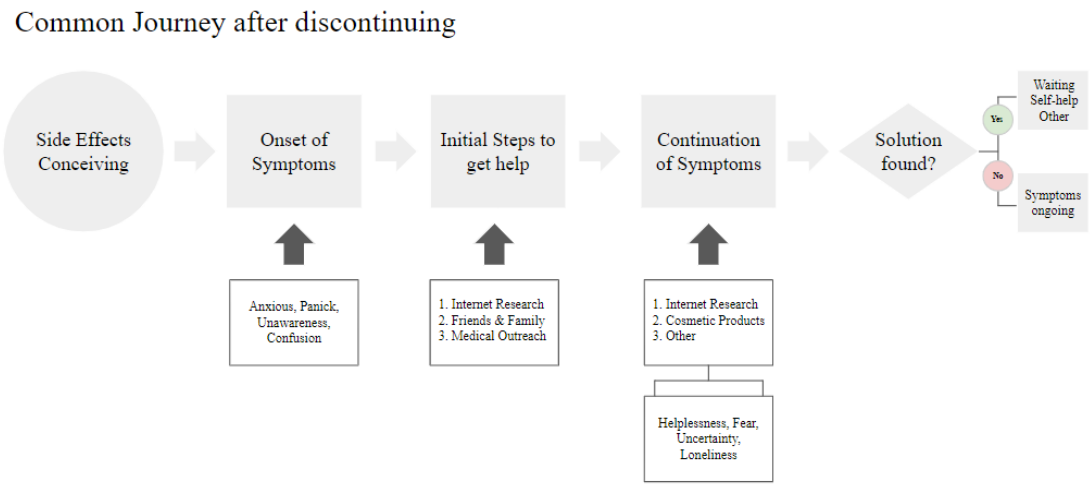

Figure 6: *Derived common journey after discontinuation*

The journey often commences with women experiencing either the side effects of the birth control pill or the desire to conceive. As a consequential step, women decide to discontinue the birth control pill. This subsequent decision is most of the time a consequential step that marks the onset of hormonal imbalance symptoms. As these symptoms manifest, women grapple with a range of emotions, including anxiousness, panic, unawareness, and confusion. Recognizing the need for assistance, they initiate steps to seek help, engaging in activities such as internet research, conversations with family and friends and medical help (See Figure 7). Medical professionals most reached out to were Gynaecologists, Dermatologists, and GPs. Furthermore, it was interesting to see that approx. 21% of women sought alternative & naturopathic treatments, showing a willingness to opt for these solutions instead of harsh medications with severe side effects.

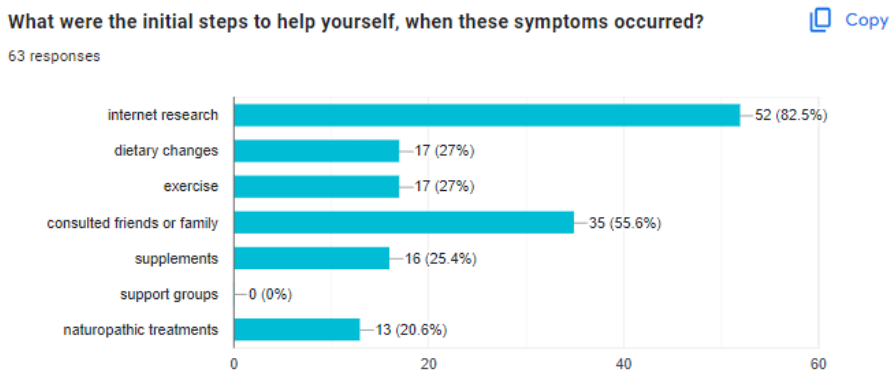

Figure 7: S*urvey results for self-help initiatives*

As mentioned before, the survey reveals that, for many women, these symptoms persist over an extended period. Throughout this prolonged phase, emotions shift to helplessness, uncertainty, fear, and loneliness. In response, they invest more and more time and resources into self-help channels such as cosmetic products & supplements. Notably, internet research consistently emerges as the primary and most sought-after source for seeking help.

The end of the journey varies for each woman. Some find a resolution, often entailing patience and acceptance, while others continue to grapple with ongoing symptoms and loop within their self-help initiatives. The survey indicates a balanced outcome, with 50% reporting finding a solution and the remaining 50% still struggling.

One solution that was mentioned often, mostly concerning women who were affected by acne, was the prescription of isotretinoin. It is an oral prescription medicine known for imposing significant lifestyle restrictions and carrying serious side effects such as blood clotting, frequent infections, liver problems, and more (NHS 2022).

Moreover, the common and identified wait-and-see approach is not a sustainable and optimal solution and we believe that there is room for improvement, suggesting the potential for better strategies that can help women in mitigating and minimizing both the intensity and duration of their symptoms.

5.1.2.4 Doctor’s learnings

"Every day during my consultation hours, there were young women who have stopped taking the pill for various reasons, who felt helplessly at the mercy of their body's changes” says Joana Pinto, Dermatologist. When interviewing medical experts, we found that there was one common point that surfaced: despite many women entering the practice with similar problems, all interviewees agreed that there is no one-size-fits-all solution. Dermatologist Joana Pinto highlighted the challenge, that doctors rarely can give a precise answer since other factors such as stress or diet also play a major role in the severity of symptoms. They can only share information up to a specific point because most of them only have a short amount of time to see a patient but also the lack of up-to-date knowledge when it comes to hormonal imbalances (Interview E, 2023).

Dr. med Marina Helms (Interview C) also observed a trend toward *“quick fixes with prescribed medications”,* supporting the latter argument. Hormonal imbalances are seen as something “*common, but not deadly*”. Therefore, if doctors suspect a hormonal imbalance, they do not extend their efforts because they know the body will eventually adjust somehow and that the symptoms will improve with time (Interview C, 2023). These findings validate the pain points identified in our survey.

5.2 Problem definition (Define)

When looking at the complex experiences of women after stopping the pill, a profound problem becomes apparent - a challenge that goes beyond their symptoms and emotional turmoil. At its core, the problem is that there are no comprehensive support mechanisms in place for women struggling with the aftermath of stopping the pill. Following the survey analysis, we identified four key problem areas, explained in the following.

5.2.1 Information overload and lack of empathetic support

Women navigating this difficult terrain face a dual challenge: an overwhelming flood of information online and a perceived lack of empathetic support from healthcare professionals. The flood of information becomes not only a source of knowledge but also a maze of confusion, adding to the struggle. In fact, affected women are spending hours on research and googling their symptoms, trying to find an answer. In moments like these, it is hard to decide where to begin with, which information to trust, and which one to classify as relevant. Most of the times, women end up with more questions than solutions after googling their problems and the only thing they are seeking is for someone to tell them what to do. Affected women feel desperate in this situation and at the mercy of their own bodies, increasing their willingness to pay out of pocket for any kind of solution, including cosmetic products, private doctors, supplements and more. In addition, medical professionals often take a rational and pragmatic stance, which adds to the emotional burden: "*I would just have liked for doctors to have more empathy*" stated Rachel, after struggling for months and getting disappointed by her doctor's answers.

5.2.2 Knowledge gaps in medical professionals

Based on our own experience, the interviews with doctors, and survey answers, medical professionals often have a conformist view when addressing hormonal imbalances. Due to the short time doctors can spend with each patient, which is about 7.6 minutes on average in Germany (Magill 2023), they don't have enough time to thoroughly investigate the underlying reasons for these hormonal imbalances, let alone propose good solutions. Doctors often lean on standard prescriptions and practices (e.g., Isotretinoin, the pill), in a tendency to recommend waiting until hormonal imbalance symptoms improve. This viewpoint was validated when talking to Dr. med Gülistan Saribas (Interview B) who stated that "Most of the times I prescribe the pill and tell them to come back once they want to get pregnant and until then to just keep on taking the pill" or when Ana Rita Jesus Maria (Interview D) said that "Doctors might be

biased with their routine clinical practice in Western Medicine". Importantly, there is a missing piece in medical knowledge, mostly formed by studies and observations on men, creating a big data gap in our understanding and treatment of women's health concerns (Shai, Koffler, and Hashiloni-Dolev 2021).

5.2.3 Emotional turmoil and enduring mental strain

What mostly begins as a physical challenge (acne, hair loss, strong periods) extends into a much-prolonged mental strain, with many women expressing a profound loss of control over their bodies. This enduring mental burden creates a never-ending cycle of helplessness and uncertainty, a journey that is both isolating and distressing.

Nonetheless, apart from all the negative, the discontinuation of the pill helped a lot of women get rid of negative side effects that were present during the intake of the contraceptive. Some women reported that the "cloud over the head", or the more official term "brain fog", disappeared. Moreover, women reported that they "cried less" or were "less emotional". Overall, they felt as if a weight had been lifted off, emotionally and physically.

5.2.4 The urgency for better solutions

The widespread suggestions to "take the pill again" or adopt a wait-and-see mentality fall short of offering sustainable, personalized solutions. A longer duration of symptoms not only worsens the emotional burden but can also have long-term health consequences. It is imperative to accelerate the development of solutions that go beyond conventional approaches and provide women with a proactive and personalized set of tools to manage their symptoms.

6 Ideation phase

The idea of Sereno emerged from this realization. Thanks to the design thinking approach, the team managed to understand and define the customer problem thoroughly.

To build our initial prototype and start testing according to the lean start-up framework, our primary step involves narrowing down potential features to the most important ones. Our 3-step approach to do so is explained in the following.

6.1 Benchmarking best practices in the femtech world

Our initial step focuses on Benchmarking to understand the femtech landscape. Currently, there is a surge in femtech startups, including prominent names such as *Clue* or *Flo* which the team has been using in their personal lives too. By extracting the features offered by each of these platforms, we gained valuable insights and ultimately compiled a comprehensive list of potential features (See Appendix 5). In total, we benchmarked with nine startups, all at different funding stages and with different offerings. Out of nine startups, three were menstrual cycle tracking apps (Clue, Flo Health, Kindara), one was specifically dedicated to helping women with Polycystic Ovary Syndrome (PCOS) (Pollie), two for menopause (Upliv Health, Gennev), two to get your blood results digitized (Aware Lab, Rupa Health) and one for overall women's health (Femna Health). The most mentioned features among these applications were 1:1 talks with health coaches, symptom tracking, and an educational library.

6.2 Identifying needs and desires of potential customers

Crucial to our decision on which features to focus on for the prototype was the thorough identification of the exact needs and wants of potential female customers. We asked ourselves fundamental questions to guide this process, such as "What is currently missing in these women's lives?" "What exactly is it, that they WANT" and "What is it, that they NEED"? In total, we asked 63 women the following question to which the answers served as a cornerstone in determining the features that would be prioritized in our initial prototype: "In an ideal world, what kind of support or guidance would have made the discontinuation process easier for you? For what would you have wished?". Since it was an optional question, we obtained 28 total answers.

Based on the multitude of responses, we derived the most mentioned needs and wants and categorized them into the following three buckets.

6.2.1 The need for comprehensive information and education

The survey respondents expressed a paramount need and desire for comprehensive knowledge and insights during the discontinuation process. The existence of information is not the problem per-se, however extracting the most important and trustable information, rightfully matching it to one's journey and having easy access to this information might be a long shot in the dark if done by one individual that is in a state of emotional turmoil. More precisely, women are wishing for more filtered information and knowledge regarding their bodies during that stage, what is happening to them, and which symptoms might appear: "*Clear information on what might happen to the body, how to get prepared for it and how to accelerate that adjustment phase after stopping the pill*", "*More enlightenment about the symptoms that might appear*", "*more understanding about everything*", " *overall better understanding of what is happening to my body*".

