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Telecontraception: An Evaluative Research Study on Birth Control Accessibility via Smart Phone Applications

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TELECONTRACEPTION: AN EVALUATIVE RESEARCH STUDY ON BIRTH CONTROL ACCESSIBILITY VIA SMARTPHONE APPLICATIONS

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by

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Abstract

Birth control accessibility in the United States continues to be a growing issue. Studies have shown that barriers such as transportation to clinics, ability to obtain an appointment at a clinic, having time off work or school, cost, lack of insurance, and residing in contraceptive deserts prevents women from obtaining birth control. However, with telemedicine on the rise, new technologies are becoming available, such as telecontraception—a recent innovation, where people can obtain birth control through a website or an app on smart phone devices. Telecontraception could potentially serve as a tool to narrow the birth control accessibility gap for uninsured and low-income people. Nonetheless, it is important to question the possible consequences of obtaining contraception online. This thesis aims to answer the question: what is the variability in telecontraception screening to prescribe the correct type of birth control to patients? This thesis aims to answer the question of screening variability by comparing questionnaires from four telecontraception apps: Nurx, Planned Parenthood Direct, The Pill Club and Hers. In this study I also compare the questionnaires to a contraindication chart developed by the Reproductive Health Access Project. This study found that among the four telecontraceptive apps there is no uniformity among the apps in terms of cost, types of insurance accepted, types of birth control offered, and states currently being served. Furthermore, this study also finds that when it comes to obtaining a prescription via these apps, we cannot determine whether the questionnaires required by these apps are able to successfully prevent possible contraindications to birth control prescriptions. Overall, this thesis considers the benefits of access to birth control via telecontraception and the barriers that are still experienced by patients via these apps and offers recommendations to increase access to birth control via telecontraception.

Table of Contents

Abstract……...iii

Table of Contents …….....iv

List of Tables…….....vi

Introduction, Research Question and Literature Review ……1

Introduction: Birth Control Accessibility in the United States……5

Literature Review…….5

Current State of Telecontraception……..5

Prescription Accuracy of Telecontraception……6

Accessibility and Cost of Birth Control via Telecontraception……...9

Theory: Control and Constraint…….14

Methods……..16

Content Analysis Methodology…….17

Apple Qualifications Age & Rating……..18

Android Qualifications Age & Rating……...19

Results……21

Demographics……22

Access……23

Identification and Language Preferences……...23

Types of Birth Control Offered……..25

Cost and Insurance…….25

Location…….28

Medical and Medication History……...29

Medical History…….30

Medication History……33

Comparisons to Contraindication Chart……35

App Design and User Experience……..39

Nurx……...39

Planned Parenthood Direct……39

The Pill Club……..41

Hers……46

Discussion……..49

Limitations…….56

Conclusion…….59

References……..60

Appendix……67

Vita……70

List of Tables

Table 1: Types of contraceptives offered by application……...25

Table 2: Insurance & costs for types of birth control and consultations……27

Table 3: Number of times a question was asked regarding a condition……31

Table 4: Displays question frequencies per condition for each app…….....32

Table 5: Number of times questions regarding types of medications were asked…….34

Table 6: Questions asked regarding the patient's previous use of birth control per app……...35

Table 7: Reproductive Access Contraindication Chart compared to apps……38

Introduction: Birth Control Accessibility in the United States

Birth control accessibility continues to be a growing issue in the United States (US). According to the non-profit organization Power to Decide which focuses on accessibility to contraceptives through policy and accessibility research, we learn that 19 million US women of reproductive age currently do not have access to publicly funded contraception and reside in contraceptive deserts (2022). A 2013 survey of 1,385 US women ages 18 to 44 who tried to obtain contraceptives found that 29% reported difficulties in obtaining or refilling a contraceptive prescription, citing cost and lack of insurance coverage as the primary barriers, with other limitations being logistical in nature, such as the ability to obtain an appointment or transportation to a clinic, as well as not having time off from work and school responsibilities to be able to go to a clinic (Zuniga et al., 2019). In fact, a more recent study found that the limitations and barriers reported by Zuniga et al. were exacerbated due to the COVID-19 pandemic (Fikslin et al. 2021).

Additionally, the federal regulations issued by the Trump Administration which went effective in January 2019 allowed employers to impose employees' coverage limitations on contraceptives based on religious or moral beliefs (Behn et al., 2019). Although the Obama administration also had exceptions for religiously affiliated organizations and grandfathered plans, the inclusion of moral beliefs allowed non-religiously affiliated businesses, universities, and organizations to limit access to contraceptives (Behn et al., 2019). Trump's health mandate potentially affected up to 127,000 women; nonetheless, the number of estimated people who experienced difficulties in obtaining contraceptives could have been significantly more, since according to the 2018 current Population Survey, 40 million American women of reproductive age had employment-based health insurance (Behn et al., 2019).

Medicaid and Title X, two healthcare programs that have worked to expand birth control accessibility, also came under scrutiny during the Trump Administration. Both programs are aimed at low-income individuals, Medicaid provides health insurance to millions of people and Title X is a family planning program that provides comprehensive family planning services (Gold & Hasstedt, 2017). According to the Planned Parenthood Action Fund, 4 million people rely on Title X annually (2021). Publicly funded family planning has proven to help the overall health of women and birth outcomes. For example, in a 2015 study, 6.2 million women were able to obtain publicly funded contraception through Medicaid or the Title X funding program which helped avoid 1.3 million unintended pregnancies which could also have resulted in 453,400 abortions (Gold & Hasstedt, 2017). Trump Administration policies sought to grant states the ability to reform their Medicaid programs. Conservative states moved toward changing Medicaid coverage for contraceptives. For instance, Missouri and Iowa ended programs that expanded family planning services eligibility to low-income individuals, this, after Texas sought to exclude any providers with ties to abortion from Medicaid such as Planned Parenthood in 2011 (Gold & Hasstedt, 2017). As of 2015, eight additional states also followed in Texas's footsteps. As for Title X, the Trump Administration also sought to eliminate Title X or exclude Planned Parenthood due to its ties to abortion. Title X helped to deliver contraceptives to 3.8 million women which avoided 822,000 unintended pregnancies and 278,000 potential abortions in 2015 (Gold & Hasstedt, 2017). Cutting Title X or excluding Planned Parenthood left millions of low-income individuals without access to contraceptives or access to abortions due to unintended pregnancies which could have resulted in potential economic and health-related hardships. In November 2019, Planned Parenthood left the Title X program, fifteen other states lost their Title X funding, and seventeen Title X grantees withdrew from the program (Dawson, 2020). As a

result of the Trump Administration's policies, the number of clients served by clinics between 2018 and 2020 fell from 3.9 million to 1.5 million (Frederiksen et al., 2019). Thus, contraceptive access is dependent on state and federal political climates.

As of November 2021, the Biden administration repealed restrictions on Title X set by the previous administration that forced healthcare providers funded by Title X to eliminate all abortion related health care, including advising or referrals from their family planning healthcare (Center for Reproductive Rights, 2022). Furthermore, in January 2022, the Health and Human Services department announced that the Biden Administration would be increasing the Title X family planning program by $6.6 million, which came after the restrictive abortion Texas law passed on September 1st, 2021 (Health and Human Services, 2022). The Texas law prohibited abortions as soon as fetal tissue cardiac activity is detected, which is usually around six weeks, normally before someone is even aware of being pregnant. The most unrelenting aspect of the Texas law is that it also allows private citizens to sue anyone they may suspect of attempting or aiding an abortion, and if they win the lawsuit, they can be entitled up to $10,000 plus any legal fees (McCammon, 2021). Following this law, effective December 2, 2021, the Texas legislature passed additional abortion restrictions by making the prescribing or aiding someone in obtaining abortion medication via telehealth illegal and punishable by law (Lucio, 2021). On June 24, 2022, the United States Supreme Court overturned Roe vs. Wade, a 1973 landmark decision that made abortion a constitutional right. Currently, 44 states prohibit abortion after a certain point in pregnancy and most abortions are now almost completely banned in 13 states (Guttmacher Institute, 2022). Texas is one such state with a total abortion ban.

While there are more barriers to contraceptives and abortions today compared to X, at the same time, the use of technology to access health resources is becoming increasingly common

(Jain et al., 2019). An example is the use of telecontraception—a recent innovation, usually a website or smart phone application through which people can obtain birth control. Telecontraception has the potential to decrease accessibility-barriers for people across the US. The convenience and ease of telecontraception seems very appealing and it could also be the only form of access for people living in contraceptive deserts. Furthermore, telecontraception could potentially serve as a tool to narrow the birth control accessibility gap for uninsured and low-income people as many telecontraception companies advertise inexpensive prescriptions and doctor consultations without the need of health insurance.

Nonetheless, it is important to question the possible consequences of obtaining contraception online. Many websites and applications (apps) only consist of a questionnaire and a quick video chat with a doctor, followed by a few birth control recommendations. Thus, the quality of the medical encounter may differ by telecontraception apps. This leads to my research question: what is the variability in telecontraception screening to prescribe the correct type of birth control to patients?

The following consists of a literature review of current studies conducted telecontraception, along with a discussion of how this proposed study relates to the feminist theoretical framework of control and constraint. Additionally, I present the methods used to answer the question of screening variability and accessibility of birth control via telecontraception, results, limitations, and a concluding discussion.

Literature Review

Current State of Telecontraception

Telecontraception is a recent innovation that falls under the umbrella of telemedicine, allowing medical practitioners the ability to practice medicine and deliver care using technology (Jain, et al., 2019). As its name indicates, telecontraception is an alternative to clinic visits, where one could simply download an online contraceptive app, answer some health-related questions, obtain a recommendation, and order contraceptives to be delivered by mail. Telecontraception distributors are usually privately-owned startup companies that are advertised through social media apps like Instagram or Facebook (Frederiksen, Gomez & Salganicoff, 2021). Recently, these apps have become an appealing tool to obtain contraceptives. For example, the most popular company, Nurx, which has also been recognized as the "Uber of Birth Control" by the *New York Times* (2019), had 200,000 customers by April 2019 (Platoff, 2018) and as of 2020 is serving 300,000 current patients and has provided over one million consultations since the company began in 2015 (Landi, 2020). In 2018, Nurx was only serving 17 states, which have increased to a current 36 (Nurx, 2022). Nurx has been very successful since its launch and has obtained an overall $113 million in funding from private investors since 2015 (Landi, 2020) and currently has a company valuation of $300 million (Clark, 2019).

These telecontraception companies present themselves as practicing reproductive justice through the language they use. For example, the Nurx website states that they are low cost and that they: "believe every woman has a right to safe, affordable birth control. Whether you know which type you want or need some pro guidance, we help you find your best option"(Nurx, 2022).

Planned Parenthood has also taken part in telecontraception, now offering Planned Parenthood Direct where patients can order self-administered contraceptives delivered by mail, or urinary tract infection medication sent to the nearest pharmacy. The Planned Parenthood Direct app is expected to serve all 50 states by the end of the year 2020 (Planned Parenthood Direct, 2021). They recently increased from serving 27 states to currently serving 40 states, and the app is still in its development stage as it is currently inviting users to sign up as beta testers to continue to improve their app (Planned Parenthood Direct, 2021). Compared to other telecontraception startup companies, Planned Parenthood Direct has taken longer in being accessible to all 50 states due to funding loss during the Trump Administration which amounted to about $60 million (Hellman, 2019).

