THE BURDEN OF CONTRACEPTION: ANALYSIS OF SOCIO-TECHNICAL FACTORS THAT INFLUENCE CONTRACEPTIVE USE AND DEVELOPMENT

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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THE UNBALANCED BURDEN OF CONTRACEPTIVE USE

Unplanned pregnancies make up almost half of pregnancies worldwide (UNFPA, 2022.). As of 2022, nearly all of the burden of contraception falls on those with female reproductive systems. The contraception methods available to women include birth control pills, hormonal and non-hormonal intrauterine devices (IUDs), hormonal rings and implants, and female sterilization (CDC, 2022). Individuals with male reproductive systems have limited access to contraceptive options, and are only given the options of condoms or sterilization. The burden of contraception has not fallen on women by pure coincidence. The roles of science and gender have contributed to the disparity between male and female contraceptive access. Potential male contraceptive methods have been researched for over 60 years, but no reversible options have been made accessible to the general public. Most research efforts into a male contraceptive have been thwarted by the inability to suppress sperm production without causing unwanted side effects. These adverse side effects can stop clinical trials from making it past the early phases of research in humans, as Institutional Review Boards are encouraged to shut down trials when there is an issue with a high rate of side effects (Sartor & Halabi, 2015).

According to the World Health Organization, nearly two-thirds of women who find themselves faced with an unplanned pregnancy are often not using a reliable contraceptive method at all (Sohn, 2020) . These unintended pregnancies have potential to negatively impact women's lives, health, and lifespan. However, not using or discontinuing use of contraception is not always a result of lack of access or ignorance of reliable methods. Many women find the side effects to be so detrimental that they must weigh the use of contraception against the impact it has on their mental or physical health. Despite these common adverse side effects, many women opt to stay on their method of birth control, as their male counterparts are unable to use a method

that provides the same efficacy against conception. This has created an inequality within couples who are hoping to prevent pregnancy, despite both genders expressing a desire to have an equal part in contraception. This inequality has impacted gender roles between couples who are looking to prevent conception. Even with an equal desire on both parts to take an active role in contraception, women are left with no option but to take more than their fair share of responsibility. This is not to say that men would not share the obligation if given the opportunity – in fact, one survey showed 70% of men would be interested in a male contraceptive (AAMC, n.d.). Further research will be conducted to investigate how social and technical factors impact how contraception is developed and used, and why are there still so many unsatisfied users.

SOCIO-TECHNICAL FACTORS THAT INFLUENCE CONTRACEPTIVE USE AND DEVELOPMENT

A person's use of contraception – and which method they choose – is a decision which is heavily influenced by many social, political, and technical factors. The birth control pill was the first contraceptive option besides the condom to be distributed widely by physicians for solely contraceptive use (Liao & Dollin, 2012). The human trials for the birth control pill became an infamous example of medical malpractice as the women participating in the trials were unaware this was a novel, untested medication. After the effectiveness of the pill was proven, it became an available option for married women. The sexual awakening of the 1960s also contributed to the dispersion of the pill, as women began to fight for control over their own reproductive health. In the 1980s, family planning became a norm for physicians to discuss with both married couples and single women. The success of the pill also created a path for new and improved forms of contraception, like the IUD, implant, ring, patch, and more (ibid).

The Social Construction of Technology (SCOT) is a theory based on the idea that people and societies are the ones who give meaning to technologies (Trevor J. Pinch & Wiebe Bijker, 2008). Pinch and Bijker explain that technology's purpose can be redefined after it is created. The social circumstances at the time the technology is created influences how the technology is made, dispersed, and accepted. According to Pinch and Bijker, SCOT is a multidirectional view of how technology is used in that a technology is in no way deterministic. Different social groups have different uses and opinions on technologies, so therefore technologies can be used and accepted in different ways around the world (ibid).