6.2.2 The desire for guidance and support

Beyond being informed and educated, respondents emphasized a fundamental desire for ongoing guidance and support throughout their post-pill discontinuation journey. While having access to accurate information is essential, the complexity of navigating hormonal imbalance symptoms demands personalized assistance from the beginning. Women expressed a big desire to be held by their hand during that journey: "*I wish for a start-to-finish guidance*", "*I would have wished for a better guidance during that period*", "*Someone who supports you throughout the time that you have these symptoms*".

6.2.3 The desire for emotional and social Support

In addition to seeking information / knowledge and guidance, respondents emphasized the critical importance of emotional and social support in the post-pill discontinuation phase, most

probably stemming from the lack of empathetic support from the medical side. This dimension recognizes the emotional strain and social implications of hormonal imbalance symptoms and highlights the need for a community-oriented solution. The latter becomes crucial in creating a supportive environment where women can find understanding, emotional reinforcement, and companionship during this transformative period. Indeed, the influx of information and the medical side falling short in support exacerbate the feeling of loneliness, increasing the desire to talk to someone who truly understands what you are going through: "*I would have liked to hear experiences of others, as I did not have a friend who had the same experience*", "*I would have wished for an exchange with other women with similar problems*", "*Even reading that other women face the same problem would have helped to decrease my stress*".

Part IV: Group Part

8 Social business model canvas

In the evolving landscape of healthcare and technology, the imperative to deliver not just commercially viable but also socially beneficial solutions has never been more pronounced. Our venture is meticulously designed to navigate this balance, poised at the intersection of impact entrepreneurship and innovation. While our ultimate objective includes the realization of profitability and scalability, our immediate focus is anchored in the principles of the Social Business Model. This approach allows us to prioritize the societal value and user-centricity that is paramount in the healthcare domain while advancing a product in a manner that prioritizes the well-being and satisfaction of our users. As we navigate the early phases of our venture, the components of our business model are assumptions based on our current understanding and are subject to refinement as we progress. We will dissect the Social Business Model Canvas, with particular attention to the segments of Key Activities, Key Partners and Stakeholders, Value Proposition, and Revenue, since these areas are crucial to our growth and pivotal in mapping out our journey from a socially oriented startup to a profit-generating entity (See Appendix 11

for the filled out Social Business Model Canvas)

8.1 Segment customers

Our main customer segment includes young to middle aged women facing hormonal imbalances post-birth control. These customers, who are also our beneficiaries, typically seek solutions for physical and emotional symptoms associated with hormonal imbalances. They are health-conscious individuals, actively looking for reliable, evidence-based information and support to manage their symptoms during this transitional phase.

8.2 Type of intervention

Sereneo is a user-friendly app designed for seamless health management anytime and anywhere. It features interactive tools and provides immediate access to a supportive community. Looking ahead, we plan to add a website for more health education and detailed service information, leveraging the app's core functionality for a complete digital health experience.

8.3 Channels

Sereneo reaches its target customers through digital marketing on social media and online health forums, popular among women seeking health information (Pew Research Center).

Partnerships with healthcare providers and women's health blogs serve as referral channels, while using their credibility to connect with our audience. These channels effectively engage health-conscious women who are increasingly using online resources for health management (Dluhos-Sebesto et al. 2021).

8.4 Key resources

Sereneo’s key resources include a strong tech infrastructure to support the platform, like servers and data security, alongside our team's expertise in healthcare innovation and UI/UX design. Partnerships with medical professionals for content validation and initial funding for prototype development are essential for ensuring platform credibility and improving our dataset for

algorithm improvement.

8.5 Cost structure

In Sereneo's cost structure, significant expenses include the development and maintenance of the app, encompassing software engineering, design, and server costs. Content creation and verification, involving collaboration with medical experts, represent another major cost area. Additionally, marketing and user acquisition efforts, alongside costs for networking with peer organizations and fundraising activities, are essential for expanding our reach and securing necessary funding. These costs collectively encompass the operational and growth-centric expenses critical to Sereneo's mission fulfilment.

8.6 Surplus

In the improbable event that Sereneo generates surplus profits within the first years, our primary strategy will be to reinvest these funds back into the business to amplify our social impact. This reinvestment would focus on enhancing the app's features, expanding our content library, and broadening our outreach and user support services.

8.7 Social value proposition (Deep Dive)

To define Sereneo’s social value proposition, we conducted a short analysis of existing solutions to better understand why the demands of these women are not being met effectively to this day.

8.7.1 Competitors

We chose to have a look at companies that follow a similar mission to Sereneo. The main advantages of this were not only to identify the gap in the femtech ecosystem but also to reveal potential ways to collaborate with some of these competitors. Therefore, Sereneo does not see the following companies solely as competition, but as a large entity of similar mission-driven companies that can leverage strengths from each other and enhance the impact of our work. In total, we have looked at 5 competitors (See Appendix 12).

Flo and *Glow* have been successful in tracking fertility and menstrual cycles. They help you understand your body's changes during each cycle phase and identify fertility windows. Hence, they are suitable for pregnancy planning and gaining insight into your body's natural responses during the cycle, including physical and mental symptoms. However, neither of them provides symptom management or guidance for women with significant hormonal imbalances. A promising partnership for Sereneo lies here. This partnership could involve integrating Sereneo's specialized knowledge regarding post-pill hormonal imbalances into their platform or even co-creating content and leverage our combined user data insights, working together on filling in women's health data gap.

In contrast, *Gennev* and *Pollie* have a strong focus on these issues, with Pollie addressing PCOS and Gennev specializing in Menopause. While they align more closely with Sereneo's mission, they are failing to cater to our unique niche of women affected by post-pill hormonal imbalances. Lastly, there's *Femna Health*, a platform that provides personalized guidance and support for a wide range of hormonal topics. They also offer one-on-one talks with health coaches, along with personalized recommendations based on at-home hormonal tests. However, this process is not digital; therefore, it is more comparable to a doctor's visit than a digitized solution.

There is, indeed, a huge market for femtech applications, with a total fundraising value of €105 Mn (Crunchbase 2023). Moreover, as already assumed before, women are strongly willing to pay out of pocket for these solutions, shown by the success of these applications, the monthly number of increasing active users and subscribers with subscription prices ranging from €10 to €80 / month. In conclusion, these are big competitors in the ecosystem Sereneo operates in, which can be seen as a validation of the concept. However, after careful analysis of the overall landscape, we realized that most of the femtech applications are still very much focused on fertility topics and cycle tracking. Even today, there remains a significant gap in addressing

hormonal imbalances, with attention primarily directed towards recognized medical conditions like PCOS or menopause. However, these require different approaches and solutions compared to women experiencing hormonal imbalances after coming off the pill, due to the distinct nature of hormonal shifts and body responses involved in each scenario (Lodge 2020).

The severity and urgency of the latter is underestimated and overlooked. This is precisely why Sereneo's mission is dedicated to bridging this critical gap.

8.7.2 Resulting social value proposition

Unlike existing femtech solutions, Sereneo uniquely caters to women grappling with the distinct and challenging hormonal shifts that occur post-pill. While others are serving different target audiences with different hormonal health journeys, our commitment is to this particular niche. Sereneo’s tech enabled solution empowers women in their post-pill hormonal health journey by helping them understand and manage their personal health with confidence, clarity and companionship. For this, we put great effort into giving access to the most essential health literacy through our educational library and foster a sense of belonging through our community forum. Our symptom tracking helps women to actively engage with their health, fostering self-awareness and informed decision-making in their post-pill journey.

At Sereneo, we believe in the power of understanding your own body and taking back control over it through a well-rounded approach that covers both your mental and physical well-being. The goal? To give you access to the most relevant resources, all personalized to fit your unique hormonal health journey.

To showcase Sereneo's social impact, we will focus on two main pillars: health outcome tracking, and surveys/questionnaires. By monitoring health outcomes through our app data, we can observe changes in symptoms over time, which highlights the concrete benefits for our users. In addition, through regular surveys and questionnaires, we will be able to collect direct feedback on our users' understanding of their health, their satisfaction with Sereneo, and the

overall improvement in their well-being.

8.8 Partners and key stakeholders (Deep Dive)

We identified a range of potential stakeholders, each of whom could play a pivotal role in advancing the platform's mission, while contributing to the overall open innovation process behind it.

Central to our stakeholder matrix are the users since they are the bedrock of our social enterprise. As these women, who are in their mid to late twenties and who have recently discontinued their hormonal contraception are the once interacting with our platform, we aim to constantly gain feedback, which is pivotal for our iterative development. By fostering a participatory development environment where user insights are effectively collected and visualized, we strive to establish a process similar to what is known as patient innovation, where the users are seen as the main drivers in terms of frequent redefining, redesigning and adapting the solution.

In the realm of medical expertise, we will engage with a spectrum of medical professionals specializing in women's health to ensure our platform's advice is grounded in comprehensive care. Gynecologists, dermatologists, endocrinologists, and other experts specialized on appearances of hormonal imbalances are crucial in curating the content of our heath library and future development of data-based recommendations to cover a wide range of health concerns related to hormonal imbalances.

To expedite the development of Sereneo’s comprehensive health library, forging partnerships with established health information providers is essential. By leveraging existing, vetted content, we can ensure our platform is populated with accurate and reliable health information swiftly and efficiently. Utilizing pre-existing resources allows us to maintain a lean operation, conserving resources while ensuring the information we offer is of the highest quality and up to date. Moreover, we are keen on exploring potential collaborations with health tech start-ups

that are innovating in dermatology, period and fertility tracking, and telehealth services, as we believe that the current patient journey can be improved through combining already existing niche solutions focusing on curing specific symptoms. Such partnerships could offer integrative features or paid or collaborative posts from companies within our educational health library and expand our service offerings, enhancing the overall value proposition for our users.

Enhancing our stakeholder ensemble, we recognize the importance of integrating research institutes into our collaborative framework. Organizations dedicated to gender equality and healthcare improvement, such as the European Institute for Gender Equality and IQVIA, since they strive for the same goal and could provide beneficial connections to IT experts and data scientist, helping with the development of our algorithm. Furthermore, their expansive research capabilities, authoritative insights, and policy influence can help shape our content to be both empowering and socially transformative.

8.9 Key activities (Deep Dive)

For Sereneo to achieve its social mission effectively, our key activities revolve around a focused set of tasks that drive both social impact and operational success. The core activity involves developing and maintaining the Sereneo app, which involves designing user-friendly interfaces, integrating functionalities as well as ensuring the platform’s reliability and security together with users and needed experts. Curating and regularly updating our comprehensive health library involves collaborating with medical professionals not only to verify the accuracy and relevance of the content, but also ensuring it aligns with the latest scientific research. Additionally building and nurturing the online community through moderating forums, facilitating user interactions, and creating an overall supportive environment is essential for our mission. Continuous data collection and analysis from user interactions and feedback are vital, since the data informs ongoing improvements to the platform and contributes to broader research on women's health. Establishing and maintaining partnerships with healthcare

providers, research institutions is crucial for resource sharing, gaining credibility, and expanding our knowledge base. Whereas effectively reaching our target audience through digital marketing, social media campaigns, and collaboration with influencers in the women's health space is key to raising awareness and driving user acquisition. Securing ongoing funding, whether through early-stage healthcare or impact venture capitalists, crowdfunding, grants, donations, or other channels accessible at different stages of the development, is essential for sustaining and scaling our operations, while an effective resource management ensures that we maximize the impact of every dollar spent. Further, ensuring compliance with healthcare regulations, data privacy laws, and ethical guidelines is the necessary fundament to deploy our platform and maintain user trust and operational legitimacy. Designing an assessment strategy to estimate the impact of our services on users' health outcomes and well-being is crucial for measuring our success against our social mission.