Prescription Accuracy of Telecontraception

Medical studies have been conducted to test the accuracy of patient screening via telecontraception. For example, a 2019 study evaluating the prescribing and screening processes for 9 online telecontraceptive vendors found that all nine vendors had similar prescribing processes (questionnaire, followed by prescription). The questionnaires varied by state as they had to follow state policies on patient information, furthermore some questionnaires were followed up by a video consultation as some states also required video visits (Zuniga et al., 2019).

In a 2019 study by Jain et al., seven patients who had characteristics of contraindications to orally prescribed medications were recruited to seek orally prescribed contraceptives from online telecontraceptive vendors. The results showed that out of 45 vendors, three prescribed oral contraceptives, overlooking the patient's contraindication. Another finding was that when screening for contraindications, all nine vendors varied in their screening procedure. For

example, only two vendors screened for multiple sclerosis with prolonged immobility, five only screened for major surgeries, and only six screened for postpartum and non-breastfeeding women, yet the majority did screen for blood pressure (Zuniga et al., 2019).

In another study, Memmel and colleagues (2005) tested the accuracy of prescriptions and accessibility of contraceptive patches and pills over the Internet by posing as three different patients with different medical histories. They then ordered estrogen-based oral and patch contraceptives from three online platforms; two were based in the US, and one was outside of the US. The US-based platforms requested a questionnaire and added a couple of questions for women with health complications. The non-US company had no questionnaire, and the authors were able to obtain contraceptives from all three platforms. In an in-person clinic, it is probable that two of the women in their study would not have been prescribed estrogen-based oral or patch contraceptives due to potentially serious side effects. Taken together, these studies illustrate how there is still inaccuracy in the questionnaires provided by these services. I propose to do a similar study, but with apps instead of internet platforms.

Furthermore, a recent study has also highlighted challenges that occur in a telecontraceptive visit, such as the inability to track potential blood pressure hypertension virtually. The authors state that "despite the ease of telemedicine for some contraception visits, many other reproductive health issues required physical examinations (e.g., suspicion for pelvic inflammatory disease) or laboratory tests (e.g., STI screening, testing, and treatment; HIV screening and Pre-Exposure)" (Barney et al., 2020, p.168).

There are other issues that could lead to inaccurate birth control recommendations and prescriptions. Most of these vendors are for-profit startup companies where their main concern is profitability. For example, an article by *The New York Times* (2019) described how Nurx

executives; Hans Gangeskar and Edvard Engesaeth attempted to loosen federally mandated prescribing policies set in place to protect women over the age of 35 who smoke, which caution against prescribing pills with estrogen because it places this group of women at risk for heart attack or stroke. Many states prohibit executives or non-medically licensed individuals from influencing doctor's decisions. Nonetheless, according to Nurx's previous medical director Dr. Jessica Knox, executives had asked her to revise this policy. Dr. Knox resisted this request and later decided to leave the company as she later commented that Nurx's mentality on prescribing was "don't ask for permission—ask for forgiveness later" (Riski et al., 2019, para.8). *The New York Times* also reported a case in which a patient who requested birth control from Nurx suffered from deep vein thrombosis that then resulted in serious blood clots in her lungs because of an inaccurate birth control prescription. According to the patients' doctors, the Nurx medical evaluators should have known that this patient would be at heightened risk for this condition, and yet she was still prescribed Tri-Sprintec, causing health complications (Riski et al., 2019). A more recent article by Wollum and colleagues analyzed thousands of contraception requests from an online prescribing platform from July 2015 to September 2017 and found that 1.2% of patients had a contraindication to progestin-only pills and 12% had a contraindication to combined hormonal birth control due to blood pressure levels. Throughout this study's analysis, the platform was able to fulfill 63% of contraceptive requests (Wollum et al., 2022).

Potential inaccurate contraceptive prescriptions are just one potential outcome of telecontraception. A study by Liang, Mackey, and Lovett (2012) found that contraception such as the Depo-Provera shot, oral contraceptives, NuvaRing, Ortho Evra patch, Paragard and Mirena IUDs, and Implanon/Nexplanon implants were all available for purchase on the internet without prescription. These contraceptives were sold on illegitimate online websites, and

although the authors do not mention it, this study makes one wonder if there is currently sufficient education to understand if people seeking contraceptives are buying via legitimate apps and websites. Today it is quite easy to develop a website that looks legitimate that could offer false prescriptions for the sake of selling contraceptives. It is no secret that people fall victim to internet fraud in various internet outlets, and this too can also be a reality in the world of telecontraception.

Accessibility and Cost of Birth Control via Telecontraception

Despite the potential implications of inaccurate contraceptive prescriptions via telecontraception, this method can still be promising. A recent study provides a description of women who sought contraceptives using a large telemedicine company, American Well; results showed that out of 126,712 women, 682 had a contraceptive related virtual visit and of these, 83% were able to obtain contraceptives (Martinez et al., 2020). This may be particularly important for people who reside in rural areas and birth control deserts. Another study looking at the role of telehealth in increasing birth control accessibility among women in rural South Carolina, interviewed 52 women of reproductive age (18-44) where 62% identified as Black and 28% identified as White. The researchers found that most women felt positive about telehealth regarding contraception, allowing them to overcome their accessibility barriers, which consisted of long drives to the nearest clinic, inability to afford gas to make the trips, and in some cases inability to obtain an in-person appointment (Sundstorm et al., 2019).

Nonetheless, living in rural areas could still have additional barriers to contraceptive online access. For example, Wollum and colleagues (2022) found that when analyzing contraceptive requests from an online prescribing platform, urban counties had a larger

concentration of requests compared to low-income counties with a larger demographic of uninsured people.

In relation to Nurx and Planned Parenthood Direct apps, a recent qualitative analysis of patient reviews found that in terms of accessibility, both platforms helped to solve the issue of access to birth control as many were facing barriers when trying to obtain an in-person consultation to obtain a birth control prescription. However, reviews were mixed when it came to cost and affordability, as some users complained that their insurance was not accepted or that the cost for contraceptives was too high, in this study, costs for birth control ranged between $20 to $150. Nonetheless, despite some negative experiences using Nurx and Planned Parenthood Direct, most users expressed support for telecontraceptive apps as a solution to accessibility--according to the study, many described telecontraception as a "game changer" and a tool that is essentially serving an unmet need (Nitkowski, 2022).

In a 2020 study, Barney et al. analyzed telemedicine implementation on adolescent and young adult health care due to the COVID-19 pandemic. The analysis sought to understand the opportunities and challenges of taking physical clinic and doctor's appointments to the online world via telemedicine. They found that overall, the number of telemedicine visits that were conducted per month were comparable to 2019's in-clinic visits. When it came to reproductive health, the study found that:

> Despite limitations to physical examinations via telemedicine, providers identified contraception counseling and provision of combined hormonal contraceptives (pills, patches, and vaginal rings) as feasible for telemedicine with a plan to reassess blood pressure at the patients' next in-person clinic visit given the low occurrence of clinically significant hypertension with these methods (p.168).

Thus, telecontraception has potential advantages and disadvantages. For example, the concept of privacy was for some a barrier and for others a benefit. Some women expressed that obtaining contraceptives through telehealth would allow them more privacy over their reproductive health decisions. As an interviewee stated: “wherever you go in a small town, people will know” (Sundstrom et al., 2019, p.1201) . On the other hand, others expressed privacy as a barrier to birth control accessibility via telemedicine, as even with some knowledge of the HIPAA act that protects patient medical information, some interviewees still felt that they could not trust telemedicine initiatives, expressing concern about being recorded during their online visit or having their information shared or leaked online (Sundstorm et al., 2019). A follow up study reported that reproductive health care examiners also expressed a similar concern for potential reproductive coercion because there are limitations to patient privacy when conducting a clinical visit virtually, such as not knowing who else is in the room with the patient (Barney et al., 2020). Reproductive coercion happens when a patient’s partner, parent/guardian, or family member behaves in a way that interferes with a person’s personal reproductive health decision making (AGOG, 2013).

In a recent study by Stifani and colleagues (2020) analyzing the opinions of 172 health clinicians/ providers on contraceptive counseling via the internet during the pandemic where 78% were new to telemedicine, found that:

> Most providers (80%) strongly agreed that telemedicine is an effective way to conduct contraceptive counseling, and that the role of telemedicine for contraceptive counseling should be expanded after the pandemic (84%). If telemedicine became a routine part of their clinical practice, 64% of providers would be “very happy about it” (p.4).

Despite the advantages, clinicians/ providers also listed some potential disadvantages of telemedicine contraceptive counseling that related to the quality of communication, technological issues, and a possible increase in health disparities for patients who have less access to technology or have language barriers (Stifani et al., 2020). Despite its limitations, because most providers agreed that telemedicine was an efficient and feasible tool for contraceptive counseling, this could potentially mean that clinicians/ providers would feel confident in the accuracy of their counseling and contraceptive prescriptions.

The COVID-19 pandemic has created significant social changes including how people obtain their contraceptives. A study by the Guttmacher Institute (2020) found that during the pandemic, for women using oral contraceptives, 24% of respondents switched to virtual telemedicine appointments with their doctor to obtain a refill prescription. They also found that women's ability to access and pay for contraception has been greatly limited. The study surveyed 2,009 cis-gendered women aged 18-49 and found that 33% of respondents delayed their doctor's visit for sexual and reproductive health (SRH) had difficulty in obtaining contraception. Additionally, the study found difficulties to contraceptive access were more common among Black (38%), Hispanic (45%), queer (46%), and lower-income women (36%).

When evaluating accessibility to birth control via telecontraception based on cost to the patient, a study found that for women who attended a contraceptive appointment, 78% reported insurance information and that the average credit card charge for women who were able to access contraceptives was $19 and coupons were also used. Although the quality of care or potential contraindications was not studied, the authors do recognize that for some patients obtaining contraceptives via telemedicine without insurance could be a more inexpensive choice (Martinez et al., 2020).

It is unclear how much an in-person clinic visit and contraceptives cost for those without insurance. Given that those who qualify for federal health programs can access contraceptives and clinic visits at no cost, and government health programs can also be accepted by some telecontraceptive companies. Nonetheless, according to a recent publication by the U.S Department of Health and Human Services, 7.9 million women of reproductive age are currently uninsured despite the Affordable Care Act's coverage gains (HHS, 2022) -- for people who fall under this number, obtaining contraceptives through in-person clinic visits can be expensive. According to the non-profit organization the National Women's Health Network (2017), oral contraceptives can cost between $20-$50 per month not including the clinical visit cost, which could cost someone between $240 to $600 a year. It is unclear how much a doctor's visit costs in the United States as it varies by clinic. Nonetheless, in a 2021 survey conducted by the Kaiser Family Foundation "one in four women reported having problems paying medical bills" (Long et al., 2021, para.11).