The theory of SCOT applies directly to contraceptive choice because each contraceptive method has been shaped by its intended users. The most popular contraceptive method in any given geographical region is highly influenced by location, social atmosphere, and political leanings or limitations. This can lead to a disconnect between what the user's wants and needs are, and what is readily available to them (Wyatt et al., 2014). Political and economic factors have also been shown to influence contraceptive use, as these aspects contribute to controlling access, enforcing relevant laws, and promoting or impeding moral support of contraception (Sai, 1993). International organizations like the World Health Organization (WHO) and the United Nations (UN) have programs that provide contraceptive access to less developed countries, which have a direct impact on the surrounding economies. Additionally, in countries where children contribute to the household income, contraception is seen as unfavorable, as having many children allows for more income. Conversely, in countries where children do not contribute to household income, contraception is seen as a way for women to have autonomy, and a potential path out of poverty with less children to support. In a study conducted with data from Nigerian women ages fourteen to twenty-four, the impacts of societal norms of the region

were analyzed in how they affected contraceptive use (BMC Public Health, n.d.). Over 68% of these women has had at least one unintended pregnancy, and 64% of those women chose to end the pregnancy via abortion. The study aimed to determine whether social norms that discourage contraceptive use impacts the motivation to get contraception, or impacts the woman's ability to acquire the contraception. The women shared their socio-economic standing, relationship status, and past use of contraception. They were then asked a series of questions to help the interviewers determine what prevented contraceptive use. It was found that the ability to access contraception was a more impactful factor than the motivation to access them, meaning that these women felt their social norms prevented them from acquiring the contraception they needed. This study is a powerful example of how social factors influence the use and development of contraceptive methods.

FUNCTIONALITY OF CONTRACEPTIVES

Contraceptive methods can be split into three overarching categories: traditional, short-acting, and long-acting methods. Traditional methods include withdrawal and cycle tracking, while short-acting methods describe methods that are taken or used daily, such as the pill, patch, or condoms. Long-acting methods can be further split into two categories, reversible or nonreversible. Nonreversible long-acting contraception is typically male or female sterilization, which is a permanent procedure which occludes essential reproductive cells from traveling to the rest of the reproductive system. Creating long-acting reversible contraceptives (LARCs) is where much of current research is focused, as it has the desired benefits of minimal uptake as well as not impacting fertility (Secura et al., 2010). Another important descriptor of contraception is whether or not the method largely relies on hormonal changes or suppression to be effective.

Most methods are hormonal, but there are some exceptions, such as the copper IUD. Hormonal methods are most common, but have many drawbacks in real use. Hormonal methods rely on adding or suppressing hormones within the body to alter the reproductive cycle. For women, this means taking estrogen and progesterone orally to confuse the body's natural cycle and prevent ovulation, thus preventing the chance of fertilization of an egg and subsequent pregnancy. For males, this requires lowering levels of sperm production.

Male Contraceptive Methods

There is a notable lack of focus on male contraceptive methods within the history of contraceptive development. The condom was the first product created for male use, and has remained the sole option for a short-term or easily reversible contraceptive choice. While condoms are inexpensive and easily accessible, they are one of the least dependable contraceptive options by only preventing pregnancy with 87% efficacy (Planned Parenthood, n.d.). However, condoms do serve purposes that are not simply preventing conception, by also guarding individuals from sexually transmitted infections.

The only long-acting contraceptive method currently available to men is a vasectomy -- also referred to as male sterilization -- which accounts for a mere 2% of contraceptive methods used (United Nations, 2019). Additionally, nearly a third of men who have vasectomies reversed reported new fertility problems after the reversal procedure (Cleveland Clinic, n.d.) Many attempts for a male contraceptive option have relied on altering hormonal levels, and research has found the male hormone cycle more difficult to alter without causing severe side effects, partially due to its 24-hour cycle (Bridget Murray Law, 2011). In contrast to the female hormonal cycle, which has a 28 day cycle before repeating its pattern of hormone release, the male cycle resets once a day (Nassar & Leslie, 2022). A great majority of male hormone production is