We aim to focus on these activities, since they form the backbone of Sereneo's operations, each contributing to our overarching goal of improving the health and well-being of women experiencing hormonal imbalances after discontinuing hormonal birth control. Regularly assessing these activities means ensuring that every aspect of our operation is aligned with our social mission and drives the intended impact.

8.10 Revenue (Deep Dive)

It is important to keep our social mission in mind while identifying possible revenue streams since we want to be financially sustainable but still stay true to our mission. We aim to support, not exploit, women's needs. The primary source of our revenue will be a subscription model, complemented by other streams. These include grants or funding from the Federal Ministry of Health in Germany or foundations such as the "Robert Bosch Stiftung". In addition, we will also feature sponsored content from health and wellness brands that align with our values, including articles and webinars. Additionally, we are open to donations or crowdfunding,

especially for new projects or expansions, leveraging our strong community support of women sharing similar experiences.

The subscription model will be divided into two phases: the initial phase (0-6 months) and the continued care phase (post 6 months). The latter addresses the challenge of potential customer turnover after completing the first 6 months of post-pill phase by offering value that extends beyond that.

8.10.1 Initial phase

For the initial phase, Sereneo will offer a two-week free trial period, allowing women to explore the total solution with all its possible features, user interface, and more. Following this, we will transition to a monthly value-based subscription model designed around two-tiered pricing. The latter is divided into the basic tier and premium tier. The basic tier (low-cost) encompasses the most fundamental features such as symptom tracking, community access, and the knowledge hub. Hereby we take great care to align with our social mission, ensuring that even the basic tier provides substantial value and ensuring accessibility for all women. For the premium tier (higher cost), we will expand our offering and include more advanced features - for those who wish and require more in-depth support. In a future state advanced features might include symptom forecasting, access to an extended collection of habit recommendation, recipes, and food lists tailored to one's hormonal journey and cycle, access to expert designed learning-modules and more.

8.10.2 Continuation phase

The second phase will only be unlocked once the initial phase is completed. For women who have transitioned past the initial phase but wish to continue using Sereneo for ongoing hormonal health maintenance, we use the same subscription model with the same prices and offered value as above ensuring a smooth transition, without imposing any barriers or unnecessary complicated transitions. This means that users can decide if they want to keep using the basic

or premium tier for this phase. It was important to keep our flexibility, allowing users to upgrade, downgrade, or cancel their subscriptions easily, based on their changing needs.

Part IV: Group Part

9 Outlook – The future of Sereneo

As we stand at the crossroads of Sereneo's development, we envision an exciting and impactful future for our platform. We started addressing this pressing problem embarked with a high degree of passion, dedication, and a commitment. Not only, because we have already walked in the same shoes as our main target group, but also because the landscape of tech solutions trying to improve women’s lives is vitally striving and we embrace the idea of potentially contributing something impactful within this area. However, we recognize that our vision for Sereneo reaches its full potential only when certain key elements fall into place. Foremost among these is the development of a robust algorithm that can truly guide users throughout their hormonal health journey. This algorithm, driven by data science and medical expertise, will be the backbone of our platform, providing users with personalized recommendations, insights, and support. It will be the engine that powers Sereneo's ability to adapt to the unique needs of each user, making it a trusted companion on their path to hormonal balance. Beyond our initial focus on post-pill hormonal health, we aspire to expand our horizons and empower women with comprehensive knowledge about their menstrual cycles and hormonal fluctuations. This expansion aligns with the rapid growth of knowledge in this field, presenting an opportunity to transition users from a vulnerable state into a proactive, empowered stance regarding their hormonal health. Our goal is to be the go-to resource for women seeking information, guidance, and support in navigating the intricacies of their bodies and understanding the factors influencing their hormone levels.

In this ideal future, Sereneo is more than just an app, it is a community, a trusted advisor, and a source of empowerment for women worldwide. Users not only benefit from personalized

guidance but also engage with a vibrant ecosystem of like-minded individuals. They access evidence-based information, engage in meaningful discussions, and participate in the latest research, all within the Sereneo platform. As we evolve, we envision forging partnerships with medical institutions, research organizations, and healthcare professionals to contribute to the advancement of women's health in general, by bridging knowledge gaps, informing medical practices, and driving research in the field of hormonal health, while recognizing the importance of staying attuned to emerging trends in healthcare, the evolving regulatory landscape, and shifting user preferences. Summing it up, our vision for Sereneo extends our current state by far and we aim to remain relevant and responsive to all future changes we could face.

10 Limitations

At the outset of developing Sereneo, we assumed already having a profound purpose and vision where we would head. However, we are acutely aware of the limitations that we, as a passionate and dedicated team, must confront. One of the foremost challenges we face is our lack of specialized knowledge in medical fields, particularly hormonal health. While our enthusiasm drives us to explore innovative solutions, we often find ourselves generating ideas that, upon closer examination, reveal their unsophistication. This discrepancy between ideation and execution highlights the need for a multidisciplinary team that can bridge these knowledge gaps. This strategic move not only enhances the credibility and functionality of our app but also ensures that it aligns with the latest medical standards and technological advancements, which are areas where our expertise falls short. Moreover, the landscape of healthcare is in a constant state of flux. Emerging trends, evolving regulations, and shifting patient preferences add an element of unpredictability to our project, forcing us to remain agile and ready to pivot our approach anytime. Furthermore, our project deals with knowledge that, while promising and potentially ground-breaking, may not yet be scientifically proven. Hormonal imbalances, especially in the context of post-pill experiences, are areas where research, although slowly, is

ongoing. As such, we must acknowledge the inherent uncertainty and variability in the available data and scientific literature. This necessitates a commitment to staying updated with the latest research and medical findings, ensuring that our recommendations are evidence-based and aligned with the best available knowledge. Data availability and security are additional challenges since handling sensitive health data demands robust security measures and compliance with stringent regulations. Ensuring the privacy and confidentiality of our users information is not just a priority but a non-negotiable aspect of our project.

In conclusion, while we are driven by our passion and conviction, we are also mindful of the limitations that accompany our journey, although we learned to see them as opportunities for growth and improvement, rather than as liabilities.

11 Reflection on the entrepreneurial journey - key learnings

Sereneo was our first attempt in building a prototype in the healthcare space. During our master's program, we engaged with several impactful topics, but healthcare resonated deeply with us. It was most definitely tied to the most significant learnings we experienced throughout our studies.

11.1 Learnings - Zeynep

This was the first time I was part of a project that I was passionate about. Sometimes it made things easier, but at the same, it made things harder since you want every little thing to be perfect. However, I learned that every entrepreneurial journey comes with setbacks, and it does not matter how great you do everything, but rather how fast you get back on your feet after setbacks. It is not a real entrepreneurial journey if there are no ups and downs.

In addition, founders should not forget to have fun during their entrepreneurial journey and celebrate the small wins. Talking to a doctor was quite an impossible task in the beginning, which definitely influenced our motivation, however the celebration afterwards of our first interview was worth the wait. I also learned how important network and especially LinkedIn is

in moving forward with your business. As Porter Gale says, “your network is your net worth”. The many people that we had the honour to talk to within such a short amount of time was only possible thanks to our own personal and university network. I believe that this definitely helped us move forward faster with our prototyping.

12 Conclusion

In conclusion, our endeavour in addressing hormonal imbalances in women post-pill discontinuation through Sereneo has been both challenging and rewarding. This project has laid the groundwork in bridging a crucial gap in women's hormonal health journey, underscoring the importance of merging empathetic understanding with user-centered design thinking and lean startup methodologies.

By delving into the complexities of hormonal health and drawing from both personal experiences and extensive research, we enriched our understanding and highlighted the urgent need for a solution like Sereneo. The key features – the Educational Health Library, Symptom Tracker, and Community Forum – were crafted to offer comprehensive support, empowering women with knowledge, personalized guidance, and a sense of community. The iterative design process, integrating feedback from users and medical experts, was crucial in fine-tuning these features to effectively meet the real world needs and expectations of our target audience.

Moreover, this work project represents not only an academic endeavour but also a personal journey of discovery and innovation in the realm of women's health. The process has highlighted the immense potential for digital health solutions to transform the way we address complex healthcare challenges. In fact, Sereneo aims to not just operate as a business, but also as a socially responsible entity that prioritizes the well-being and satisfaction of its users.

While this marks a significant step in supporting women with hormonal imbalances, it is clear that the field of women's health, particularly in the context of digital innovation, is vast and ever evolving. As the landscape of women's health and digital health continues to evolve, so

too will the opportunities to enhance and expand upon the foundations laid by this project.

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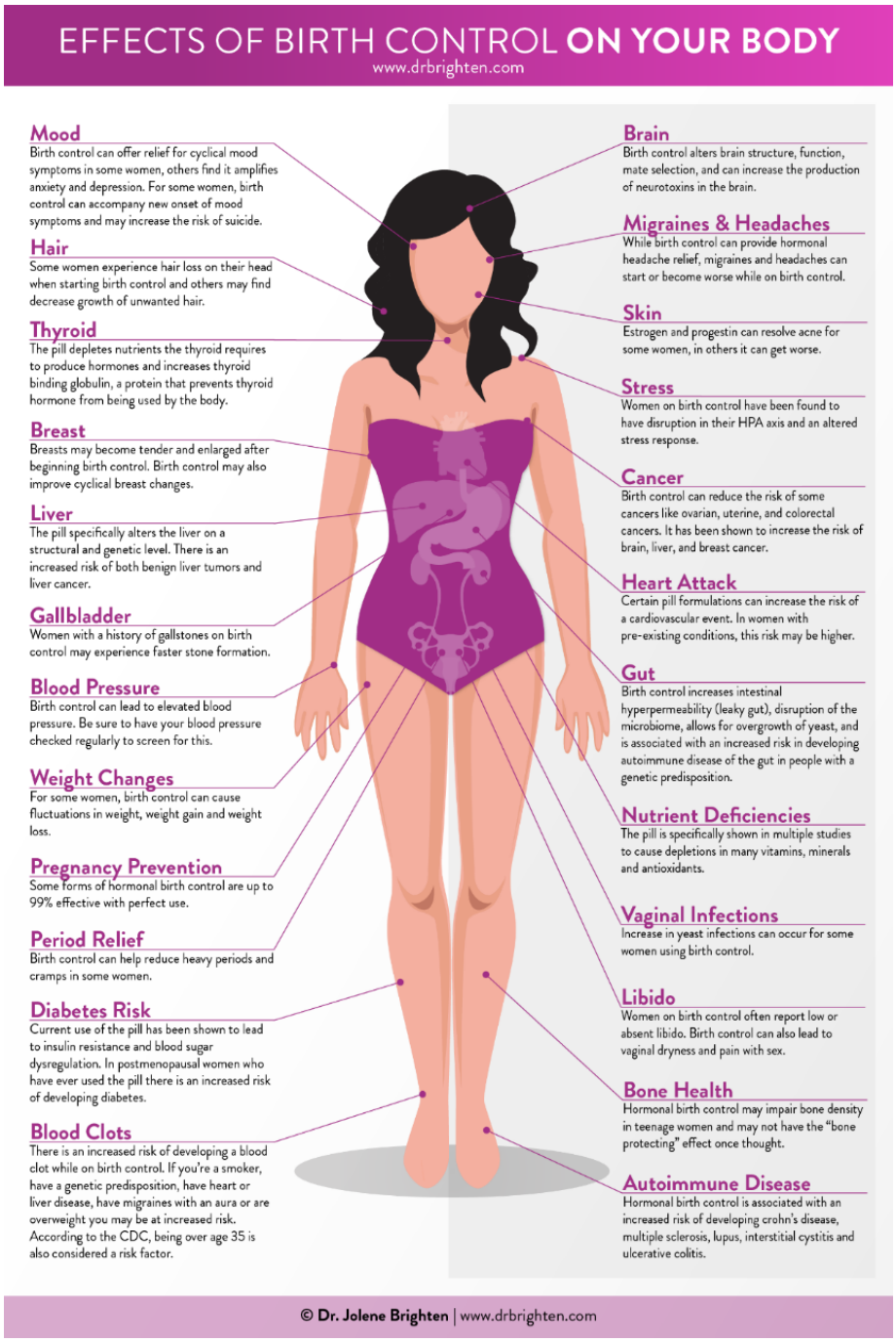
15 Appendix