Theory: Control & Constraint

The framework of control and constraint is discussed by Bird and Rieker (2008). The authors state that individual health decisions and consequences are complex and ultimately due to a combination of social constructions, health policies, personal behavior, and choice. The authors specifically focus on gender and explain how in the health decisions individuals make, "many of the constraints and their consequences for individual choice are similar for men and women, their health impact will vary somewhat due to gender differences in biology and life experiences" (Bird & Reiker, 2008, p.6).

Looking specifically at reproductive health, Leyser-Whalen and Berenson (2022) discuss a theoretical model of control and constraint for women deciding on sterilization. They state that gendered behaviors are often influenced by larger structures in people's lives mediated by meso-, micro-, and macro-level social processes. In other words, people's decisions, including decisions on health, can often be influenced by social norms such as socially expected behaviors based on gender and race or by their socioeconomic status, level of education etc. The decisions people make for themselves based on larger outside structures is the constraint people face when making daily decisions including decisions regarding SRH. Nonetheless, as people negotiate their daily lives through these constraints, there are opportunities of control as social circumstances change. Kimport also focuses on constrained choices when people are faced with unplanned pregnancies, where abortion is not necessarily an available choice based on people's personal circumstances (e.g., finances, relationship status, life goals, physical and mental health, previous health care experiences) and relatedly, larger societal structures (cost, antiabortion cultural narratives, policies, and regulations).

The theoretical model of control and constraint relates to this study because it allows us to see the complex relationship that allows people control over their reproductive health via telecontraceptive apps and still highlights how this control is still dependent on larger structures outside of one's control. For instance, telecontraceptive apps have the potential to allow people more control over their reproductive health because they advertise inexpensive contraceptives and virtual doctor's visits. However, the existence of these apps is largely dependent on technology conglomerates Google and Apple, which allows for these apps to exist within their app download centers Apple Store and Google Play. At any given moment, the decisions these two companies make regarding medical apps such as telecontraceptive apps could immediately affect people's newfound control over their reproductive health. The theoretical model of control and constraint can be used to describe how people's SRH decisions, despite the feeling of control, is still largely constrained by larger forces at play such as social status and a capitalist society.

Methods

A 2021 survey from the Pew Research Center revealed that 85% of those surveyed in the US owned a smartphone device. Additionally, using the 2018 American Community Survey (2021), the Census Bureau found that smartphone ownership was far more present in households (84%) than the ownership of laptops, desktops (78%) or tablets (68%). Furthermore, when it came to age, 95% of people ages 18 to 49 owned a smartphone device. Because smartphone ownership is more common and accessible, this study focused on telecontraception available through mobile applications. Access to mobile applications is dependent on the operating system of the device being used. For this study, only devices that work on the Android operating system and the Apple IOS system will be studied as these are the top two most widely used operating systems across the world (Gandhewar & Sheikh, 2011).

The strategy implemented to find telecontraceptive apps was based on user accessibility through the Apple Store and Google Play platforms available on iPhones and Android devices. Using the app download center for each device, the keywords used in the search were "*birth control", "contraceptives", "contraception", "birth control pill", "order birth control", "the pill", and "Plan B"*. All apps that appeared were downloaded onto the device. Through a quantitative content analysis, several key variables were identified such as cost of consultation, cost of birth control with and without insurance, whether they accept government-funded insurance, cost of emergency contraception (with and without insurance), the quantity of states they currently operate in, and types of birth control offered.

I also collected sociodemographic and health screening questions the apps utilized. The Reproductive Health Access Project, a non-profit organization that works directly with health care providers to guide them into including types of reproductive health into their practices such

as abortions, contraception, and miscarriage care, has developed a medical eligibility for initiating contraception chart (see Appendix A) based on contraindications which were used as a guide for this section of the content analysis. The chart identifies 39 potential conditions which could serve as contraindications to certain types of contraceptives; the goal was to identify how these apps are working to identify these contraindications. To obtain access to these questionnaires, I created a personal e-mail which was used specifically to start an application and answer questions accordingly using my personal information. Thus, this study will be coming from my personal user profile and is not generalizable to others. The data collected through this content analysis was then recorded on Excel. The goal was to obtain an overall comprehensive understanding through descriptive statistics of the cost, accessibility, and contraindication filtration of telecontraception apps. This was generated using Excel.

Additionally, as I obtained access to these questionnaires, I answered them truthfully with my personal health information and requested oral contraceptives for each individual app that will be analyzed. The goal was to understand the differences in the questionnaires provided among these apps and the variance in prescriptions obtained as a result.

Content Analysis Methodology

In content analysis research methodology, the researcher codifies written materials or medias to find a similar theme among them, in this case the materials that were analyzed were different mobile telecontraception applications available on the Apple Store or the Google Play Store. A content analysis approach was selected for this research because it is focused on various characteristics telecontraceptive apps and their similarities, differences, and approach to prescribing contraceptives through their questionnaires. This method also allowed for an inductive approach to the data collected. Because telecontraception apps are a recent innovation,

not a lot is known about the way in which they work to prescribe contraceptives. A content analysis of these apps could give insight to gaps in their prescribing questionnaires which could be a potential risk to prescribing accuracy for patients. Finally for this method of research, I will adhere to proposed procedures for an inductive content analysis (Mayring, 2000; Young Cho & Lee, 2014). This procedure can be further broken into 6 steps:

1. Developing a research question.
2. Determining the categories for selected texts.
3. The development of inductive categories from the selected material.
4. The revision of categories (first check of reliability).
5. Revisiting the texts for possible missed categories (second check of reliability).
6. The interpretation of results.

Apple Qualifications, Age & Rating

Apple has developed App Store Review Guidelines for app developers. These guidelines are a set of rules or qualifications that developers must follow to make their app available on Apple's app store. When it comes to medical apps, such as telemedicine apps, Apple briefly describes guidelines under the section of "Physical Harm;" according to Apple, medical apps are to be reviewed with "greater scrutiny" (Apple Inc, 2021). Apple requires that apps that fall under the medical category submit proof of regulatory clearance, from whom these apps should seek regulatory clearance is unclear. Furthermore, for apps which prescribe medications, Apple requires that "drug dosage calculators must come from the drug manufacturer, a hospital, university, health insurance company, pharmacy or other approved entity, or receive approval by the FDA or one of its international counterparts" (Apple Inc, 2021, para.1.4.2).

When it comes to age rating, Apple asks developers to answer Apple's required app rating

questionnaire accurately so that apps can accurately align themselves with parental controls. Apple has four different age ratings developers can select for their apps: 4+, 9+, 12+ and 17+. It is important to note, that most of the apps discussed in this study have an age rating of 17+, which according to Apple, apps with this rating may not be suitable for children under the age of 17 as they may contain instances of gambling or suggestive content relating to alcohol or sexual instances. Placing a 17+ rating on an app also suggests that it is not suitable for children as these apps may contain "frequent or intense medical or treatment focused content" (Apple Inc, 2021, para. 4). Interestingly, the Nurx application is the only prescription platform that has set their age rating to 12+. According to Apple, apps with an age rating of 12+ may not be suitable for children under the age of 12 due to "infrequent or mild medical or treatment-focused content" (Apple Inc, 2021, para. 3). Based on Apple's age ratings, according to Nurx's age rating, they include potential customers who fall under the ages of 12 to 16.

Android Qualifications, Age & Rating

Compared to Apple's guidelines for medical apps, Android is more lenient. Most of their developer app guidelines are more concerned with the codification of the app and its accessibility. Specific guidelines or restrictions for medical apps are not present, in fact, according to Dash Solutions, a company which focuses on creating privacy and HIPPA related solutions for medical app developers, Google Play, Android's app center, does not have restrictions but only privacy requirements for apps (such a medical apps) that will obtain access to user information (Nemetz, 2017). For apps to comply with Android's privacy policy, app developers must submit their own privacy policy explicitly explaining how the app will be using people's data. When it comes to age ratings for apps on Google Play, Android specifically states that "Ratings are the responsibility of the app developers and the International Age Rating Coalition (IARC)" (Google, 2021, para. 1). Furthermore, Android explains that age ratings

which are set by app developers are only used to describe the maturity level recommended by the user however, it is not an indicator of the age developers have built the app for. In Google Play, we also learn that there are unrated apps, these apps are treated as high maturity to help filter parental controls.

Results

Through a key word search in the Apple App Store (that works only on Apple products) and Google Play store (that works only on Android products) four mobile applications (apps) were identified. When typing in the key words "*birth control", "contraceptives", "contraception", "birth control pill", "order birth control", "the pill"*, and "*Plan B*" on the search bar, the Apple App store and Google Play store introduced the apps with the most downloads or apps that had paid for advertising. Each app store had different search results; for example, the first telecontraceptive app shown for Apple was Planned Parenthood Direct. Planned Parenthood Direct, however, was not the most downloaded app in this category; that app was listed first because it paid for advertising. The Apple App store will let the consumer know that Planned Parenthood Direct paid for advertising due to a small label that appears next to the app that reads "ad". Following the advertisement, the Nurx app was the next suggestion, meaning Nurx was the most downloaded app for telecontraception on the Apple App store. As the rest of the key words were typed into the search bar no other apps were found. Upon selecting the Nurx app, I was redirected to a page that included more information regarding the app and reviews. This page also offered similar apps to discover, namely The Pill Club app. Upon selecting The Pill Club app, the Apple App store offered more suggestions and then the Hers app was found.

The Google Play store differed in its app suggestions and had no apps that paid for advertising. Upon typing in the key words, the first app to appear was The Pill Club and while scrolling, Nurx was then the 8th app suggested, followed by Planned Parenthood Direct which was the 9th app suggested. The apps in between were pill tracking apps. The Google Play store also offered additional app suggestions upon selecting an app, however it did not offer similar

apps, for example, when selecting The Pill Club, Google Play store listed other apps related to travel and home rentals instead of apps related to birth control or health in general. Unlike the Apple App store, the Hers app was not offered in the Google Play store during the key word search.

At the end of this search on both platforms, the four apps found were: Nurx, Planned Parenthood Direct, The Pill Club and Hers. These apps were downloaded onto an iPhone. The next step was to open each app and begin an order for birth control by answering the questionnaire. All apps except for Planned Parenthood Direct offered a birth control pill prescription suggestion after answering the questionnaire, without having to pay a consultation fee. Nonetheless, the apps also noted that after paying a consultation fee the brand suggestion could change, as a medical professional would then examine the questionnaire answers and make any changes in the prescription if needed. For each app, I recorded all questions on an Excel sheet and then organized them by type of question, which resulted in three different categories: demographic, access, and medical and medication history. The following will discuss the similarities and differences for each application by category.

Demographics

All apps asked for the following demographic information: state, gender, biological sex, date of birth, height, and weight (of note, the last three are also included in medical history). However, the apps differed when it came to questions regarding ethnicity, race, and pronouns. Planned Parenthood Direct was the only app that asked for the patient's race and ethnicity at the beginning of the questionnaire; all other apps did not ask for this information. The Pill Club was the only app that directly asked for the patient's pronouns, Planned Parenthood Direct did not

include a question about pronouns during the questionnaire but the patient was able to add their pronouns under the account information tab within the app.

Access

Access to birth control within each app was measured by identifying the language preferences and types of identification each app accepted, the types and cost of birth control offered, the types of insurance each app accepted, and lastly, the states the apps service.

Identification and Language Preferences.