dedicated to testosterone, which leads to the production of sperm, spermatogenesis. To create an effective male contraceptive, many methods rely on decreasing spermatogenesis by reducing the testosterone levels in the body. To attempt to suppress the production of sperm, testosterone levels must be lowered until the spermatogenesis reaches azoospermia (Khourdaji et al., 2018), which is at most one million sperm per milliliter of semen, compared to the average of 15 to 200 million sperm per milliliter of semen (*Spotlight,* 2022*).* Low hormone levels can lead to unwanted responses in the body, such as reduced sex drive, osteoporosis, loss of muscle mass and hair, poor sleep, and mood instability (ibid.). Reproductive hormones, such as estrogen and testosterone, are also neurosteroids that impact the maintenance and function of the brain (Gurvich et al., 2018). Abnormal production or suppression of these hormones will impact how the brain functions, explaining why so many contraceptive options have negative impacts on cognitive function and mental wellbeing.

RESEARCH QUESTION AND METHODS

This research addresses the questions: How have social and technical factors impacted how contraception is developed, and why are there still so many unsatisfied users? Historically, women have carried an unfair portion of contraceptive responsibility, and the research guided by this question will unveil ways for future contraceptive methods to even this burden. In the last 20 years, there has been an abandonment of innovation in the field of contraception, even as medicine finds new ways to effectively prevent pregnancy (Callahan et al., 2020). An extensive literature review was performed to compile data concerning contraceptive use and development, as well as the social factors that influence these qualities. Relevant peer reviewed articles and case studies were gathered to provide evidence of contraceptive use, non-use, or development. I

analyzed studies about the development of contraceptive methods such as oral contraceptives, intrauterine devices, and novel nonhormonal contraceptive devices. Studies concerning political factors surrounding contraceptive were gathered to see how access to contraception is impacted by laws and regulations. Articles that discussed social factors affecting contraceptive uptake were also compiled to discern what societal factors may impact the use of contraception in certain regions. Evidence from the selected articles was analyzed using the Social Construction of Technology framework, and details of how social factors impact the development of technology will be shown.

RESULTS

Several key factors have impacted how contraception has been developed and used. The first, and potentially most influential factor is the politics and regulations that surround contraception and reproductive health in a region. Politics and regulations that involve contraception can impact a person's access to contraception, both financially and legally, as well as their knowledge of effective and safe methods. A person's comfort using contraception is also typically affected by their societal norms, as some regions discourage contraception use, while others show increasing support of those who choose to use contraception. As most contraceptive methods are prescribed, many users look to their physicians for advice on which method to use, which can be a significant influence on which method a person will choose. Within the last two decades, contraceptive research and development has come to a bit of a standstill, with most research efforts focused on improvements to already existing methods. The lack of funding and research into contraception has left many groups of people without access to safe, affordable, and effective contraception. Male reproductive health is another vital part of solving the issue of unplanned pregnancy, especially as medicine evolves to allow for safe and effective male

contraceptive methods. Reproductive health is an essential part of a person's life, and research and development should begin to focus on closing the gap between users' needs, and what is available to them.

How have social and technical factors impacted the development of birth control?

In the early to mid-twentieth century, when contraception was beginning to make a more frequent appearance in scientific research and sexual practice, gender dynamics were very different from what they are today. In the early and mid-twentieth century, cultural norms expected men to be the head of the household and sole source of income, while women were typically expected to stay home to care for the house and the family (Campo-Engelstein, 2012). As women are expected to bear the responsibility of pregnancy, contraception was initially focused on keeping women from getting pregnant. From the first forms of hormonal contraception, women were immediately given the role of contraceptive consumers, and research focused solely on impacting women's ovulation and hormonal cycle. The impact of the decision to initially focus on female contraception is still felt today, as women are still the primary users of contraception over a century later.