Appendix 1: List of Figures

Appendix 2: Side Effects of the birth control pill (Source: www.drbirghten .com)



Appendix 3: Doctor Interviews and Outcomes & Learnings

Interview Partners	Date of Interview	Location	Role	Outcomes and learnings	Citation
Doctors (5)					
Interview A: Joana Pinto	02.11.2023 second outreach for prototype feedback 12.12.2023	Remote: Berlin/Lisbon	Doctor of Medicine (MD), In training to become a specialist in Dermatology and Venereology, over 5 years of practical and clinical experience, currently working at FORMEL SKIN - a Health Tech Dermatology start-up.	- diagnosing hormonal imbalances is almost impossible and even if possible, does not play a crucial role, since there is lack of medical evidence about effective solutions how to counterbalance specific resulting symptoms precisely. - experienced the problem in her own practice very dominantly - concerned about the lack of collaborative approaches between gynecologists and dermatologists, or the included medical experts potentially contributing in general - hormonal blood testing and frequent displaying of levels does not make sense to include as a potential feature	- It's about female hormones, primarily a gynecological matter, but diagnosing hormonal fluctuations is quite complex. I understand that women suffer tremendously, and I'm deeply interested in the topic. - Unfortunately, we can almost never give a precise answer, as factors like stress and diet also play a role. Skin issues are multifactorial, and the decision to resume the pill is a personal one. The reasons for stopping can vary, not always due to a desire for children. Many are torn because they tolerated the pill well but chose to stop after learning more about it. - A major issue is the lack of collaboration between gynecologists and dermatologists. - Simple blood-based hormone tests by gynecologists don't suffice for dermatologists to act on. Hormone levels are unstable and vary based on many factors, making them unreliable for concrete diagnoses. - As for diagnosing hormonal acne, it's challenging. Conditions like PCOS and certain tumors can disrupt hormone balance. In Germany, unlike the U.S., Spironolactone isn't approved for hormonal acne. Off-label treatments require transparency and self-funding. - Ultrasound of the ovaries and regular cycle checks can be indicative. Patient reports on cycle irregularity and symptoms can suggest hormonal imbalances. - PCOS is relatively easy to diagnose with symptoms and ultrasound findings. Yet, treatment options remain limited. - In practice, we try to help and diagnose to the best of our abilities, prescribing and advising on treatments, with gynecology often being the first recommendation. - Endocrinology is the last resort. When symptoms extend beyond skin issues, like hair loss or weight changes, endocrinology seeks to identify and balance the hormonal issues, though endocrinologists are scarce. - Every day during my consultation hours, I saw young women who have stopped taking the pill for various reasons and since then feel helplessly at the mercy of their body's changes.
Interview B: Dr. med. Gülistan Saribas	06.11.2023	Remote: Berlin/Berlin	Gynecologist and General Practitioner with her own practice in Berlin	- Identificaton of Features - The importance of correct information - Lack of time due to the healthcare systems	"the solution should be medically correct, medically prepared/reviewed, easy to understand, no high costs" "I only have about 5-10 minutes for each patient until I have to move on to another patient" " If I am being honest with you, hormonal birth control is really effective in treating acne and until it always worked for my patients. Most of the times i prescribe the pill and tell them to come back once they want to get pregnant and until then to just keep on taking the pill"
Interview C: Dr. med. Malina Helms	28.10.2023	Remote: Berlin/Berlin	Gynecologist and medical advisor in Berlin for the femtech startup FEMNA Health - works mainly in the hospital and focuses mostly on hormonal imbalances	- the importance of health literacy - Identification of features - Problem identification & Validation - What the app has to include in order to be recommendable by doctors - The importance of guidance for self-management	- "I think that many women do not understand exactly what is going on in their bodies and therefore feel helpless. There is also the question of how long such symptoms last. The greatest relief would be to understand the processes and to know that the body will at some point regulate itself but that you can shorten that time through several methods" - "Most of these patients are NOT well informed that hormonal fluctuations can occur after discontinuation" - "Health literacy is a super important topic, especially when it comes to self-help methods, dietary changes and its influence on the hormones. Same with sport and stress management. A women needs to be aware of their own unique cycle, how their body works during each cycle phase and what they can do to support their body and hormones during each of these phases. So an app on this topic makes" - "Unfortunately, hormonal imbalances are not really taken serious enough - doctors are making decisions based on the severity and urgency of the matter. If they suspect a hormonal imbalance (i.e in a situation where the patient tells them that these symptoms have arisen after discontinuing a hormonal contraceptive), they instantly put you in a bucket and know that this is something common, but not deadly and that the symptoms will
Interview D: Ana Rita Jesus Maria	12.10.2023	Remote: Lisbon/Lisbon	GP at the Regional Health Administration of Lisbon	- Deep Insights on the patient journey - Identification of Features and self-management practices - The importance of health literacy	- "The holistic approach is always important if we think it includes the patient's values. I think it should include health literacy materials on self-management, and clues for the patient to know when to ask for a health professional help. So i would definitely include the missing health literacy on this topic" - " More often during the patient journey, women ask help before starting the pill with 2 main concerns: hormonal imbalances or contraceptive needs. We can manage hormonal imbalances many times (with or without pills, eg acne). After stopping the pill, most women return to their previous status – eg if they had history for menstrual cramps or acne they usually return to the same status."
Interview E: Dr. Ulrich Menneking	06.11.2023	Remote: Berlin/Lisbon	Gynecologist and Specialist in Obstetrics and Gynecology with his own gynecology practice in Berlin, Germany.	- There is a significant degree of uncertainty in the fields of nutrition and hormonal balance due to a lack of robust scientific evidence. Simple recommendations such as maintaining a diet diary can significantly increase awareness of how dietary choices may impact hormonal balance. - It's essential to recognize that finding 100% solutions for complex medical issues related to hormonal fluctuations may be unrealistic. Instead, leveraging technology to provide guidance on nutrition, stress management, sleep, and exercise can empower patients to take control of their well-being. These tools are not promises of a cure but attempts to positively influence hormonal fluctuations that patients can explore independently. - There are significant gaps and inefficiencies in the medical field since areas often work in isolation, leading to a lack of knowledge sharing and transparency.	- There's a lot of uncertainty in nutrition and hormonal balance fields, with a lack of evidence. However, basic recommendations like keeping a diet diary can significantly impact awareness. - We are talking about highly complex medical issues, where we must let go the idea of a quick fix or finding a solution that is effective with 100% certainty. Instead utilize technology to provide recommendations on nutrition, stress, sleep and other methods that patients can undertake themselves, as attempts to improve their situation - The elimination tactic involves omitting certain elements to see the impact on well-being. Digital tools can support this process. - There are big gaps between the different medical areas that are involved, we work very separated, which translates to unefficiency - I wish I had the specific formula to solve the problems these patients face, but in reality, besides lacking time to analyse each patient individually, we simply lack knowledge in dealing with symptoms connected to hormonal imbalances - We must let go of the expectation of finding 100% solutions for these highly complex medical issues, but instead utilize technology to provide tips on nutrition, stress management, sleep and exercise that patients can undertake themselves, as attempts to improve their situation"

Appendix 4: Survey Questions and Answers

Aftermath of Hormonal Birth Control

This survey aims to gather insights into your experiences after discontinuing hormonal birth control. We appreciate your honest and precise responses as they help us better understand the current patient journey.

Our long-term goal is to develop a tool that supports women before, during and after this process, making it less burdensome and stressful.

* Indicates required question

1. **Your age at the present moment?** *

2. **Age when you first started hormonal contraception?** *

3. **Age when discontinuing hormonal contraception?** *
   (if discontinued multiple times, list the age, when you discontinued the last)

4. **Total duration of hormonal contraception?**
   (years in total excluding breaks)

   Mark only one oval.

   - ◯ beneath 1 year
   - ◯ 1-2 years
   - ◯ 2-3 years
   - ◯ 4-5 years
   - ◯ 5-6 years
   - ◯ 7-8 years
   - ◯ 9-10 years
   - ◯ over 10 years

5. **Which type of hormonal contraception did you use?** *
   (you can select multiple, if you used multiple)

   Check all that apply.

   - ☐ Pill
   - ☐ Patch
   - ☐ Hormonal IUD (spiral)
   - ☐ Vaginal ring
   - ☐ Other

6. Would you tell us the reason why you started taking the hormonal birth control?

7. Would you tell us the reason why you decided to discontinue hormonal birth control?

Physical & mental changes arising after discontinuation.

8. **What physical symptoms arose after discontinuing hormonal birth control?** *
(you can select multiple)

Check all that apply.

- [ ] acne or other skin related problems
- [ ] weight gain
- [ ] irregular periods
- [ ] heavy periods
- [ ] strong period cramps
- [ ] hair loss
- [ ] headaches
- [ ] breast tenderness
- [ ] nausea

9. **Did you experience any other physical symptoms that were not listed?**
please specify

10. **What mental symptoms did you experience after discontinuing hormonal birth control?** *
(you can select multiple)

Check all that apply.

- [ ] mood swings
- [ ] anxiety
- [ ] depression
- [ ] irritability
- [ ] low libido
- [ ] cognitive fog
- [ ] insomnia
- [ ] Non of the above listed

11. **Did you experience any other mental symptoms that were not listed?**
please specify

12. **How long did the longest of these symptoms last?** *

Mark only one oval.

- ◯ less than 1 week
- ◯ 1-4 weeks
- ◯ 1-3 months
- ◯ 3-6 months
- ◯ 6-12 months
- ◯ more than 1 year
- ◯ still ongoing

X

13. **What were the initial steps to help yourself, when these symptoms occurred?** *
(select all that apply)

Check all that apply.

- [ ] internet research
- [ ] dietary changes
- [ ] exercise
- [ ] consulted friends or family
- [ ] supplements
- [ ] support groups
- [ ] naturopathic treatments

14. **Were there any other steps you took to help yourself?**
please specify

15. **Did you seek external/medical help or support for these symptoms?** *
(select all that apply)

Mark only one oval.