The Pill Club and Hers were the most accessible to any client because they did not ask for a form of identification at this stage of the application process to order contraceptives. Nurx and Planned Parenthood Direct required a form of identification, which could take the form of a passport, driver's license, or a school ID. It was not stated within both apps if school IDs from other countries were also accepted. Upon contacting Nurx and Planned Parenthood Direct regarding this question, the Nurx representative explained that a school ID is only for minors under the age of 18, and that it must also be accompanied by guardian information and that only United States (US) school IDs would be accepted; they also explained that anyone over the age of 18 must submit a state ID, driver's license, or passport. Nonetheless, this could be incorrect information, or the app might contain a glitch when it came to identification, as I submitted my university ID as a form of identification and the app allowed me to continue through the ordering process without any other issues. The Planned Parenthood Direct representative was unable to explain if the app also accepted school ID from any country, furthermore, they also did not know why the app required ID in general, they also assumed the app asks for identification to match the information to insurance information provided, however the Planned Parenthood Direct app does not accept insurance as a form of payment, which I confirmed on their website. Nurx also accepted a consular ID card, which is an identification card issued by some countries for citizens

who live abroad; this suggests that patients without legal US documentation who also have access to an address within the US and an electronic form of payment could potentially order contraceptives via Nurx. Planned Parenthood Direct did not include a consular ID as a form of ID but did include a work badge as an additional accepted form of ID. Again, it is unclear if a work badge from another country would be accepted as the representative did not know. Additionally, Planned Parenthood Direct required an additional layer of identification by requesting a mandatory selfie within the app, unfortunately, the Planned Parenthood representative was unable to give an answer regarding why the app requires a selfie, and again assumed that it was part of the verification process to match a name and face to [nonexistent] insurance information.

None of the apps catered to non-English languages. Planned Parenthood Direct was the only app with a language preference in their settings. However, upon selecting a different language, it did not change the language of the app. When changing the language of the iPhone in general the app still did not change to that language. It is unclear why the Planned Parenthood Direct app has language preferences available if the app will not change to a language preference, perhaps the language preference is used only in the case of communicating with a medical professional within the app. When contacting customer service via phone (except for Planned Parenthood Direct, as they do not offer a customer service line) for these apps, other language options were also unavailable for customer support. Their respective websites also did not have a language option. Due to this, a person who is not fluent in English could come across potential issues when trying to order birth control through these apps.

Types of Birth Control Offered.

All apps offered oral contraceptives in three-month packages. Hers only offered the pill, whereas Nurx and Planned Parenthood Direct also offered the patch and ring. The Pill Club offered the pill, ring, and condoms as forms of birth control. Lastly, Nurx, Planned Parenthood Direct and The Pill Club offered emergency contraceptives (see Table 1). The apps also differ in the number of oral contraceptive brands available. Nurx and The Pill Club had over 100 different brands of oral contraceptives available. Hers had 55 different brands of oral contraceptives and lastly it is unknown how many different oral contraceptive brands Planned Parenthood Direct had.

Table 1

Table showing types of contraceptives offered by application.

App	Oral Contraceptives	Patch	Ring	Emergency Contraceptives	Condoms
NURX	Yes	Yes	Yes	Yes	No
PPD	Yes	Yes	Yes	Yes	No
PILL CLUB	Yes	No	Yes	Yes	Yes
HERS	Yes	No	No	No	No

Cost and Insurance

All apps differed in price as well as type of insurance accepted (see Table 2). Hers and Planned Parenthood Direct did not accept insurance as a form of payment for contraceptives. Nurx and The Pill Club did accept insurance as forms of payment but differed in the types of insurance accepted. Nurx only accepted private health insurance, which is stated in the app, however one can only find the list of accepted insurance companies on their website. Nurx accepted the following: Aetna, Anthem, Blue Cross Blue Shield, Cigna, CVS Caremark, Express Scripts, OptumRx and United Health Care (Nurx.com, 2023). The Pill Club mentioned that they

accept all major insurance plans (specific insurance companies were not listed), however, the app also mentioned that Medicaid plans were accepted in select states. The app also specifically highlighted that Medi-Cal (California's Medicaid healthcare program), and Family PACT (California's family planning program for low-income individuals) were also accepted. It is unclear why The Pill Club specifically mentioned California's health care programs.

When it came to out-of-pocket costs, all apps offered the pill in three-month packs. Hers and Planned Parenthood Direct's three-month pack were the most expensive out of the four apps, charging $60 and $75 respectively. Nurx charged $45 for a three-month supply, and lastly, The Pill Club was the least expensive compared to all other apps, charging $31.99 for a three-month supply of oral contraceptives (Table 2).

Furthermore, three apps (Nurx, Planned Parenthood Direct, The Pill Club) offered emergency contraceptives, of which the out-of-pocket costs differed. Compared to the other two apps, Nurx's emergency contraceptive was the most expensive at $90, Planned Parenthood Direct charged $75, and The Pill Club was the most inexpensive at $14.95. For cost of the patch or ring, Nurx and the Planned Parenthood Direct apps warned the patient of high cost. Nurx warned that the patch or ring could cost $100 or more per month, and Planned Parenthood Direct warned that these forms of birth control could cost the patient up to $200 a month. The Pill Club specifically offered the Annovera brand ring and warned that without insurance it could cost up to $200 a month. It's important to note however, that although we can see a comparison of pricing for contraceptives by app, the pricing could also vary due to the different brands offered by each app. Because of this, it is difficult to obtain a true comparison of cost for contraceptives.

All apps except for Hers also had consultation costs if the patient was to pay out of pocket. Planned Parenthood Direct charged $25 for the virtual consultation if the prescription

was to be sent to a local pharmacy but was free if the prescription would be mailed, Nurx also charged $25, and The Pill Club charged $20. Although a consultation cost sounds like the patient was able to meet and speak with a medical professional via the app, this was not the case. The consultation cost is a fee incurred by the patient because before ordering birth control, a medical professional reviews the submitted questionnaire and then offers birth control recommendations. Two apps (Nurx and Hers) required that the patient submit their preferred payment information; once the patient had been prescribed birth control the app would only charge if the patient accepted the prescription. Planned Parenthood Direct did not offer a prescription until the consultation and month supply was paid in advance; The Pill Club required that the consultation fee is paid before receiving a prescription.

Table 2

Accepted forms of insurance & out of pocket costs for types of birth control and consultations

App	Accepts Private Insurance	Accepts Public Insurance	Pill Cost 3-month supply	Emergency Contraceptive Cost	Patch or Ring Monthly Cost	Cost of consultation
NURX	Yes	No	$45	$90	$100	$25
PPD	No	No	$75	$75	$200	$0/$25
PILL CLUB	Yes	Yes	$31.99	$14.95	$200	$20
HERS	No	No	$60	N/A	N/A	$0

Location.

Not all apps cater to all 50 states within the United States. Nurx currently only services 36 states, Planned Parenthood Direct is available in 41 states, The Pill Club claims to serve 49 states and "have reached 99% of contraceptive deserts in the US" (The Pill Club, 2022). Lastly, Hers claims to be able to serve all 50 states; their website asserts that patients can order birth control to be delivered to their homes or be sent to their nearest pharmacy. It is unclear if Hers can mail contraceptives to all 50 states or if they claim to be able to serve all 50 states, because for states where prescriptions cannot be mailed, they instead can send a prescription to the nearest pharmacy. Only Planned Parenthood Direct offers a list of states they cater to on their website. To find out if an app can serve the patient, during the initial sign-up process the patient would have to select their state from a drop-down menu within the app and then obtain a result of whether they can order birth control. The ability for these companies to serve all 50 states highly depends on funding but more importantly depends on their ability to follow state regulations.

Medical & Medication History

Each app contained a questionnaire to collect the patient's medical and medication history, although all differed in the types of questions they asked. One could assume that these questions are required to identify any potential contraindications to types of birth control. On their respective websites these telecontraceptive companies do not offer any information on whether they are using a specific contraindication rubric offered by government organizations such as the Centers for Disease Control and Prevention (CDC) or the World Health Organization (WHO). When searching the apps' frequently asked questions section in their respective websites there is no mention of a specific rubric being followed; nonetheless, all websites mention that medical providers oversee all prescription requests, thus one can only assume that they are using a rubric as part of their responsibility to prescribing medications. It is also unclear how these apps come to select the specific types of questions regarding one's medical or medication history. For each app I recorded medical and medication history questions on an Excel sheet, and then compared them to the Medical Eligibility for Initiating Contraception: Absolute and Relative Contraindications chart developed by the Reproductive Health Access Project. This chart was selected because it combines eligibility criteria developed by the CDC, WHO and the American College of Obstetricians and Gynecologists (ACOG). The following is a discussion of the medical and medication history questions each app asked for, followed by a comparison of these apps to the chart provided by the Reproductive Health Access Project.

Medical History

Between all four apps, 86 questions were asked regarding patient medical history. When counting the total number of questions asked per app, Nurx had the least number of questions for medical history at 22 questions, Planned Parenthood Direct asked 33 questions, and The Pill Club and Hers asked 43 and 42 questions respectively. In the Excel sheet, for each app, I organized the questions by type relating to specific conditions. A total of 25 conditions were identified when organizing the questions, which were related to: alcohol and tobacco consumption, allergies, blood pressure, breast conditions, bowel conditions, the cardiovascular system, cancer, the endocrine system, eyes, the gallbladder, headaches/migraines, the liver, Lupus, mental wellness, the musculoskeletal system, the nervous system, the pulmonary system, surgery, transplants, women's reproductive system, BMI, age, and other conditions the patient can self-report. Among all apps, questions regarding cardiovascular conditions, women's reproductive system, and blood pressure were the most frequently asked about (see Table 3).

The identified conditions were organized by the number of questions asked per each condition and grouped together with some exceptions. Although some conditions may be grouped together, it is easier to separate them due to how many questions were asked for each. For example, it is understood that blood pressure is part of cardiovascular health, nonetheless, questions about blood pressure were not grouped with cardiovascular conditions because of the number of questions recorded for blood pressure alone, it was best to separate blood pressure from cardiovascular health to have a better understanding of what kinds of conditions were prioritized within these apps.

Table 3

Number of times a question was asked regarding a condition.

Conditions	Question frequency
Cardiovascular	23
Women's Reproductive System	21
Blood Pressure	11
Liver	7
Allergies	6
Surgery	6
Endocrine	6
Headaches/Migraines	5
Smoking	5
Musculoskeletal	5
BMI	4
Bowel	4
Gallbladder	4
Age	4
Breast Conditions	3
Lupus	3
Transplants	3
Other	3
Mental Wellness	3
Pulmonary	3
Cancer	2
Eye	1
Alcohol Consumption	1
Nervous System	1
Total	138

The number of questions asked per condition varied between all four apps, as well as the conditions that were prioritized based on the number of questions asked per condition. Beginning with Nurx, out of the potential 25 conditions identified, Nurx only asked about 15 conditions, with the greatest number of questions centering on allergies and cardiovascular conditions. Planned Parenthood Direct asked about 18 conditions and liver and cardiovascular conditions were the most frequently asked. The Pill Club asked 19 out of the 25 conditions identified and

prioritized questions about cardiovascular conditions and women's reproductive health. Lastly, Hers asked 23 questions out of 25 identified conditions, and like The Pill Club asked the most questions regarding cardiovascular conditions and women's reproductive health (see Table 4).