The limited options provided for male contraception has contributed to a culture where women are typically expected to take on the burden of preventing pregnancy. The lack of male contraception has limited the ability men have to actively participate in their own reproductive health, and has impacted gender norms around contraception. Leaving women with the responsibility of pregnancy prevention has reinforced the concept that women should be the ones primarily responsible for raising and caring for children as well. In traditional gender roles, child

rearing and pregnancy are often viewed as a feminine responsibility, which reinforces the concept that contraception is a feminine, or non-masculine, issue. One key impact that contraception has on gender roles is its ability to allow women to continue with their education and career. Without access to contraception, women are more likely to lose or leave their jobs before their male counterparts (Kitroeff & Silver-Greenberg, 2018). Contraception has been a key ally to the feminist movement as it provided women with autonomy over their reproductive health while also destigmatizing gender norms around sexuality and allowing women to further their education and careers.

Politics are a social factor that heavily influences contraceptive use and satisfaction, and vary greatly depending on region. Political stances on contraception may impact access to certain methods, enforce laws that ban or control birth control usage, and subsequently effect the moral stances and societal norms of a region (Sai, 1993). The uptake of contraception in a particular region is impacted by politics in direct and indirect ways, at national and local levels of government. Direct implications are typically along the lines of laws banning methods, economical support for providers and patients, and perceived morality of contraception. These direct implications are typically a result of nationwide laws and regulations. Local politics may also have an influence on contraceptive use by influencing region-wide education, such as sex education programs in public schools and free clinics that offer family planning services. Regions with more extensive sex education are correlated with lower rates of teen pregnancy and abortion, and higher uptake of contraception (ibid.). Politics can also impact reproductive security, which is the ability to have autonomy in reproductive choices in a certain region or country (Flores, 2000). Reproductive security is influenced by many political factors, such as financial support, regulations, and gender hierarchy. The type of government also has

implications on contraceptive use and access. Women in non-democracies typically use contraception at half the rate of women who live in democratic countries.

The regulations and safety requirements surrounding contraception also impact how a method is researched, developed, and marketed. The first widespread contraceptive method was an oral hormonal pill taken to arrest ovulation, most commonly known as simply "the pill" (Liao & Dollin, 2012). The pill contains progesterone, which can stop ovulation at certain doses, and was the basis for reliably preventing pregnancy. Synthetized progestin became a readily available in the 1940s, which allowed for progesterone to be administered orally, and so "the pill" was born. The development and distribution of the pill was heavily influenced by the politics and social norms of the time. In places like the United States and Canada, discussing and distributing contraception was illegal, as it was considered to be obscene and could potentially corrupt morals. Even once the pill became available through a physician's prescription, it was still not legal to refer to it as a form of contraception, and was instead marketed solely for the purpose of menstrual control and regulation. In 1965, the United States Supreme Court ruled that married couples had the right to privacy which including access to contraception. This Supreme Court ruling specifically did not extend that right to unmarried couples or single women, as it was thought access to contraception would increase promiscuity, which battled with societal norms seen in the United States at that time. It is not until 1972 that the Supreme Court extended the protection to include unmarried people.

To receive approval from the Food and Drug Administration (FDA), the pill had to be proven to be effective and safe when used in humans. The strict laws in the United States and Canada led the primary researchers, Dr John Rock and Dr Gregory Pincus, to use Puerto Rico as the location for the trial due to its lack of regulations. The women who were involved in the trail

were given almost no information about the pill, its purpose, or the risks associated with a brand-new medication. While this lack of informed consent was neither illegal or uncommon, the women who complained of any adverse side effects were discounted as "unreliable", and their complaints were not formally taken into account in the clinical trial. These women were suffering from mild issues such as headaches and cramps, as well as much more severe side effects such as dizziness and blood clots. Despite the pill's unattractive history, it paved the way for the feminist movement by allowing women to advocate for their own sexual autonomy, and led to decades of innovation and research concerning contraception (ibid.).