- ◯ yes
- ◯ no *Skip to question 17*

16. **What kind of medical help did you seek?** *
(select all that apply)

Check all that apply.

- [ ] Gynecologist
- [ ] Dermatologist
- [ ] Endocrinologist
- [ ] Primary Care Physician (General Practitioner)
- [ ] Alternative practitioner
- [ ] Nutritionist/Dietitian
- [ ] Mental Health Professional (Psychologist, Psychiatrist, Therapist)
- [ ] Hormone Specialist
- [ ] Acupuncturist
- [ ] Other

Solutions and help

17. **If you invested time and money, where did you primarily allocate your resources?**
(select all that apply)

Check all that apply.

- [ ] Internet research
- [ ] Supplements
- [ ] Naturopathic treatments
- [ ] Cosmetic products
- [ ] Medical outreaches

18. **Did you experience any of the following positive changes after discontinuation?** *
(you can select multiple)

Check all that apply.

- [ ] improved mood
- [ ] increased energy
- [ ] weight loss
- [ ] better sleep
- [ ] increased libido
- [ ] clearer skin
- [ ] improved cognitive function
- [ ] Non of the above listed

19. **Any other positive changes (mentally or physically)?**

20. **In an ideal world, what kind of support or guidance would have made the discontinuation process easier for you? What would you have wished for?**

21. **Did you find a solution or relief for your symptoms?**
(select all that apply)

Mark only one oval.

- ◯ yes
- ◯ no *Skip to question 23*

22. **What was your solution to counterbalance the negative symptoms after discontinuing?**

Thank You for Sharing Your Experience!

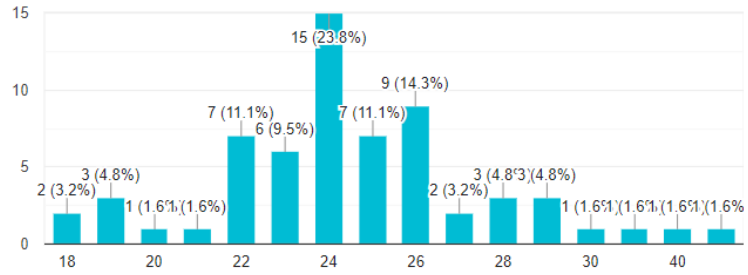
Stay Informed and Engaged:
If you'd like to stay updated on the progress of our project or be part of the first group to test our initial prototype, please consider providing your email address below. We will keep your information confidential and use it solely for project-related updates and opportunities.

23. **Name**
(optional)

24. **Email Address:**
(optional)

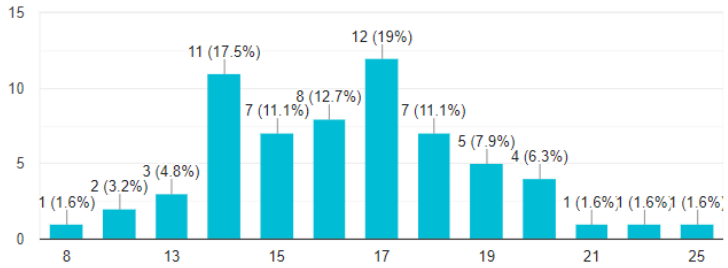
Your age at the present moment? Copy

63 responses



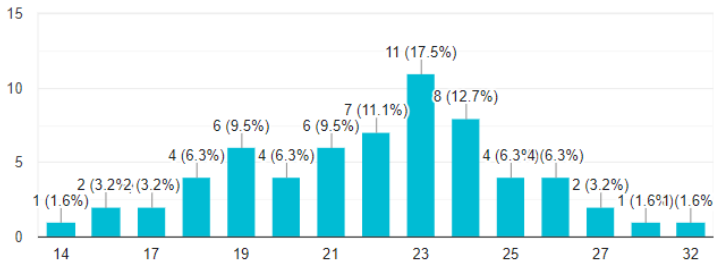
Age when you first started hormonal contraception? Copy

63 responses



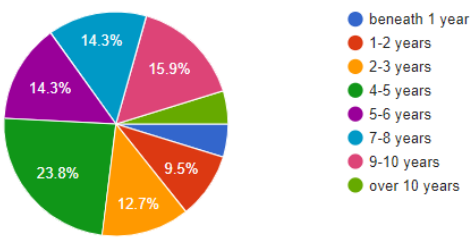
Age when discontinuing hormonal contraception? Copy

63 responses



Total duration of hormonal contraception? Copy

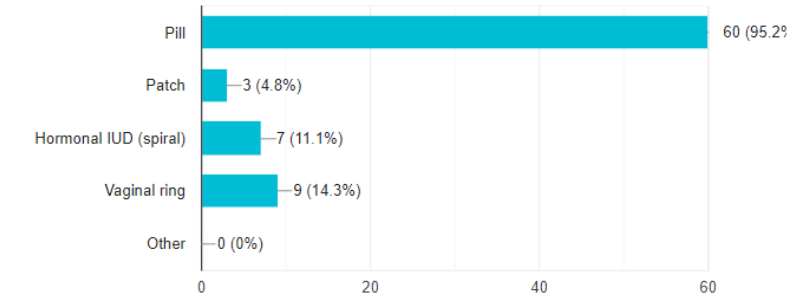
63 responses



Which type of hormonal contraception did you use?

Copy

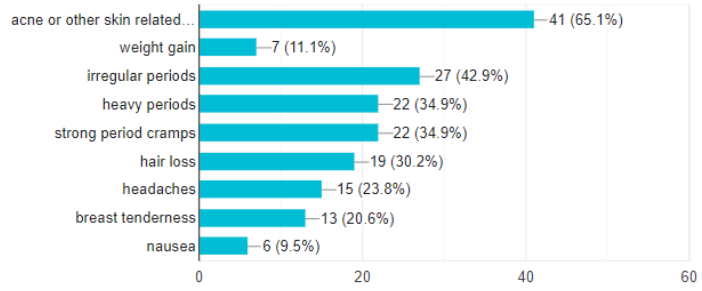
63 responses



What physical symptoms arose after discontinuing hormonal birth control?

Copy

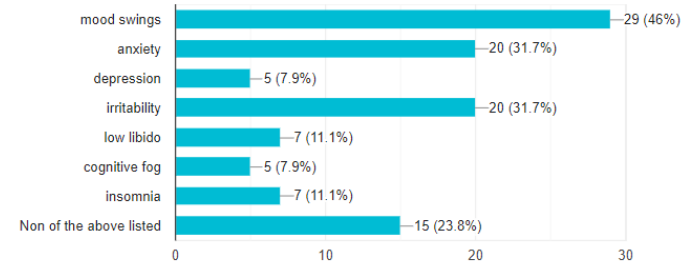
63 responses



What mental symptoms did you experience after discontinuing hormonal birth control?

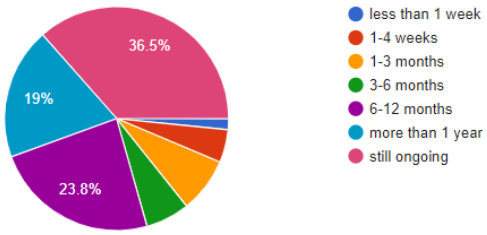
Copy

63 responses



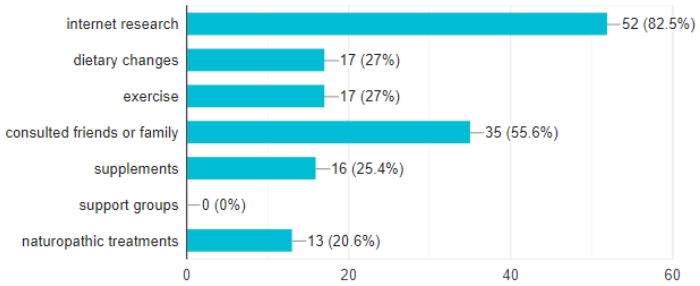
How long did the longest of these symptoms last? Copy

63 responses



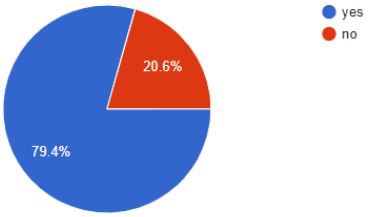
What were the initial steps to help yourself, when these symptoms occurred? Copy

63 responses



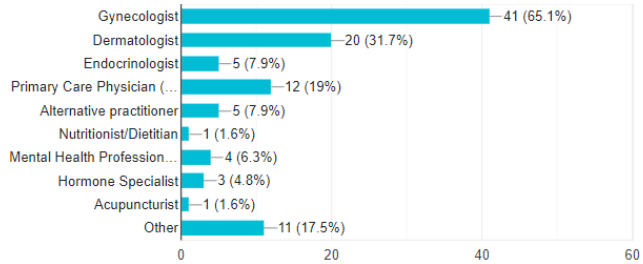
Did you seek external/medical help or support for these symptoms? Copy

63 responses



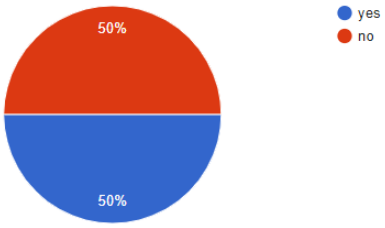
What kind of medical help did you seek? Copy

63 responses



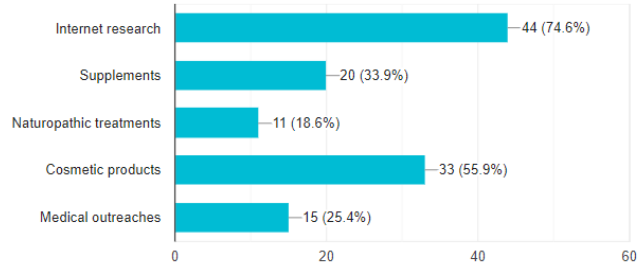
Did you find a solution or relief for your symptoms? Copy

56 responses



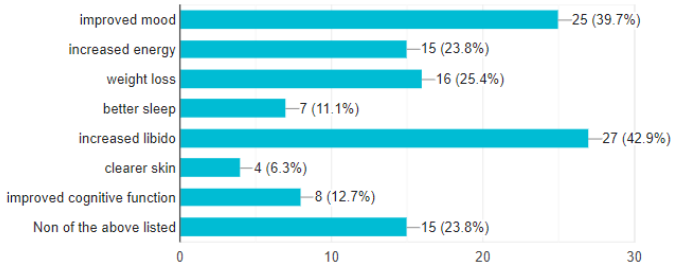
If you invested time and money, where did you primarily allocate your resources? Copy

59 responses



Did you experience any of the following positive changes after discontinuation? Copy