Table 4

Displays question frequencies per condition for each app.

Conditions	Nurx	PPD	The Pill Club	Hers
Alcohol Consumption	0	0	0	1
Allergies	3	2	2	1
Blood Pressure	2	2	5	2
Breast Conditions	0	2	1	0
Bowel	0	0	3	1
Cardiovascular	3	4	9	7
Cancer	1	0	0	1
Endocrine	1	2	1	2
Eye	0	0	0	1
Gallbladder	1	1	1	1
Headaches/Migraines	1	2	0	1
Liver	1	4	1	1
Lupus	0	1	1	1
Mental Wellness	0	0	2	1
Musculoskeletal	2	2	2	1
Nervous System	0	0	1	1
Pulmonary	0	0	0	3
Smoking	1	1	1	2
Surgery	0	1	2	1
Transplants	0	2	1	0
Women's Reproductive System	2	3	7	9
Weight	1	1	1	1
Height	1	1	1	1
Date of Birth	1	1	1	1
Other	1	1	0	1
Totals	22	33	43	42

Medication History

All four apps asked a series of questions regarding patient medication history. Between all four apps a total of 25 medications were identified. I also organized the medications by the type of conditions they addressed on an Excel sheet, and a total of 12 conditions were identified: skin conditions, HIV, tuberculosis, fungal conditions, seizures, mycobacterium avium complex (MAC), heavy menstrual bleeding, hepatitis, sleep disorders, muscle relaxants, pulmonary arterial hypertension and lastly mental illness specifically treated by the herbal supplement St. John's Wort. Out of the 12 conditions, seizure medications were the most asked about-- a total of 10 seizure medications were identified.

Individually the apps differed in the number of questions asked regarding medications. *Nurx* asked a total of 13 questions, and the majority (eight total) asked about seizure medications. Planned Parenthood Direct only asked regarding one medication, which was St. John's Wort, and required the patient to self-report any medications currently being taken. The *Pill Club* asked a total of 14 questions and listed medications that addressed most conditions identified except for medications for skin conditions, fungal conditions, and pulmonary arterial hypertension. Hers asked a total of 13 medication-based questions, however 10 out of the 13 medications addressed seizures, the last three addressed mental wellness treated by St. John's Wort, MAC, and pulmonary arterial hypertension (see Table 5). It's important to note that all apps ask the patient regarding St. John's Wort which is a supplement which is known to lower the efficacy of oral contraceptives (Reproductive Health Access Project, 2016).

Table 5

Number of times questions regarding types of medications were asked about which address specific conditions, per app.

Conditions	*Nurx*	*PPD*	*The Pill Club*	*Hers*
Fungal Conditions	1	0	0	0
HIV	1	0	1	0
Heavy Menstrual	0	0	1	0
Hepatitis	0	0	1	0
MAC	0	0	2	1
St John's Wort	1	1	1	1
Muscle Relaxant	0	0	1	0
Pulmonary Arterial Hypertension	0	0	0	1
Seizures	8	0	3	10
Skin Care	1	0	0	0
Sleep Disorders	0	0	2	0
Tuberculosis	1	0	2	0
Self-Report	0	1	0	0
Totals	13	2	14	13

All four apps also asked questions regarding the patient's previous experience with birth control. Between all apps a total of 17 questions regarding birth control history were recorded; each app was different in the number of questions asked regarding this topic. The Pill Club asked a total of 11 questions, Nurx asked a total of eight questions, Hers asked a total of four questions and Planned Parenthood Direct only asked three questions. Out of the 17 questions identified, three questions were asked by almost all four apps. All apps asked the patient for the brand name of the birth control currently being taken if any, three out of the four apps (Nurx, PPD, & The Pill Club) asked if the patient was seeking to skip their menstruation with birth control, and

lastly, three apps (Nurx, The Pill Club, Hers) asked if the patient has used any form of birth control before (see Table 6).

Table 6

Lists questions asked regarding the patient's previous use of birth control per app.

Questions regarding birth control (BC)	*Nurx*	*PPD*	*The Pill Club*	*Hers*
Has used BC before	1	0	1	1
Type of BC used before	1	0	0	0
Current method of BC	0	0	0	1
Brand/Name of BC currently taking	1	1	1	1
BC Monophasic, Biphasic, Triphasic	0	0	0	1
Happy with previous BC	1	0	0	0
Why not happy with previous BC	1	0	0	0
Birth Control Preferred	1	0	1	0
Reactions to Birth Control	1	0	1	0
Currently taking estrogen	0	1	0	0
Doctor recommended to avoid hormones	0	0	1	0
BC Mood Changes	0	0	1	0
BC Headaches	0	0	1	0
BC Heavy Menstruation/Spotting	0	0	1	0
BC Breast Tenderness	0	0	1	0
Wants to skip periods with BC	1	1	1	0
Has consulted with doctor before due to BC symptoms	0	0	1	0
Totals	8	3	11	4

Comparisons to Contraindications Chart

The Reproductive Health Access project is an organization with a mission to "train, support, and mobilize primary care clinicians to ensure equitable access to sexual and reproductive health care, including abortion" (Reproductive Access, 2023). The organization developed a chart that combines information from the CDC and WHO recommendations for

initiating contraceptives. The chart includes a color-coded and numbered legend to let the user of this chart understand risk levels according to conditions listed when prescribing certain types of contraceptives. Green 1 means the method can be used without restrictions, yellow 2 means advantages can outweigh potential risks, orange 3 means the method is not recommended unless other methods are unavailable and finally red 4 means the method is not to be used (see Appendix A).

In the chart, there are only a few conditions in which the use of estrogen/progestin oral contraceptives, pill or patch are labeled in orange 3 or red 4. These conditions are if the patient currently has or has had the following conditions: breast cancer, diabetes with organ damage, the patient is taking anticonvulsants or specific antibiotics, gallstones without cholecystectomy or hormone-related cholestasis in past, headaches with aura, hypertension, Ischemic heart disease, liver related illnesses such as active viral hepatitis, severe cirrhosis, hepatocellular adenoma, malignant liver tumors, is less than three weeks postpartum breastfeeding or not, age 35 and smoking 15 to 35 cigarettes a day, past or current stroke, major surgery with prolonged immobilization, systemic lupus erythematosus, antiphospholipid Ab + (related to Lupus), complicated valvular heart disease, and lastly venous thrombosis. One would assume that the four apps would ask multiple or more in-depth questions regarding these conditions or at least specifically ask about these conditions based on how they are labeled in the contraindications chart.

In Table 7, I listed 20 conditions that the chart by Reproductive Access labels as high risk for possible contraindications and whether the apps ask the patient about those specific conditions. The apps varied and the only condition all apps asked about was if the patient has suffered a stroke before. Although some of these apps do ask about conditions in relation to the

ones listed by Reproductive Access, they are not as specific compared to how the chart lists the conditions. For example, all four apps ask the patient if they have diabetes, however, none of the apps ask if the patient has diabetes with organ failure. The comparison to the contraindication chart designed by Reproductive Access also creates more uncertainty on what contraindication recommendations the apps are following or how they are coded into the design of the questionnaire within the app. How these apps try to identify contraindications will be something we will not have answers to since all four apps do not disclose information on how contraindications are identified. One can only assume that perhaps identifying potential contraindications based on the patient's answers falls on the medical providers in charge of reviewing patient questionnaires.

Table 7

The table shows 20 conditions that the chart by Reproductive Access labels as high risk for possible contraindications and whether the apps ask the patient about those specific conditions. 1 meaning the question was present, and 0 meaning it was not.

High Risk Conditions	Nurx	PPD	The Pill Club	Hers
Breast cancer	0	1	1	0
Diabetes with organ damage	0	0	0	0
Anticonvulsants	1	0	1	1
Antibiotics (Lamotrigine, Rifampin/rifabutin)	1	0	1	0
Gallstones without cholecystectomy	1	0	1	1
Hormone-related cholestasis		0		
Headaches with aura	1	1		1
Hypertension	1	1	1	1
Ischemic heart disease	0		0	0
Active viral hepatitis	0	1	0	0
Severe cirrhosis	0	1	0	0
Hepatocellular adenoma	0	0	0	0
Malignant liver tumors	0	0	0	0
Three weeks postpartum breastfeeding or not	0	1	0	0
Age 35 and smoking 15 to 35 cigarettes a day	1	0	1	1
Past or current stroke	1	1	1	1
Major surgery with prolonged immobilization,	0	1	1	0
Systemic lupus erythematosus, antiphospholipid Ab + (related to Lupus)	0	1	1	1
Complicated valvular heart disease	0	0	0	0
Venous thrombosis	0	0	0	1
Total	7	9	9	8

App Design and User Experience

The user experience of an app is crucial to the app's overall success. There are various components of app design that lead to the overall success in user experience, such as accessibility, color, branding, layout, motions within the app, etc. (Yu & Huang, 2020). A component of this analysis is my personal experience navigating each telecontraceptive app as I attempted to order contraceptives using my personal information and device. Telecontraception could potentially become a tool in minimizing barriers to access, and the visual design and experience of these apps are an important aspect of minimizing barriers to access. As a consumer downloading and opening these apps, I believe it was important to keep in mind the look and feel of the app as it gives me insight into to whom the app is catered towards. Furthermore, the easiness to navigate the app is important as I personally believe that it would contribute to how confident the user might feel about the prescription they are being recommended. The following is a personal description of my experience navigating each app, focusing on app design, user experience as well as the prescription recommendations I was given per app.

Nurx

From a design perspective, beginning with the Nurx app logo, I automatically felt that this app was designed for a mature woman. The logo is sleek and black using a slim and elegant font for the name of the company. Upon opening the app, the design matches the logo, as it offers a clean minimalist design with white backgrounds and solid black typography. The app is straightforward, offering a menu of health services which include skincare, mental health, hair loss treatments, allergy medications and contraceptives. What was particularly interesting about the design of the app was the photography used. The app displayed photographs of hands holding products. I found this interesting because I believe that was an intentional design choice. I would

have expected to see women of various backgrounds using the product, but instead I was met with just hands of different skin colors using the product. I believe this was a chosen design to allow the user to better imagine themselves using Nurx products or the app for whatever services are being sought after.

When I began to look at the list of services, contraceptives and emergency contraceptives were at the top of the list; this let me know that contraception is this company's main priority. Upon selecting contraceptives, the first question I was asked was regarding the state I reside in, offering me a list of states to which Nurx is currently able to mail contraceptives. I felt this was a smart design choice as I would be disappointed if I filled out a medical questionnaire only to find out I cannot order contraceptives from my state at the end of the questionnaire; placing that question at the beginning saves time. As I continued to navigate the app Nurx asks for my gender identity and sex assigned at birth which I appreciate, it lets me know that perhaps Nurx cares about gender affirming health care.

As I continued through the app, it also asked me if I had used birth control before and if I was happy with it. When I selected no for happiness, the app then asked for me to explain why, which I had to type in. The fact that I was able to describe why I was dissatisfied with previous birth control let me know that maybe there is a medical professional that will read my answers and take them into consideration. Following that question I was then asked what type of contraceptives I was looking for and gave me the options *pill, patch, ring* and *not sure*. In that same question however, the app warns about the price of the patch or ring if paying out of pocket, which could potentially cost over $100.