The first intrauterine device (IUD) can be traced back to 1909, created by German scientist Dr. Richard Richter, and was composed of a ring made of silkworm gut (Project, 2013). This version of the IUD was altered and used until the mid-1950s, but many physicians did not support the innovation due to its risk of infection and painful, unsuccessful insertion. In the early 1960s, the modern IUD came about in the form of a plastic loop, which opened up the field of contraception to allow for many variations of the first IUD. By the 1970s, there were variations of hormonal and non-hormonal IUDs available on the market. The widespread use of IUDs in the United States coincided with the rise of the feminist movement, and was seen by many as a liberation for women and their reproductive autonomy. Safety concerns over the birth control pill spiked at the time, and a Senate hearing discussing these concerns pushed many women towards the IUD. Just as trust and use of IUDs was at its highest, scandal hit the United States. The Dalkon Shield was put on the market in the United States in 1971, but its defective design caused bacterial infections that led to sepsis and infertility, leading to more than 300,000 lawsuits and its removal from the market within three years of its launch. The scandal of the Dalkon Shield dropped IUD usage severely, until only one approved IUD remained on the market in the United

States. The IUD became a shunned form of contraception by physicians and patients, and societal outrage pushed development away from the IUD for decades. By 1996, about 1.5% of contraceptive use in the United States was IUDs. Only within the last 20 years has the IUD made its return as a popular and effective form of birth control. The popularity of IUDs has spiked in recent years, with the highest increase in young women, possibly due to the fact that they do not have the memory of the Dalkon Shield scandal (ibid.).

In recent years, politics in the United States has greatly impacted women's access to contraception. The passing of the Affordable Care Act in 2010 allowed access to healthcare for those who could not otherwise afford or access it, which includes sexual health care and contraception (Suffolk University, n.d.). A Supreme Court ruling in 2014 decided that employers can refuse to cover certain healthcare costs based on religious exemptions. The Affordable Care Act was amended in 2017 to extended the religious exemption to also include any moral objections that the employers may have to include coverage for contraceptive use. Both of these mandates limit the financial coverage and ready access that a person may have to contraception, sterilization, and services related to or involving abortions. Additionally, in 2019, a "domestic gag rule" was placed on Title X health care clinics by the Trump administration. Title X health care clinics provide affordable care to low-income communities, and the ban on the clinics decreased access to sexual health services across the country by 50%. Legislation and politics surrounding contraception continues to change, and is often a topic of tension between political parties (ibid.).

Politics are not the only factor that impacts contraceptive use and development. A study discussing women's values in contraceptive choice focuses on which attributes of contraception are considered most important to women when making the choice of which method to use (Wyatt

et al., 2014). This study divided the values women listed into four broad categories: mechanistic, method effects, social/normative, and practical. Many women elect to rely on advice from healthcare professionals, such as gynecologists and primary care physicians, to aid their choice of contraceptive method. As such, medical considerations like protection from sexually transmitted infections and non-contraceptive benefits, are shown to be one of the most frequent attributes women cite as deciding factors. Medical considerations that are emphasized by healthcare professionals leave personal experiences and side effects as less important attributes of contraceptive choice. The disconnect between healthcare professionals and individual patients only furthers the disconnect between what women want, and what they actually use (ibid.).

Another limiting factor surrounding contraception is the amount of people who will decide not to use contraception, even when it is available. A study conducted in 2020 aimed to discover reliable predictors of contraceptive use and nonuse (Otim, 2020). The study was based in Uganda, and compared socio-economic status and demographic factors across geographical regions of Uganda. The location of this study was chosen in part for Uganda's unusually high percentage of contraceptive nonuse, especially as knowledge of birth control and family planning methods is fairly widespread and common. Contraceptive nonuse is defined as a person who does not regularly use a contraceptive method, despite having need of one or not wanting a pregnancy. This nonuse is estimated to be around 40% in Uganda, and is at its highest in the northern region of the country. The study found that factors like wealth, number of current children and education level were reliable predictors of contraceptive nonuse. However, age, religion, desire for children, and more were not reliable predictors of contraceptive nonuse and varied greatly across geographical regions of Uganda (ibid.). This case study is a prime example of how contraceptive uptake is impacted by social factors outside of access or desire of use.