63 responses



Would you tell us the reason why you started taking the hormonal birth control?
my gynaecologist prescribed it because of skin issues and stomach cramps
Because i was in a relationship
Protection, less Akne
was told by th doctor it made my cycles regular lol
avoid pregnancy
First long-term relationship, from gynaecologist seemed to be the only option, no other options were known to me as a usual birth control
I started taking hormonal birth control after I had an abortion at the age of 16. I got scared it might happen again so I wanted to be sure I couldn't get pregnant. Hormonal birth control seemed like the safest choice, despite the side effects.
Birth control
Zu starke Schmerzen und extrem dolle Blutung innerhalb der Menstruation. Wollte sie nehmen, um einen geregelten Zyklus sowie mildere Blutung ohne Schmerzen zu haben.
My mom decided it was best for me
Mangelnde Aufklärung und Beratung vom Facharzt über anderweitige Methoden
heavy stomach aches and bleedings, irregularity
Ich hatte immer starke Schmerzen während der Periode und wollte noch vor meinem ersten Freund die Pille nehmen.
Acne, contraception, endometriosis
For birth control
contraception with a first boyfriend, feeling of safety regarding not getting pregnant, acne
Birth Control
Scared of developing acne and all the other girls were on it
I didn't want to get pregnant
First married started using it so I wouldn't get pregnant
Birth control, easy, given by doc, safe
Because of impurity's of my skin
I had very strong period cramps when I was little and my doctor prescribed me the pill since it was proved to help the cramps
For my skin
i had very strong acne with 13 years old which is why i started taking the pill
Hormonal Imbalances before taking the pill
Acne
as contraception
I had some problems with my skin when i was in puberty
I had some issues with my hormones back when I was in puberty, especially regarding my strong period cramps.
contraception purposes
I had very small breakouts when I was young and they never went away which bothered me a lot. It was not even acne, just puberty pimples. But still, i got prescribed the pill.
Birth Control
I had a boyfriend
prevent babies
period cramps
bad skin, a lot of pimples, tendency for cystic acne
breakouts

Would you tell us the reason why you decided to discontinue hormonal birth control?
wanted to get rid of artificial hormones
Mainly for Mental health --> mood swings, anxiety, brain fog Digestive issues --> constant bloating Water retention and weight gain Didn't feel like myself
factor 5 suffer mutation
I experienced severe symptoms nobody told me about before. I had depression, weight gain, felt disconnected from my body and would not get my period anymore, which was terrible.
Mental Health
mental health issues (depression), weight gain, loss of hair
i didn't feel comfortable using it anymore because of the negative effect it had on my body, also the public image and awareness regarding the topic has changed a lot which allowed me to inform myself differently compared to when i started taking it when i was younger
I lost the pill an decided to not get a new one also because we had just split up
Had the feeling my body „got used" to it and I actually don't know how it works without the pill. Wanted to „feel" my body and how it deals with Hormons naturally. 10 years seemed a long time taking Hormons. I often forgot to take the pill.
depression, anxiety, loss of femininity
health
had a longer pause anyway due to a sickness, felt there were other ways than the pill, still had very heavy & painfull periods (pill was not helping as declared) and sometimes migraine probably increased due to the hormones, without it felt more like myself
I recently decided to discontinue hormonal birth control because I want to use a contraception without any hormones. When I first used the pill I discontinued it because I felt like it numbed my emotions. Neither did I experience extreme lows but I also felt like I didn't experience real excitement anymore. It also affected my libido. That's when I discontinued hormones first. After a while of researching different methods I came back to hormones but in the way of the vaginal ring as I was told it didn't have that many hormones so it wouldn't affect me as much as the pill did. I was quite happy with the ring and used it for more than two years. I didn't feel really affected by it in a negative way but I realised that hormonal birth control cannot be my long term contraception because there will always be added hormones in my body and I never am sure if my emotions and feelings are "the real me" or just the hormones from the contraception. If I have low libido I want to know that it is because that's the way I feel at the moment and not because of the hormones. When I am sad I want to know it's because I am sad and not because of the hormones. There are also different physical side effects I want to avoid. You know the list ist long so I am not going to list them all, but I definitely wanted to avoid things like headache, higher risk for thrombosis etc etc…
Mood swings, wanted to go the natural way
Starke Stimmungsschwankungen, depressive Verstimmungen, Hormonhaushalt durcheinander
Bad side effects (feeling like I had to throw up when I had to take the pill, bad mood, acne, feeling depressed, etc.)
Trennung von Exfreund und zunehmende Nebenwirkungen
decreasing good psyche
Ich hatte sehr starke Nebenwirkungen, die immer mehr Überhand genommen haben. Ich hab mich damit nicht mehr wohl gefühlt und hab mich dann dazu entschieden, diese abzusetzen.
Side effects
Too many hormons
side-effects, awareness about health concerns
Constantly bloated boobs
I became interested in holistic medicine and I read more into the negative effects of hormonal birth control.
I wanted to know what my body was like without additional hormones
So I could get pregnant
Because of the hormons, I thought it is not worth it
I wasn't feeling myself - gained weight, felt impulsive and sometimes depressed
Too many side effects, including mental health problems
Side effects

I had another illness
side effects
Side effects
I felt like it gave me anxiety and depression
i gained 8 kilos of weight and was not happy in my own body
I had a lot of bad symptoms while taking the pill including a lot of emotional changes, i cried a lot. Also i gained a lot of weight
I got a very bad depression
It made me depressed
I gained 10kg of weight, was very emotional and felt like i had 24/7 brainfog
mental health
it had a toll on my character, personality
Insomnia
I became aware of how bad the pill is
couldnt tolerate it
realized how bad it actually is for my body and was scared of thrombose
i was smoking which is not a good combo with the pill because of thrombose risks

Were there any other steps you took to help yourself?
changed my routines
Bunch of internet research and dermatologists, gynecologists. Appointment at endocrinologist was impossible.
Dermatologist
New skin care products
Be gentle on myself, consulted a docor.
research
i started taking Klettenwurzel to help with PMS
Skincare, which made it worse
Different kinds of cosmetical therapies
going to therapy
stick it out
Since the only symptom I really had was that my period got stronger again and my cramps were worse I think/thought that that's just normal because the period gets lighter when using hormonal birth control. I didn't really see that as symptoms of the discontinuation so I didn't really take extra steps.
I went to the doctor
I saw an acupuncturist to help get my periods back and regular
Yes I studied naturopathy and functional medicine ☺ 7 years after I took out the copper IUD and used the vaginal ring.
Youtube Videos and Internet research
no alcohol
Internet Research, Cosmetic Professionals
Pharmacy visits and consultations
trying to keep myself busy
A lot of google search. No alochol, no smoking, probiotica etc
no because my doctor just told me to wait
I bought cosmetic products but also just accepted my faith. I just waited I guess.
Not much, I just tried to wait and see if it goes away
Probiotics
a lot of research

A
In an ideal world, what kind of support or guidance would have made the discontinuation process easier for you? What would you have wished for?
I woudl have had something to track symptoms and compare it to others and get feedback if everything is normal and when it is estimated to end
From start to finish guidance
I would've wished, that somebody would have told me how my skin was going to breakout.
better advice in advance
More info from my doctor
More information on negative effects
more medical clarification about side effects
easier access to health professionals that specify exactly in that field, better advice on alternatives other that the pill
My gynecologyst being more informative of the impact discontinuing taking the pill could have on you. Especially if you start taking it at a young age and mybe don't even know who you really are yet and what other possibilities there are, other than the pill.
More research or medical studies that are explaining these symptoms. Guidance what to do about it. More people who talk about it so you don't feel alone.
Awareness (even before starting with the pill), information about treatments of symptoms, questioning the status-quo that the pill is the only/right thing to do - have several friends who stopped with the pill but only in the recent 2 years, before it was sth u just wouldn't do
I think it would have made it easier if hormonal free birth control would be discussed more widely and recommended for girls/young women. What made it difficult for me to stop was not knowing how I would protect myself in the future with a birth control that fits all of my needs. I needed to do a lot of research on my own and wished there was more help from doctors.
Vorherige Aufklärung über die Nebenwirkungen durch die Pille und nach der Pille. Eine Art "Anleitung" wie man sie absetzt zur Regulierung der Nebenwirkungen (langsames Absetzen der Pille; Bestimmte Tabletten/Ergänzungen zur Unterstützung) Nicht sofortige Verschreibung der Pille seitens des Frauenarzt!!
If I had known more about the pill I would have never took it
Aufklärung durch Fachpersonal gerade weil ich noch so jung war als ich die Pille zum ersten Mal verschieben bekommen habe!
Would have preferred better guidance about going on hormonal birth control in the first place
More information from my doctor, especially before starting to take the pill in the first place

I would have wishes that I would have been more informed about the pill at such a young age when I first started. It was given to me no question asked
Pills that don't take months and months to get used to and then months and months to recover once we come off them
I wished I never went on the copper IUD even though it wasn't Mirena, it still has an impact.
That the docs talk more about the disadvantages of the pill - my doctor was not helpful in that
In first place I would have wished for a better guidance before even starting the pill! if I knew what would happen after stopping the pill regarding my skin, I wouldn't have started taking it
Understanding, openness to talk about contraception and how to cope with symptoms, hear experiences of others (as I did not have friend who had the same experience
More understanding about the side effects of the pill and what i can do with your body,
Open, clear communication about acne problems after discontinuing the pill so people do not feel alone when they have these symptoms. I was the only one back then which increased my feeling of loneliness. I would have wished for an exchange with other women with similar problems. My doctor irritated me by saying that it is normal. Maybe it is, but not offering any kind of solutions was frustrating.
More enlightenment about the symptoms that might appear and what kind of changes your body is going through. Overall more knowledge
The biggest problem was the multitude of information (information overload) with different tips and suggestions all the time. That was just so overwhelming to not be able to filter out these infos
Having more information about this phenomenon that happens after stopping hormonal IUD / pill
Someone who supports you throughout the time that you have these symptoms (the best would be from the beginning on) and filters the knowledge and information for you.
Enlightenment about how long the symptoms will last, warning that this might happen and more. Overall more enlightenment of what is happening to be honest
Right from the start, I wouldve liked to know more about what is happening or going to happen + my gynaecologist preparing me for what to expect. I had no information and no help and took care of everything myself. Classic advice from the gynaecologist: just take the pill again and your skin will be fine
I wish my gynecologist had been more supportive. She should have given me more information about the symptoms and suggested treatments. For example, I could have taken supplements before stopping the pill/ring to make the transition easier for my body. But I didn't know these things at the time. She could also have suggested on her own that I take a hormone or blood test after I told her about my symptoms. The sentence "That's normal, that's how it is" didn't help me and worsened the situation
My gynecologist could perhaps have supported me even better. She was not helpful at all and could have asked for a check-up after 6 months and then also look at and treat other symptoms (skin condition). She had recommended that I stop using the Nuvaring for 3 months to see how it was (I also asked myself at the time whether it wouldn't be better to stop using hormonal contraception, as I wanted to know what effect it had on me) and simply start again after 3 months if nothing changed. I then just had so much abdominal pain for 2-3 weeks, felt uncomfortable and bloated that it was no longer an option for me.
I am not even sure to be honest. I would just have like for people to have more empathy. I would like for doctors to do more research on hormonal acne, period pain, pre-, during- or post-pill to help alleviate the pain, without meds and any time of hormonal contraception. It was just a horrible time because everytime I woke up, my face would have another pimple and my heart would sink one centimeter lower
- Even a website for support for women and these problems would have been enough - Information on what might happen to the body, how to get prepared for it and how to accelerate that adjustment phase. - A platform with a section for comments where I could exchange with other women. Or even reading that other women face the same problem would have helped to decrease the stress. Something like quora. - Once you see that someone else is going through the same shit as you it makes you feel a bit calmer □ makes you feel more normal
I would have loved someone telling me beforehand that this would happen and that it is also normal. I was drowned in the internet and did not know what or where I should find the right guidance.I did not know what was happening to me . All of my hair kept on coming out and out and I did not know how to stop it - it was one of the worst times of my life
I would have liked for someone to tell me exactly what to do from the beginning to the end
i wish someone would have told me what will happen to me
someone telling me what to do WHILE coming off the pill (preventive)