When I made it towards the end of the app questionnaire, the app offered a potential recommendation but would not allow me to order contraceptives until I submitted my most

recent blood pressure measurements. Although I appreciate Nurx attempting to obtain the most accurate information, I could also imagine someone typing in a guess of their blood pressure measurements to continue through the ordering process, and I assume that could lead to dangerous outcomes or an inadequate contraceptive prescription. Nonetheless, by requiring the consumer to self-report, this places the responsibility on the consumer to answer honestly and could alleviate Nurx of any wrongdoing.

Overall, the design of the app is clean and straightforward. It is easy to find and select the health services one is looking for. The app also moves seamlessly through the questions and allows me to go back to previous questions in case of any mistakes in my selections. The app also allowed me to enter my credit card information and insurance information but informed me that I would not be charged until a medical professional viewed my questionnaire, made a proper recommendation, and obtained my approval; this gave me a sense of security and I had no problem inputting my credit card information. Although I had submitted my credit card information, I did not obtain an official prescription from Nurx and my request was left pending, this was because I did not have the time to get my blood pressure checked and submit the results. Although I am aware that I could always visit a local pharmacy like Walgreens or CVS which have blood pressure measuring machines, I just simply never got around to stopping by due to my school, work, and family responsibilities. This experience let me know that asking for specific most recent blood pressure results (although important) could lead someone to simply not obtaining a prescription due to logistical barriers.

Planned Parenthood Direct

Planned Parenthood as an institution has made their branding clear. One can assume that if anyone is in search of in-person services at Planned Parenthood, they are aware of the logo and

color combinations, namely blue and white. I had the same expectations from their app and my assumptions were correct. The app shows up in blue with the double "P" design with the added word "Direct". Immediately upon opening the app I am taken to a sign-up page with a list of services available via the app. The services included the pill, ring, patch, UTI care, and emergency contraceptives. After signing up, the app asks me to select the contraceptive or health service I'm in search of. Upon selecting birth control, it then asks for the state I am residing in but does not offer a list with states currently being served. After selecting my state, it then lists the different types of contraceptives such as the pill (available to be mailed), the patch, the ring (can be ordered via the app but must be picked up at a local pharmacy), the IUD, the implant, and the shot (only available by visiting a local health center). I appreciated that under each type of contraceptive Planned Parenthood offered a description of each which included how often the contraceptive is administered, if it uses hormones to prevent pregnancy, and its effectiveness which was listed by percentage. On the right side of each contraceptive option there was also a question mark symbol. When I clicked the symbol, I was taken to a page that offered a more in-depth description of the contraceptive I had selected. The description included how the contraceptive is to be administered, a list of its benefits and possible side-effects. Having these descriptions felt on brand with Planned Parenthood as I've always felt there is an educational component to how Planned Parenthood offers health services, and I felt that this was a very smart design choice for patients that might want more education on the different types of contraceptives available. Upon selecting the pill, before beginning the questionnaire the app informs me about the cost of ordering a pill prescription which also includes free shipping. It also informs me that my prescription can be sent to a pharmacy for same day pick up. Like Nurx, the app was straightforward in its questionnaire. When nearing the end of the questionnaire I

found it strange that the app would ask for a selfie after submitting a picture of my ID. As previously mentioned, it is unclear why the app asks the consumer to take a picture of themselves and add it as an additional form of identification; it did make me feel uncomfortable.

Lastly, the app asked for my credit card information, but unlike Nurx, it would charge my card for a three-month supply for contraceptives before letting me know what I would be prescribed in the first place. I did not submit payment, as I would much rather be aware of what I am being recommended before blindly paying for a three-month supply. It is also unclear if I would be able to obtain a refund if I was not content with the prescription recommendation or if I would at least be able to obtain a different recommendation with no additional charge. Asking the consumer to submit payment first before even knowing what they will be receiving via mail seems like a poor design choice and made me think twice before submitting payment. The overall use of the app, like Nurx, was easy, clean, and seamless, but ultimately, I did not obtain a prescription or brand recommendation.

The Pill Club

Before describing my experience with The Pill Club app, it's important to mention that this app has undergone a name change, which I believe can cause some confusion or inconsistency when searching for telecontraception apps. When I first began my search for telecontraception apps I first encountered the app named Favor. Through research I later found out that *Favor* was first named *The Pill Club* but changed their name after extending their health services. Most recently, as I was looking for the app once more on my device, Favor was no longer found, until I realized that the app had updated to The Pill Club once again. I later found that Favor had to change their name back to The Pill Club after another app by the same name (a snack delivery service) sued the telecontraception company for violating trademark laws (The

Wall Street Journal, 2023). I did not receive any emails regarding this name change and was completely caught by surprise when I could no longer find the Favor app logo on my device. From a consumer perspective, I did find this change inconsistent and it even made me wonder if the company had changed any other aspects of their app or the way in which they offer their services. Due to the name change I decided to navigate the app once more and compare my experience to my first when the app was working as Favor but found that the app experience was still the same.

Upon opening the app, it is clear to me who this app is catered to as the sign-up page displays a group of young women who seem to be in their late teens to possibly their early twenties. The sign-up page also informs me that this app offers birth control, skin care and more. Upon completing the sign-up process, I was then asked what services I was looking for; the app also displays their products next to their services. The products shown have colorful and inviting packaging that matches the color scheme of the app itself-- light pinks and greens, and the font throughout is youthful and modern. The app design almost makes me feel like I am shopping online for make-up. Compared to Nurx and Planned Parenthood Direct, the design of The Pill Club feels more commercial rather than medical. The previous two apps were more straightforward in their design with a clear menu; I was able to select birth control and continue with the health questionnaire. In contrast, The Pill Club seems to be designed to keep me on the app and explore what else they can offer. They use marketable language regarding their products such as “It feels so good to be prepared” when offering emergency contraception or “discover what feels right for your body” when offering menstrual products. The Pill Club also offers safe sex essentials packages which consist of condoms, lubricants and emergency contraceptives and gives these packages risqué names such as the “Friends with Benefits Kit” or “The Threesome”.

The app's design and language further convince me that there is a clear target audience for their products which is young women who might be starting their sexual wellness journey. Unlike Nurx or Planned Parenthood Direct which clearly list their services, The Pill Club lists their services as treatments and labels them with broader terms of sexual wellness, skin care, and menstrual care. When selecting sexual wellness, I am then taken to a page that allows me to start a birth control questionnaire, to shop for sexual wellness essentials (condoms, lubricants, emergency contraception, pregnancy tests) or explore their blog on birth control.

After finishing the questionnaire, before I could reach the check-out page, I was offered additional products to add to my subscription. The products ranged from the safe sex essentials packages, emergency contraceptives to skin care products like sunscreen. After skipping those additional offers, I was finally taken to the check-out page where I was required to submit payment for my consultation before obtaining an official prescription. I did obtain a recommendation from The Pill Club, which was Vienva, a contraceptive that uses both progestin and estrogen. This was upsetting because The Pill Club did ask about my previous experience with birth control where I made it clear that I previously had a very negative experience with this specific type of contraceptive. Nonetheless, that was a recommendation offered by The Pill Club and it could be that I would have obtained a different recommendation had I submitted my consultation payment, which I did not. Despite the recommendation I was not happy with, my overall experience with The Pill Club was a positive one. Despite the app design being more commercial, I appreciated how inviting the app is; although its language is risqué or comedic for marketing purposes, it also allowed me to feel more at ease when navigating the questionnaire. Compared to Nurx and Planned Parenthood Direct, The Pill Club is also more affordable. I also

appreciated that all other products The Pill Club offers can be added to my subscription and mailed along with the contraceptives I were to be prescribed.

Hers

My first impression of *Hers* is based on the name of the app. It could be that I am the type of consumer that is more sensitive to how companies practice inclusivity, but from the beginning my first thought upon encountering this app is that its name has inclusivity issues. Having an app be named Hers, I feel alienates people who are gender non-conforming or are gender-binary but might still need access to birth control. I also noticed the same company has a Hims app, which offers self-care and sexual wellness products for men, and I could say the same about the name choice of that app. When opening the Hers app to the sign-up page, like The Pill Club, I am also met with photographs of happy women using products offered by Hers; the only difference is that the women pictured looked older in age, I would assume between late twenties and late thirties. After signing up, I am then given access to everything this app has to offer. I am first met with a photograph of a celebrity Kristen Bell holding a cell phone device, who seems to have partnered with the app in marketing mental health medications. I immediately find it interesting that antidepressants marketed on this app as wellness products in beautiful packaging, unlike a florescent orange bottle one can expect to obtain at a pharmacy. As I continue to scroll through the app there is still no sign of birth control prescriptions available; I am now shown trending products consumers are purchasing via the app, these include hair loss treatments, acne treatments, collagen powders, lubricant, and women's probiotics. As I make my way to the bottom of the app, I have yet to find any information regarding birth control. The last product I'm shown is Hers' complete self-care line which includes anti-aging cream, hair treatment masks, libido supplements, and a penis ring vibrator. Based on the product design of this app and

how products are being offered to me, I would assume that birth control is not Hers' priority, rather skin care, mental health, and some aspects of sexual wellness are their main priority.

As I continue to navigate the app, I find that at the bottom of the app there are buttons with selections that will take me to different pages within the app-- these buttons are the home page, a bubble symbol named "care," a clip board named "programs" and a shopping cart named "shop." When I select care, the app now has a more medical design to it, featuring pictures of doctors with a banner that says, "A team of licensed medical experts dedicated to your care." I am now able to see the different health care services they offer, which include hair and skin, sexual health, mental health, and everyday health. Under sexual health, birth control is listed, as well as cold sores and genital herpes. Compared to the other three apps, Hers is the only app I've seen offer treatment for STIs like herpes. I select birth control and start the questionnaire.
The questionnaire for this app made me feel like I was not prepared to answer some questions based on the vocabulary used in its questions since I do not consider myself to be someone who has great knowledge on medical terms. The first question I did not understand was when I was asked if the birth control, I was previously taking was monophasic, biphasic, or triphasic; I have never heard those three descriptions and had to search their meaning before making a selection. Another question asked me if I've had breakthrough periods while on my previous birth control. I also did not understand what that question meant by "breakthrough," but I assumed maybe it meant spotting. The app also asked me if I suffer from any psychiatric illnesses. I personally thought the phrase psychiatric illness was an interesting choice as out of the four apps The Pill Club was the only other app that asked about mental wellness but asked instead if I've experienced prolonged depression or sadness while on birth control, or if I've thought of hurting myself before. When I answered on The Pill Club, I answered that I did have prolonged

depression or sadness while on birth control, but on the Hers app, I automatically answered that I did not have any psychiatric illness, because I assumed the app was asking if I was diagnosed with a specific psychiatric illness that needs to be treated with medication. Comparing mental wellness questions between Hers and The Pill Club made me realize that one could have different answers to similar questions based on the vocabulary used and how the person filling out the application perceives each question.