Where are we now, and why are we stuck with unsatisfied users?

While technology and medical possibilities for contraception have increased in the last century, the current state of the field of contraception is disappointing to many users (Chamberlain et al., 2020). The consistently high rates of unplanned births continue to impact economies with an estimated $21 billion in publicly funded medical costs related to unplanned pregnancies. An estimated one-third of women around the world discontinue their hormonal method of contraception within their first year of use. Many of these women who choose to discontinue their contraceptive method list hormonal side effects and health concerns as one of their main reasons for stopping use. Despite a globally unsatisfied group of users, pharmaceutical companies do not appear to be capitalizing on an interested market. In general, pharmaceutical companies tend to spend about 20% of their sales revenue on research and development for new products, medications, and technologies, but only 2% is dedicated to contraception. Even as the market for potential users continues to grow, the focus on contraception research and development seems to be on incremental improvements to already existing technologies like the pill and IUDs. Pharmaceutical companies' hesitance to create and fund new contraceptive methods is a prime case of human actions shaping how technology is used and created. Within the general market of contraceptive users, there are less targeted groups that pharmaceutical companies can focus their research efforts on, such as men, low-income communities, and older communities. Many pharmaceutical companies drastically cut their contraceptive research down in the early 2000s, even discontinuing male contraceptive opportunities (Callahan et al., 2020).

Male contraception is a growing field, but currently, no products have been able to make it to market. This is in part due to the extensive regulations and testing that must be completed for a novel technology, but that is not the sole reason. Investments into male contraception were

cautioned against because of the belief that men would not be interested users, and women would not trust men to use contraception properly. Despite the fact that male contraceptive methods have been a topic of research since the 1970s, the motivation to get a product to market has been lacking (Andrew Marquardt, 2022). This shortfall has often been blamed on the physiological differences between male and female reproductive systems, and while male hormone cycles must be impacted differently than female cycles, new developments in medicine have shown that safe male contraception is a very real possibility. The struggle with development of these methods lay in the regulations and social norms that surround this technology, just as it directly impacted the way female contraception was developed (Kabagenyi et al., 2014). As male contraceptive options are explored, research and development is often delayed or halted due to the strict regulations and requirements that the Food and Drug Administration and other regulatory bodies hold. While these regulations are imperative from a safety standpoint, they slow the process of creating new technologies that may serve underrepresented groups. As the global unplanned pregnancy rates continue to stay at unprecedented levels, this is the time to capitalize on an underutilized community who has a very similar interest in preventing conception. There are several barriers that must be addressed before male contraception can become a socially accepted form of birth control. Currently, many men cite fear and unease concerning vasectomies and other contraceptive options as a leading factor in their nonparticipation in contraceptive uptake. Unease around medical procedures and products is something that must be addressed by novel methods. Providing an effective and safe method is a battle on its own, but it is a worthless endeavor if patients are too uncomfortable to use the method. Another barrier to male contraception is the societal perceptions around gender norms, sexual health, and family planning. In the past, many men did not think they belonged in discussions concerning

contraception or want to be involved with many parts of female reproductive health, and women have not always wanted men to be privy to this information either. However, as social norms and gender dynamics shift, it is time to include everyone in the discussion of contraception. This will not only lead to more equality surrounding contraception, but create opportunities to provide contraception to everyone who has a need for it (ibid.).