Any other positive changes (mentally or physically)?
I just overall felt better.
Felt like myself again (after some time)
my digestion got better
Body felt „real“
felt like myself again
Empowered at being more connected to my periods and body
My mind was clear
I stopped crying about small things
I felt like i could think on my own again

What was your solution to counterbalance the negative symptoms after discontinuing?
time
No solution. Started to take the pill again
Skincare
chocholate
exercising, nutrition
expensive skincare, working out, eating hormon balancing foods
Hoping that my be it gets better, and only washing my face with water. Informing myself on the different phases of the cycle and how you can adjust to your cycle to understand your moods and use your energy in a good way.
Took the hormone spiral to decrease period cramps. Doing a therapy of Vitamine A pills to decrease my Akne.
healthier lifestyle, Fitness, less stress
unfortunately just wait it out
Diet
Hauptprobleme: keine Lösung gefunden Eisen: Tabletten/Ergänzungen Schmerzen: Tabletten Stärke der Blutung: keine Lösung
Skin care, Physiotherapie, Minzöl
Getting back on hormonal birth control - IUD, not the pill
- Regular face cleansing appointments. - Skinoren. - Angus Castus.
Just embracing my cycles and the PMS that came with them
Eventually the symptoms subsided on their own and I felt more like myself again, but it took a while, over 6 months
Stop using it! Exercise, diet
I took very strong vitamin A pills. It did help a lot, but I'm still not over it and am still struggling with my skin
I took the pill again and am on it since then. I never found a solution
Waiting until everything went back to normal
I got prescribed a very strong antibiotic that I took for 2 cycles.
Waiting a long time
Internet research and self help. My gynecologist could not help much and just said "wait a bit, it will get better"
Spending a lot of money on cosmetic products and trying to fix it
Cosmetic Products helped a bit with my acne but it is unfortunately still ongoing
I tried to manage my stress as much as possible
Psychotherapy or a doctor who would have informed me better about the effects of hormones on my mental state from the start.
I had to take these super strong antibiotics for my skin that are being challenges because of their very bad side effects
I am doing yoga and learned to cope with the period cramps
Waiting
I took the pill again
i spent a lot of time googling
stress management
I waited for quite a long time until it went away slowly at some point. It took a very long time however..
I am reading a lot about gut health and currently trying to fix my gut through probiotics
a lot of herbal teas that my GP recommended
I take medication for the nausea and breast tenderness is still ongoing
it went away with time
Cut out dairy and alcohol
Medication such as ibuprofen in order to get rid of the pain that i never had before
My hair fell out very badly the first few months, at some point it got better. They were still the worst moments of my life

Did you experience any other physical symptoms that were not listed?
Cysts
Directly after getting off the spiral, I could not eat anything for three days. I had terrible pain, cramps and felt really bad. My period did not return for another 4 months.
No
ovarial cyst
Positiv: depressive Verstimmungen gingen weg
Hitzewallungen
No
I didn't have my period for 2 years afterwards and developed ovarian cysts
No, but I had symptoms after I had both my kids when I used the copper IUD
During my period I am know again more moody/emotional; now my libido is higher again
Sometimes no period at all
weight loss, feeling uncomfortable in my own body
Strong PMS
Excessive sweating
back pain
Hair texture changed and strong PMS
back pain and hot flashes
Cysts on my ovaries
cysts

Did you experience any other mental symptoms that were not listed?
felt really disconnected
No
General more emotionally
I experience PMS
No
During my period I am again more emotional
improved mood, not so emotional
I felt lonely with my symptoms
I felt kind of numb for a long time, rather emotionless
low self esteem

Appendix 5: *Benchmarking best practices*

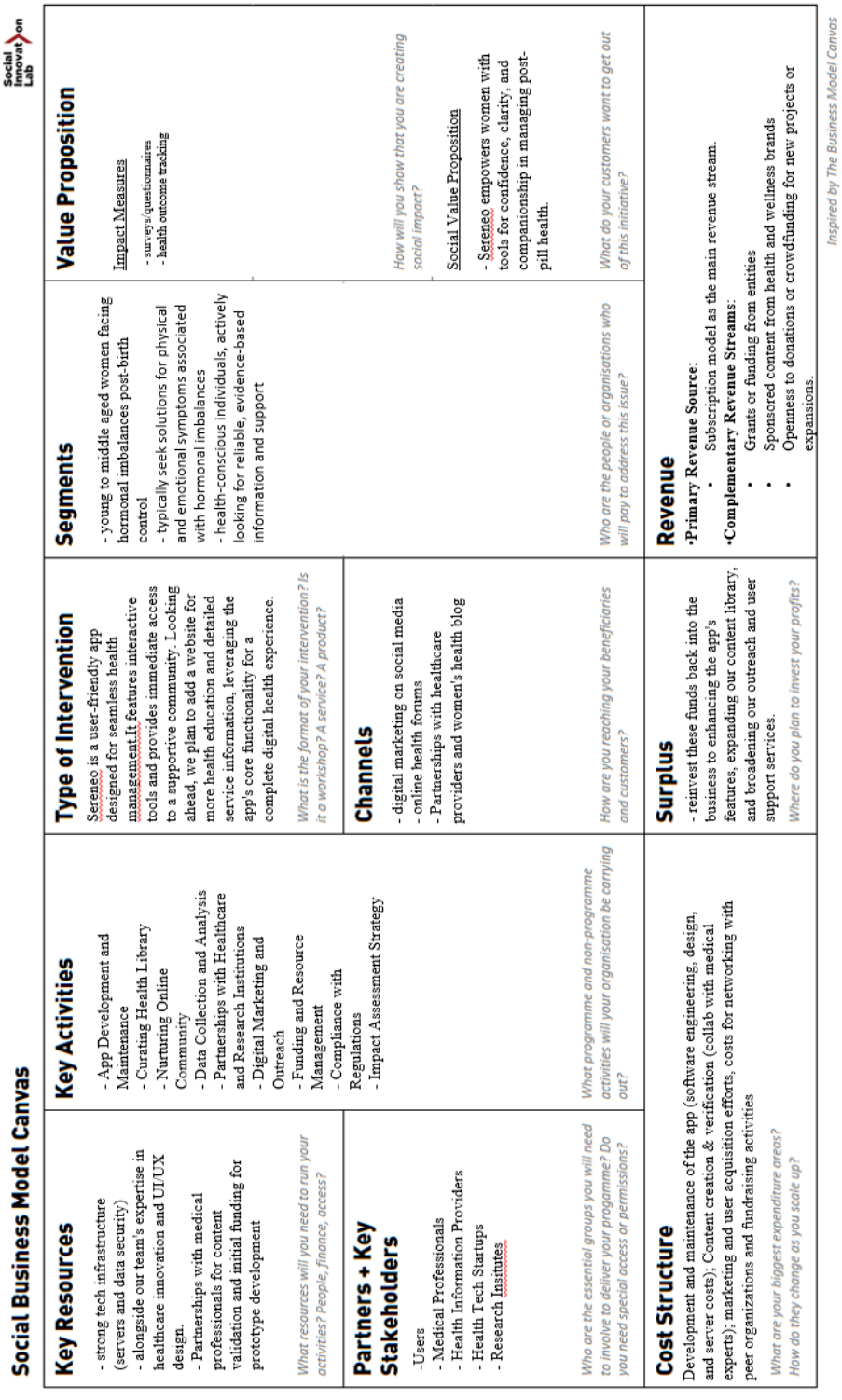
Companies Name	Short Description	Notable Features
Flo Health	Menstrual cycle tracking and women's health app	Symptom Tracking Chat Feature where you chat with a bot that edcuates you about your symptoms and guides you throughout your journey Eductional Library Automatic report to download for your doctor based on your symtpoms and periods that were logged in Prediction Analytics based on Symptom tracker Period Log Daily Insights
Pollie	Digital platform for PCOS	Unlimited chat with registered dietitian, health coach, and care coordinator Personalized care plan updated monthly Advanced testing options Community group coaching sessions Symptom tracking and trends Educational content
Aware App	Blood Work Overview / Results	Digitized blood overview results Biomarker explanation for each Biomarker tested Educational content Online Booking Appointments Personalized recommendations based on biomarker results On-Site Lab Testing and take-home tests PDF Download of lab results
Rupa Health	Blood Work Overview / Results	Personalized take home tests Educational Content Results automatically get sent to the doctor --> Not digitized
Femna Health	Digital platform for hormonal health	Take home tests Personalized care program for 6 months based on symptoms Program includes: Talking 3x to a doctor, micronutrient treatment recommendation, acces to educational content
Upliv Health	Digital platform for Menapose	Community Portal 1:1 Talks to health coaches Symptom tracking Progress Check ins Personalized Care Plan to solve symptoms
Clue	Menstrual cycle tracking and women's health app	Symptom / Cycle Tracking Prediction Analytics based on Symptom tracker Educational Content / Library Period Log
Gennev	Digital platform for Menapose / hormonal health	Personalized Care Plan Vitamin and supplement recommendations 1:1 talks to health coaches Newsletter Telehealth
Kindara	Fertility / Menstrual cycle tracking and women's health app	Fertility / Symptom / Cycle Tracker Prediction Analytics for fertility windows based on tracking info Basal body temperature tracking Community Ovulation detection