Upon finishing the questionnaire, the app offered me six different brands of oral contraceptives which were *Junel, Junel Fe, Yasmin, Sprintec, Tri-Lo Sprintec, and Tri-Sprintec.* Under each option the app also listed some possible benefits for each brand such as "helps pms" for one option or "helps acne" for another. The options offered to me were also labeled as monophasic, biphasic, or triphasic. This made me feel very uneasy, because I am not a medical professional and I was depending on this app to offer me the best oral contraceptive for me based on my answers, and instead I got six different options, all with different dosages. I personally did not know which contraceptive was the best option for me. I also did not know if whatever selection I made would be the oral contraceptive I would be sent, or if a medical professional will review my selection first before shipping it off to me. Compared to the other three apps, I would not feel comfortable ordering oral contraceptives from Hers. Based on the overall design of the app, and some of the complicated questions I encountered in the questionnaire, I felt like birth control is not this app's priority.

Discussion

Through this evaluative research study of four telecontraceptive apps: Nurx, Planned Parenthood Direct, The Pill Club and Hers, there are several points that can be made. Firstly, one could conclude that the patient does not have a lot of say in app preference because the Apple store and Google Play store are more likely to recommend an app based on an algorithm designed to recognize certain key words, number of downloads an app has, or paid advertisement. When any of the keywords typed in the search bar for either app store was used, the four telecontraceptive apps did not automatically appear in a list one after the other, allowing the patient to click on each one, read reviews and then make a personal decision on which app to download. Instead, the first app to appear is Nurx because it has the most downloads across both Apple and Android platforms, or Planned Parenthood Direct which has paid advertising on Apple. Although the Apple app store does offer additional app suggestions upon selecting one app, the fact that all apps are not immediately visible already takes away from the patient's ability to easily see the full selection and choose an app they may feel is better suited for them. The Google Play store also offers additional app suggestions after selecting one app; however, it does a poor job at offering similar apps to the one that has been selected.

Secondly, we learn that access to contraceptives via these apps can further be compromised by in-app requirements such as forms of identification. Although some apps allow school IDs, requiring an ID in general prevents people without identification from ordering contraceptives via these apps. Another access barrier to telecontraception via these four apps is the lack of language options within the apps. Previous studies found that telecontraception could be inaccessible for people with language barriers (Stifani et al., 2020, p. 261), in this study I

found this to be true as none of the apps had additional language options for non-English speakers or people who are not fluent in English.

Third, when it comes to obtaining a prescription, based on this study, we cannot determine whether the questionnaires required by these apps are able to successfully prevent possible contraindications to birth control prescriptions. We can conclude that all apps differ in the number and types of questions asked. Like Zuniga et al.'s 2019 study which compared nine online telecontraceptive vendors and found all vendors to vary in their screening for contraindications to contraceptives; there was also no true uniformity in the questionnaires across all four apps evaluated in this study. Some apps asked more questions than others and one could assume that perhaps for apps that require a telemedicine visit, that medical providers might ask more questions regarding one's health.

Furthermore, it's important to note that some questions within the app could pose a challenge for contraindication, namely when it comes to blood pressure monitoring. As Barney et al. (2020) mention, telecontraception apps cannot track blood pressure or identify hypertension and must depend on the patient to answer truthfully to questions regarding blood pressure. In this study, questions regarding blood pressure were among the most asked within all four apps, but regardless, I must admit, as I navigated the questionnaires, I did think that there is a potential for someone to just look up a normal reading for blood pressure on the internet and submit that as an answer to these questions to move on with the questionnaire.

Additionally, the language used for similar questions also varied among apps which could potentially lead to different answers from the patient. For example, as previously mentioned in my personal review of these apps, The Pill Club and Hers had a question regarding mental wellness where I answered differently for each due to how they were differently written.

The Pill Club asked if I had experienced depression while on birth control, I answered yes. Hers on the other hand asked if I have had a psychiatric illness, to which I answered no because I assumed the app was only referring to officially diagnosed psychiatric illnesses, even though this was not made clear on the Hers app.

It is unclear why the questionnaires for these apps lack in uniformity and why they do not list all potential contraindications shown in the chart designed by Reproductive Health Access, which combines contraindication charts by the CDC, WHO and ACOG, however, explanation is that these apps could be more concerned for profitability than patient health, which could be why these questionnaires fall short in this aspect. As we can recall from the *New York Times* 2019 article, one of Nurx's doctors even mentioned that Nurx's mentality on prescribing was "don't ask for permission – ask for forgiveness later" in regards to not being able to accurately pick up contraindications. We also do not know how patients are protected in the case that they face health complications due to a wrong prescription from a telecontraception app. Nonetheless, from personal experience, it seems like patient protections fall short in in-person situations and so I would not expect that patients have any legal protections at all when it comes to incorrect birth control prescriptions.

In relation to existing literature, the variability in cost and types of insurance still pose a barrier to contraceptives via telemedicine apps. If we recall Zuniga et al.'s (2019) survey study, they found that 29% of women trying to obtain contraceptives via in-person appointments had difficulties accessing birth control, citing cost and lack of insurance as barriers to access. Additionally, as previously mentioned, in a recent publication by the U.S Department of Health and Human Services (Sugar et al., 2022), we learn that 7.9 million women of reproductive age are currently uninsured. Through this evaluation I found that telecontraception apps are still far

from alleviating the issue of access to birth control when it comes to cost and insurance because all apps varied in cost and types of insurance accepted as well. Nitkowski's (2022) study of reviews from Nurx and Planned Parenthood Direct users also confirms this issue, as some users complained that their insurance was not accepted, or that the cost for contraceptives was too high. In this study we find that this is still true as Nurx only accepts private insurance and Planned Parenthood Direct does not accept any form of insurance. This means that for uninsured patients or those with public insurance, ordering contraceptives via Nurx or Planned Parenthood Direct would require them to pay out of pocket; this creates a barrier to patients who cannot afford contraceptives at Nurx's and Planned Parenthood Direct's pricing. Compared to the three apps, The Pill Club was the most accessible in terms of price and types of insurance accepted, however, this app is also the least downloaded app; this could be due to various reasons, such as the app store algorithms or the company's marketing budgets. We also come to understand that despite the existence of these apps, income is still a large factor in accessibility to these apps. As Wollum et al. (2022) found through their analysis of an online telecontraceptive platform, counties with larger uninsured populations had lower rates of requests for contraceptives compared to more urban counties. It is unclear why apps like Planned Parenthood Direct does not accept any form of insurance or why Nurx only accepts private insurance, but like previous studies, one can conclude that due to these variabilities in cost and access, telecontraception still has a long way to go in terms of making birth control more accessible across the US. Furthermore, information regarding cost and insurance was also not readily available within each app; the lack of information on the apps presents an additional burden on the patient seeking contraceptives, because they would have to visit each app's website to better understand cost and forms of accepted insurance for each app.

Although cost and insurance still pose a barrier to contraceptives, previous studies also found that barriers to contraceptive access were due to logistical issues, such as lack of transportation, time off from work or school to visit a provider or difficulties in obtaining an appointment (Zuniga et al., 2019, p.250). From this evaluative study, one can confirm that telecontraceptive apps do offer a solution to logistical barriers. I was able to download the apps and fill out the questionnaires at a time convenient to me and for some apps I was able to obtain a recommendation as soon as I finished filling out the questionnaire. During my time working on this study, I even encountered a situation in which I recommended one of the apps as a solution to my sister after she had been surprised by her primary doctor when she was told her insurance was no longer accepted, and her birth control prescription would not be filled. Nitkowski's (2022, p.7) qualitative study of user reviews of Nurx and Planned Parenthood also confirmed this as the study found that respondents noted that telecontraception was a solution to logistical barriers which included time off from work or waiting months for an in-person appointment.

In terms of variability, it is also important to note that not only did apps vary in cost and accepted forms of insurance, but they also differed greatly by the types of products offered. For example, some apps offered the ring, patch and emergency contraception, and other apps did not. The apps also offered many different types of oral contraceptives. It is unclear why they varied so much, and if the apps work closely with some pharmaceutical companies. Furthermore, some apps prioritized other medications or products over birth control that made it difficult to order contraceptives in the first place. For example, the Hers app exposes the consumer to mental health products such as anti-depressants or skin care products, and when it came to sexual wellness, Hers offered libido supplements and vibrators for penises before finally finding a section within the app where one could order contraceptives. The Pill Club on the other hand was

very straight-forward and it was easy to start the questionnaire for birth control, and in terms of sexual wellness it also offered packages which included condoms, emergency contraceptives and lubricant. Between these two apps one would conclude that The Pill Club prioritizes birth control and safe sex compared to the Hers app. The variability in how these apps are designed and how they offer products adds an additional burden to the consumer when searching for birth control options; for instance if someone is already receiving their birth control prescription via Hers and then later needs emergency contraceptives, which Hers does not offer, this would require the consumer to search for another app, start a new application and questionnaire just to order mail-in emergency contraceptives.

Keeping in mind the theoretical framework, this study relates to control and constraint and how people's access to contraceptives via these apps will vary based on larger structures in one's life. Telecontraception does offer the opportunity for one to obtain more control over their reproductive life, but this control is still constrained by larger structures like income; one must be able to afford a cell phone with a data plan and be able to pay for in-app consultation fees and prescriptions. It can also be constrained by one's educational background and ability to answer a health questionnaire as accurately as possible.

Among other social statuses that can pose as constraints to people's decisions are external constraints such as the large force of capitalism. When searching for telecontraceptive apps on the Apple App Store and Google Play, we can conclude that one's control over which app they are most likely to download is constrained by Apple and Google and the way in which they offer apps based on key word searches. In a way, one could say that the patient does not have a choice on which app to download between the four evaluated in this research. The app store one is using selects the app for the consumer, and unless one does an extensive search on telecontraceptive

apps, it is likely, that in the end the consumer will download the app that shows up first during a search.

External constraints such as policy are also relevant. State regulations can affect an app's existence and parameters within a state. For example, state legislation affects birth control accessibility via telecontraception and thus these apps must keep up with differing state regulations. Currently, reproductive health is becoming more restrictive in many states that continue to push legislation in relation to reproductive health. For example, in December of 2022, a Texas ruling by a federal judge ruled that allowing minors to obtain contraceptives without parental consent in federally funded clinics would violate parental rights (PBS, 2023). Further and more recent research is needed to understand how minors are obtaining contraceptives without parental consent and if telecontraception can also be a tool to overcome these barriers. Nitkowski (2022) finds that both Democrat and Republican-led states with higher proportions of women legislators are associated with greater telecontraception availability within states. Thus, a recommendation would be to vote more women into office!

Limitations

As with all studies, this evaluation has some limitations that can be addressed in future studies. Some of these apps use one's device location services to serve the patient according to state policies. Although this is only speculation and based on personal experience, it could be that the information I obtained through this content analysis was only specific to Texas patients since I am in Texas and the app adjusted accordingly. Additionally, this study focused on accessibility by analyzing the states these apps currently service and the types of contraceptives they are making available to patients, and potential costs of using their service; nonetheless, because people are not part of this study, it is still not known if people in birth control deserts are currently using these services.