Recently, more users are interested in the idea of nonhormonal contraceptive options to try and avoid the unpleasant side effects of added hormones to their system. However, limited funding is restricting innovation and improvements that are focused on the user's needs. There are several reasons why pharmaceutical companies choose to not invest too much time and effort into development for contraception. One reason lies in the fact that it is very time consuming and expensive to get a contraceptive approved, as you need extensive testing, clinical trials, and data to get approved. Another big factor is the liability concerns that exist in the contraceptive market. Contraceptives are one of very few medical products that are regularly and widely dispersed to a healthy, adult population. One of the only other class of products that fall under this liability is vaccinations, which are another medical product that endure extreme scrutiny and intense regulatory safety requirements. These barriers for companies make them wary of investing in contraceptive research and development. The obvious lack of satisfaction from contraceptive users is not enough to encourage investment, as users are still picking a method to use, even when they are not happy with it. At a fundamental level, contraception – and reproductive health – is understudied and underfunded.

DISCUSSION

Recognizing reproductive health as an essential part of a person's wellbeing and health is an important step towards gender equality. Without reproductive autonomy, women are left at a disadvantage to their male counterparts when concerning freedom around their bodies and future. It is usually the case that if a heterosexual couple desires a child, the woman must shoulder an unequal burden of procreation. During the 40 weeks of pregnancy, women literally carry much of their responsibility with them at all times. After birth, most women require time off of work, which can mean decreased pay, missed opportunities, or even termination of their position. The ability to choose when – and if – they desire to have a child allows women to continue their education longer than was previously possible, which often leads to better job opportunities and pay. Allowing men to take on part of the burden of preventing pregnancy is a crucial step in promoting gender inequality, as men deserve the opportunity to learn and participate in their own reproductive health, not just their partners.

While the research results stated above are intended to be as inclusive as possible, this research does not pertain to all persons or regions. Some people have personal, moral, or religious reasons for not wanting to use contraception, even with access to many methods. Additionally, not all people are searching for contraception, as pregnancy might not be a concern for a person or their partner. Birth control, especially hormonal methods, are also frequently used for reasons separate from preventing pregnancy as well. Women may use hormonal contraception as a way of cycle control, to alleviate painful menstrual symptoms, or to regulate their hormone uptake.

Sex and reproductive health are often a taboo or uncomfortable subject in many societies, which discourages people from asking questions and expressing their needs and wants around

these subjects. As such, there is not an extensive amount of quantitative data around contraception, reproductive health, and the problems that exist within that field. It would be interesting to analyze data from a survey of a large population of people of reproductive age. This survey could include questions concerning their contraceptive use, motivation, barriers, and ideal situations concerning their reproductive health.

In the field of medicine, user's wants and needs are just as essential as an effective and safe medical product. My research has helped me understand what type of factors may impact a patient's mindset around a medicine, and how to make products that will fit their needs. Additionally, medical products must be strategically developed to be accessible to as many people as possible. This can be achieved in part by making medicine and procedures affordable, simple, and effective. New products and technology must also be developed with the healthcare system in mind, so that there are as few barriers as possible between a user and the medicine they need.

CONCLUSION

Contraceptive development has been impacted by many social, political, and technical factors, each of which influence how it is used and accepted. The Social Construction of Technology framework helps to explain how factors such as political regulations and gender norms have impacted contraceptive use. Additionally, there is a significant needs gap between the contraceptive methods available, and the wants and needs of contraceptive users (Otim, 2020). Therefore, future research into new contraceptive technologies must become a priority in

order to diminish this needs gap. Specifically, less targeted groups, such as men, must become a focus in research so that contraception can be made as accessible and equitable as possible. It is essential to note that the initial introduction of contraceptives to all women, married and unmarried, has allowed the feminist movement to take off as women fought for their equality. Contraceptives have allowed women to take control over their reproductive health, plan their families, continue their education, and eventually enter the workforce in the same capacity as men, but the future of contraception mainly lies in novel technologies such as non-hormonal methods and contraceptive methods targeted for the male population. With these new methods of contraception, the burden of pregnancy prevention can be more evenly split between the groups of individuals involved regardless of gender.

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