***Appendix 6**: Deriving features, needs, and wants based on survey answers.*

Respondant	What they would have wished for in an ideal world - Citations	Derived possible features	Derived Overarching Topics
Respondant 1	I would have had something to track symptoms and compare it to others and get feedback if everything is normal and when it is estimated to end	- Symptom Tracking & Prediction - Community Channel / Forum	
Respondant 2	From start to finish guidance	- Personalized Information & Advice hub - Personalized Post-Pill Program from start to finish - Symptom Logging	
Respondant 3	I would've wished, that somebody would have told me that my skin was going to breakout, meaning that my body would react like that. Usually I have the worst breakouts before my period. I guess for me it is dependent on which phase I am in my cycle. An explanation of what symptoms might arise during which phase would give me a feeling of control over my body	- Hormone Cycle Visualization and explanation of each phase - Personalized Information & Guidance Hub - Symptom Tracking & Prediction	
Respondant 4	better advice from the beginning	- Personalized Information & Guidance hub	
Respondant 5	Overall more Information, especially on what happens with your body and which symptoms might appear, what is normal, what is not and how my body reacts to my cycle	- Hormone Cycle Visualization and explanation of each phase - Symptom Tracking & Prediction - Personalized Information & Guidance Hub	
Respondant 6	easier access to health professionals that specify exactly in that field, better advice on alternatives, other that the pill and self help methods	- Personalized Information & Guidance Hub - 1:1 talks to health coaches	**Need for Information and Education**
Respondant 7	more medical clarification about side effects	- Personalized Information & Guidance Hub	
Respondant 8	My gynecologyst being more informative of the impact discontinuing taking the pill could have on you. Especially if you start taking it at a young age and mybe don't even know who you really are yet and what other possibilities there are, other than the pill.	- Information & Guidance Hub about general topics	
Respondant 9	More research or medical studies that are explaining these symptoms and my cycle in general after stopping the pill. Guidance what to do about it. More people who talk about it so you don't feel alone.	- Personalized Information & Guidance Hub - Hormone Cycle Visualization and explanation of each phase - Community Channel / Forum	**Desire for Guidance and Support**
Respondant 10	Awareness (even before starting with the pill), information about treatments of symptoms, questioning the status-quo that the pill is the only/right thing to do - have several friends who stopped with the pill but only in the recent 2 years, before it was sth u just wouldn't do	- Information & Guidance Hub about general topics and symptom treatments	
Respondant 11	Some kind of "instructions" on what to do after stopping the pill to regulate the side effects (slow weaning off the pill; certain tablets/supplements for support). Not immediate prescription of the pill by the gynecologist!	- Personalized Information & Guidance Hub - Hormone Cycle Visualization and explanation of each phase	
Respondant 12	Education by specialist staff precisely because I was still so young when I was first got prescribed the pill!	- Information & Guidance Hub about general topics - 1:1 talks with health coaches	**Desire for Emotional and Social Support**
Respondant 13	Would have preferred better guidance about going off the hormonal birth control in the first place	- Information & Guidance Hub	
Respondant 14	More information from my doctor, especially before starting to take the pill in the first place, but also after getting off of the pill	- Information & Guidance Hub	
Respondant 15	In first place I would have wished for a better guidance before even starting the pill! if I knew what would happen after stopping the pill regarding my skin, I wouldn't have started taking it	- Information & Guidance Hub	
Respondant 16	Understanding, openness to talk about contraception and how to cope with symptoms, hear experiences of others (as I did not have friend who had the same experience	- Community Channel / Forum - Personalized information & Guidance Hub	
Respondant 17	More understanding about the side effects of the pill and what it can do with your body, how my body will react and what I can do to help my body	- Community Channel / Forum - Symptom Logging and Prediction - Personalized information & Guidance Hub	
Respondant 18	Open, clear communication about acne problems after discontinuing the pill so people do not feel alone when they have these symptoms. I was the only one back then which increased my feeling of loneliness. I would have wished for an exchange with other women with similar problems	- Community Channel / Forum	
Respondant 19	More enlightenment about the symptoms that might appear and what kind of changes your body is going through. Overall more knowledge	- Symptom Tracking / Prediction - Personalized information & Guidance Hub - Hormone Cycle Visualization and explanation of each phase	
Respondant 20	Having more information about this phenomenon that happens after stopping hormonal IUD / pill	- Information & Guidance Hub in general	
Respondant 21	Someone who supports you throughout the time that you have these symptoms (the best would be from the beginning on) and filters the knowledge and information for you.	- Personalized Information & Advice hub - Personalized Post-Pill Program from start to finish - 1:1 talks with health coaches	
Respondant 22	Enlightenment about how long the symptoms will last, warning that this might happen and more. Overall more enlightenment of what is happening to be honest	- Symptom Tracking and Prediction - Personalized Information & Advice hub	
Respondant 23	Right from the start, I wouldve liked to know more about what is happening or going to happen + my gynaecologist preparing me for what to expect. I had no information and no help and took care of everything myself. Classic advice from the gynaecologist: just take the pill again and your skin will be fine	- Symptom Tracking and Prediction - Personalized Information & Advice hub	
Respondant 24	I wish my gynecologist had been more supportive. She should have given me more information about the symptoms and suggested treatments. For example, I could have taken supplements before stopping the pill/ring to make the transition easier for my body. But I didn't know these things at the time. She could also have suggested on her own that I take a hormone or blood test after I told her about my symptoms. The sentence "That's normal, that's how it is" didn't help me and relativized the symptoms	- Symptom Tracking and Prediction - Personalized Information & Advice hub - Hormone Test with digitized blood results	
Respondant 25	y gynecologist could perhaps have supported me even better, from the beginning on - ask for a check-up after 6 months and then also look at and treat other symptoms (skin condition). She had recommended that I stop using the Nuvaring for 3 months to see how it was (I also asked myself at the time whether it wouldn't be better to stop using hormonal contraception, as I wanted to know what effect it had on me) and simply start again after 3 months if nothing changed. I then just had so much abdominal pain for 2-3 weeks, felt uncomfortable and bloated that it was no longer an option for me.	- Personalized Post-Pill Program from start to finish	
Respondant 26	I am not even sure to be honest, I would just have liked for doctors to have more empathy. I would like for doctors to do more research on period pain, pre-, during- or post-pill to help alleviate the pain, without meds and any time of hormonal contraception.	- Community Channel for support and empathy - 1:1 talks with trained (empathic) health coaches	
Respondant 27	- Even a website for support for women and these problems would have been enough - Information on what might happen to the body, how to get prepared for it and how to accelerate that adjustment phase. - A platform with a section for comments where I could exchange with other women. Or even reading that other women face the same problem would have helped to decrease the stress. Something like quora. - Once you see that someone else is going through the same shit as you it makes you feel a bit calmer □ makes you feel more normal - Information on my own cycle without the influence of synthetic hormones	- Community Channel / Forum - Personalized Information & Advice hub - Hormone Cycle Visualization and explanation of each phase	

Respondant 28	I would have loved someone telling me beforehand that this would happen and that it is also normal. I was drowned in the internet and did not know what or where I should find the right guidance. I felt super lonely and did not know what was happening to me	- Symptom Tracking and Prediction - Personalized Information & Advice hub - Community Channel / Forum

Appendix 11: Social Business Model Canvas



Appendix 12: Competitive market analysis and USP's

Competition	Pollie	Gennev	Flo	Glow	Femna Health	Sereneo
Focus on Hormonal Imbalances	yes	yes	no	no	yes	yes
Holistic & personalized Symptom Management	no	no	no	no	yes	yes
Community Support	Yes	no	yes	yes	no	yes
For post-pill affected women	no	no	no	no	yes	yes
Personalized educational recommendations (not broad)	no	no	yes	no	no	yes
Tech-enabled solution	yes	yes	yes	yes	no	yes

Appendix 13: Interview Guide for Medical Professionals

Interview Guideline

Outreach: Gynecologists, GPs, Dermatologists

Introduction:

Hello [Gynecologist's Name],

I hope you're doing well. We appreciate your time and expertise in discussing an important healthcare initiative we are working on. We are Zeynep and Luiza, and we are passionate about addressing the concerns and challenges faced by women who discontinue hormonal birth control.

Background and Purpose:

We are researchers who have conducted extensive studies and gathered insights from women who have experienced hormonal imbalances after discontinuing birth control. We have identified a need for a comprehensive solution to guide women through this transitional phase.

Need Validation (Set 1):

1. Can you share your experience regarding how frequently patients come to you with concerns related to hormonal imbalances after discontinuing birth control?
2. What advice, medications, or guidance do you typically provide to patients facing these concerns?
3. Can you share some common scenarios or typical concerns that patients express when they approach you after discontinuing hormonal birth control?
4. When patients present these concerns, what are the initial steps you usually recommend to them, and how effective have these recommendations been in your experience?
5. Blood tests to assess hormone levels are a common diagnostic tool. Could you elaborate on how often you suggest these tests to patients experiencing post-birth control symptoms, and what information or guidance do you usually provide based on the test results?
6. Once the blood samples are sent to the lab and the hormone levels are assessed, what typically happens with these results? Are they communicated to the patient, and if so, in what format?
7. In your practice, have you observed any common misconceptions or anxieties among patients regarding hormone levels and their impact on post-birth control symptoms? How do you address these concerns?

Features Discussion (Set 2):

Now, we would like to present some features of the solution we are developing and gather your valuable feedback:

1. We are designing a platform that allows women to log and track their physical and mental symptoms after discontinuing hormonal birth control. How do you think this feature could assist patients and healthcare providers like yourself? What advantages or concerns might be associated with it?
2. Another feature we are considering is providing curated, evidence-based information about the origins of specific symptoms, including information on hormone levels. How valuable do you find this feature in helping patients understand their symptoms better?
3. We are also exploring the possibility of offering personalized suggestions related to nutrition, exercise, and lifestyle changes that may alleviate symptoms. How do you see this feature benefiting your patients?
4. We are considering the possibility for users to log their symptoms on the platform. How would you assess the integration of such a feature, and what advantages or concerns might be associated with it?
5. We are considering allowing users to monitor their hormone levels through blood tests and display the results in the app. How would you assess the feasibility and benefits of such a feature?
6. Another consideration is the integration of online support groups or forums where users can exchange experiences. What are the pros and cons of this feature, particularly in terms of medical accuracy and privacy?
7. Another feature could be reminders for taking supplements or implementing behavior changes. How do you assess the usefulness of such reminders for users, and what technical or medical challenges might arise?
8. The platform could also include informative articles and resources on various hormonal topics. What impact do you foresee on patients when they have easy access to information about their health?

Feasibility & Accessibility (Set 3):

1. What are the major concerns or challenges you foresee in implementing such a platform within the healthcare system?
2. Why do you think a comprehensive platform like this does not already exist? What are the barriers to its development?
3. If a platform like the one we are proposing were available and you were confident in its safety and effectiveness, would you recommend it to your patients?
4. From your point of view, do you believe that a platform like the one we're proposing, which

appointments?

5. Do you believe a platform like the one we're proposing has the potential to contribute to gathering more comprehensive and diverse data related to womens health issues? If so, how might it facilitate data collection and research in women's health?
6. From your perspective as a gynecologist, what concerns or challenges do you foresee in integrating digital platforms like the one we're proposing into your practice?
7. Are there any specific guidelines, regulations, or ethical considerations that you believe should be addressed when developing and implementing a platform like this?
8. What types of collaborations or partnerships do you think would be essential for the success and credibility of a platform like this within the medical community?
9. Are there any specific features or functionalities that you believe are critical for such a platform to be embraced by healthcare professionals and seamlessly integrated into patient care?

Recording and Transcription:

With your permission, we will record this interview for accuracy and reference. We understand the sensitive nature of the topics discussed, and your insights will be invaluable in shaping our initiative.

Conclusion:

Thank you very much for taking the time to share your expertise and insights with us today. Your input will play a pivotal role in the development of a platform that can genuinely benefit women navigating through this challenging phase of discontinuing hormonal birth control.

Follow-up:

If you want, we will send you a transcript of this interview for your review and records. If you have any additional thoughts or suggestions after our conversation, please feel free to share them with us.

Thank you once again for your valuable contribution to our project. We genuinely appreciate it.

Best regards,

Zeynep and Luiza

Appendix 14: University Contact Interviews and Outcomes & Learnings

University Contacts (2)			
Leid Zejnilovic	Assistant Professor at Nova SBE	- Feasibility of a low code / no code within this workproject taking into account the idea and vision - Insights on prototyping and which steps to take	-"you should also focus on the willingness to pay when you are gathering feedback for your prototype. Ask your focus group if they would be willing to pay an X amount of money after showing the prototype. If they say no, then ask them what it would take for them to be willing to pay and therefore adjust the prototype / your solution"
Mafalda Paiva Chaves	Team Leader at Co.Innovation Lab	- Insights and tips on how to develop the idea / business model - Prototyping support	- "I think you should also take into account that the user journey in your case is quite limited. Meaning if you want to overbridge that time from the moment where they discontinue the pill to the moment where the body regulates slowly and the symptoms start minimizing, the user journey will use your solution for 6 months and then drop off. You should build a second business case that will make your user keep using your app in order to minimize the churn rate"