As previously mentioned, to gain access to apps and their questionnaires I used my personal information to act as a potential patient seeking contraceptives. The information that was used to apply for contraceptives on these apps was my own and this can be a limitation as the results I received from answering questionnaires was only based on my personal information such as the cost of contraceptives offered to me or potential additional contraindication questions. Thus, my analysis is not comprehensive of the totality of the apps' potential, but rather my analysis was a comparison of similarities and differences, or variability, in apps based on the same user profile. Additionally, an app is most likely to appear based on the number of times it has been downloaded by other users, this means that it is the most used app based on searches; because of this there is a possibility that a telecontraceptive app was missed if it is not widely searched or downloaded.

Furthermore, due to the COVID-19 pandemic, virtual medicine has become a reality for various patients for various medical needs. It is likely that telemedicine is now widely used, and

people may now be communicating with their doctor whom they used to visit personally, online. With that said, this study did not reflect the experiences of people who seek contraceptives online via their personal practitioner but only focused on specific apps being used for accessibility to contraceptives.

Lastly, this is an evaluative study using content analysis to better understand telecontraceptive apps. However, in the future an intersectional lens on telecontraception is necessary to understand racial, economic and gender-based implications of accessibility to these apps, in other words, further research is needed to understand who is currently accessing and using these telecontraceptive apps. Furthermore, studies with an intersectional lens on race and gender and location is also needed to understand the social demographics of those currently using these apps.

To establish reliability in this research it was important that I constantly go over the data being collected through the analysis of the in-app questionnaires and that they were properly coded into their categories and variables. Nonetheless, this research could have potential issues of reproducibility, the internet and technology are ever changing, because this is content analysis on apps that are live, replicating the same data could become an issue if for example one of these apps makes a drastic change in the interface of their website or includes new information overnight. Apps are constantly changing and uploading updates to their overall design and user experience. In app questionnaires could change at any moment as well as product and consultation costs. For example, throughout this study one app changed their company name

from Favor to The Pill Club, additionally Nurx increased their consultation cost from $15 to $20, to $25, as of March 28, 2023.

As previously mentioned, this study only focused on apps available through smart phone devices which work on an Apple IOS or Google's Android operating system. It is important to highlight that the qualifications set in place for app publishing on these platforms are set in place by Apple and Google and could change at any given moment, as these two companies ultimately decide which apps are allowed to be published and used by their users. Apple and Google can change qualifications or remove certain apps or limit access based on certain implications like age at their discretion. This means that access to telecontraceptive apps and the way in which these apps limit their access or not are also dependent on Apple and Google.

Conclusion

Telecontraception is still a novel but growing technology. Telecontraception apps have the potential to minimize barriers to contraceptive access across the nation and more specifically across birth control deserts. In this study four apps were evaluated, and all four apps were very different in their questionnaires and cost. To continue to provide more access to birth control via these apps it is recommended that these apps become more accessible to the public by accepting public forms of insurance, or to dream bigger, the US healthcare system could benefit from single payer insurance, which would streamline the payment process.

Despite the possible limitations of this study and the implications regarding reliability and validity, this evaluative study using content analysis of these apps reveals some important information for the public, specifically those who use contraceptives, health professionals, social scientists, app developers and each app's management team.

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Appendix A

Medical Eligibility for Initiating Contraception: Absolute and Relative Contraindications Chart
Developed by Reproductive Health Access Project

Condition	Qualifier for condition	Estrogen/ progestin: pill, patch, ring	Progestin-only: pill	Progestin-only: injection	Progestin-only: implant	Hormonal IUD	Copper IUD
Age	< 18	1	1	2	1	1	1
	18-40	1	1	1	1	1	1
	40-45	2	1	1	1	1	1
	> 45	2	1	2	1	1	1
Anemia	Thalassemia	1	1	1	1	1	2
	Sickle cell disease	2	1	1	1	1	2
	Iron-deficiency anemia	1	1	1	1	1	2
Bariatric surgery	Stomach restrictive procedures, including lap band	1	1	1	1	1	1
	Malabsorptive procedures, including gastric bypass	Pill: 3 Patch or ring: 1	3	1	1	1	1
Breast cancer	Family history of cancer	1	1	1	1	1	1
	Current	4	4	4	4	4	1
	In past, no evidence of disease for > 5 years	3	3	3	3	3	1
Breast problems, benign	Undiagnosed mass	2	2	2	2	2	1
	Benign breast disease	1	1	1	1	1	1
Cervical cancer and pre-cancerous changes	Cervical intraepithelial neoplasia	2	1	2	2	2	1
	Cancer, awaiting treatment	2	1	2	2	4	4
Depression		1	1	1	1	1	1
Diabetes mellitus (DM)	Gestational DM in past	1	1	1	1	1	1
	DM without vascular disease	2	2	2	2	2	1
	DM with end-organ damage or > 20 years duration	3	2	3	2	2	1
Drug interactions	Antiretrovirals	All antiretroviral medications (except fosamprenavir) are either 1 or 2 for every contraceptive method.					
	Anticonvulsants: phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine	3 Must select a pill with ≥ 30 mcg of estrogen to maximize efficacy	3	1	2	1	1
	Lamotrigine alone (Lamotrigine/valproate combo does not interact with hormones)	3	1	1	1	1	1
	Rifampin/rifabutin	3	3	1	2	1	1
	ALL OTHER antibiotics, antiparasitics, & antifungals	1	1	1	1	1	1
Endometrial cancer		1	1	1	1	4	4
Endometriosis		1	1	1	1	1	2
Gallbladder disease	Asymptomatic gallstones or s/p cholecystectomy	2	2	2	2	2	1
	Symptomatic gallstones, without cholecystectomy	3	2	2	2	2	1
	Pregnancy-related cholestasis in past	2	1	1	1	1	1
	Hormone-related cholestasis in past	3	2	2	2	2	1
Headaches	Non-migranous	1	1	1	1	1	1
Headaches: migraines	Without aura	2	1	1	1	1	1
	With aura	4	1	1	1	1	1
HIV infection	High risk for HIV infection	1	1	1	1	2	2
	HIV infection (without drug interactions)	1	1	1	1	1 if well/2 if ill	1 if well/2 if ill
Hypertension	During prior pregnancy only – now resolved	2	1	1	1	1	1
	Systolic < 159 & diastolic < 99	3	1	2	1	1	1
	Systolic ≥ 160, diastolic ≥ 100, and/or with vascular disease	4	2	3	2	2	1

Inflammatory bowel disease	Ulcerative colitis, Crohn's disease	2	2	2	1	1	1
Ischemic heart disease	Past or current	4	2	3	2	2	1
	Multiple risk factors (such as smoking, diabetes, hypertension, hyperlipidemia, or older age)	4	2	3	2	1	1
Liver Disease	Viral hepatitis-carrier	1	1	1	1	1	1
	Viral hepatitis–active	4	1	1	1	1	1
	Cirrhosis–mild	1	1	1	1	1	1
	Cirrhosis–severe	4	3	3	3	3	1
	Tumors-focal nodular hyperplasia	2	2	2	2	2	1
	Hepatocellular adenoma	4	3	3	3	3	1
	Tumors–malignant	4	3	3	3	3	1
Obesity	BMI > 30 kg/meter squared	2	1	1	1	1	1
Ovarian cancer		1	1	1	1	1	1
Ovarian cysts	& benign tumors	1	1	1	1	1	1
Pelvic inflammatory disease	Past, with subsequent pregnancy	1	1	1	1	1	1
	Past, without subsequent pregnancy	1	1	1	1	2	2
	Current	1	1	1	1	4	4
Postpartum, not breastfeeding	< 3 weeks postpartum	4	1	1	1	See Postpartum IUDs	
	3-6 weeks, increased risk DVT	3	1	1	1		
	3-6 weeks, normal risk DVT	2	1	1	1		
	> 6 weeks postpartum	1	1	1	1	1	1
Postpartum, & breastfeeding	< 3 weeks postpartum	4	2	2	2	See Postpartum IUDs	
	3-4 weeks postpartum	3	2	2	2		
	4-6 weeks, increased risk DVT	3	1	1	1		
	4-6 weeks, normal risk DVT	2	1	1	1		
	> 6 weeks postpartum	2	1	1	1	1	1
Postpartum IUDs	< 10 minutes post-placenta delivery-Breastfeeding					2	1
	< 10 minutes post-placenta delivery-not breastfeeding					1	1
	10 minutes post-placenta delivery to 4 weeks					2	2
	> 4 weeks					1	1
Post-abortion	First trimester	1	1	1	1	1	1
	Second trimester	1	1	1	1	2	2
	Immediately after septic abortion	1	1	1	1	4	4
Rheumatoid arthritis	On immunosuppressive therapy	2	1	2	1	2	2
	Not on immunosuppressive therapy	2	1	2	1	1	1
Sexually Transmitted Infections (STI)	Vaginitis / Increased risk of STI	1	1	1	1	2	2
	High risk of STI	1	1	1	1	2	2
	Current GC/Chlamydia/ Purulent cervicitis	1	1	1	1	4	4
Smoking	Age < 35	2	1	1	1	1	1
	Age > 35, < 15 cigarettes/day	3	1	1	1	1	1
	Age > 35, > 15 cigarettes/day	4	1	1	1	1	1
Seizure disorder	Without drug interactions	1	1	1	1	1	1
Stroke	Past or current	4	2	3	2	2	1
Surgery	Minor	1	1	1	1	1	1
	Major, without prolonged immobilization	2	1	1	1	1	1
	Major, with prolonged immobilization	4	2	2	2	2	1
Systemic lupus erythematosis	Antiphospholipid Ab +	4	3	3	3	3	1
	Severe thrombocytopenia	2	2	3	2	2	3
	Immunosuppressive treatment	2	2	2	2	2	2
	None of the above	2	2	2	2	2	1

Thyroid disorders	Simple goiter, hyperthyroidism, hypothyroidism	1	1	1	1	1	1
Uterine fibroids	IUDs ok unless fibroids block insertion	1	1	1	1	2	2
Valvular heart disease	Uncomplicated	2	1	1	1	1	1
	Complicated	4	1	1	1	1	1
Varicose veins		1	1	1	1	1	1
Venous thrombosis	Family history (first-degree relatives)	2	1	1	1	1	1
	Superficial thrombophlebitis	3	1	1	1	1	1
	Past DVT, high risk of DVT, or known thrombophilia	4	2	2	2	2	1
	Current DVT	4	2	2	2	2	2

Legend

Risk Level	
1	Method can be used without restriction
2	Advantages generally outweigh theoretical or proven risks
3	Method not usually recommended unless other, more appropriate methods are not available or not acceptable
4	Method not to be used

VITA

Salma Y. Atiya is a Palestinian-Mexican American, born in El Paso, TX. She studied at the University of Texas at El Paso (UTEP). She also attended the Research for Undergraduate Experience program at Texas A&M University-College Station funded by the National Science Foundation (2015), where she researched educational attainment of Mexican Children. Following this she received her Bachelor of Arts in Sociology at UTEP in December of 2015, where she graduated with Departmental Honors. In the Fall of 2018, she began studying for her Master of Arts in Sociology and in 2023 she was recognized at UTEP's Honors Convocation as a University and Department Honoree. During her time working on her master's degree Salma became interested in reproductive justice. Her long-term goal is to work in public health initiatives relating to women's reproductive justice in El Paso, TX.