REVIEW ARTICLE

ADDRESSING INFERTILITY AND OTHER REPRODUCTIVE OUTCOMES AMONG FEMALE PHYSICIANS

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ABSTRACT

Infertility affects one in four female physicians in the United States, yet the topic of fertility among female physicians is understudied and warrants focused strategies to implement change. Factors that exacerbate the rates of infertility in female physicians include intentional delays in family planning that are driven by the length of medical training and career advancements, age, long working hours, and physician burnout. While the effects of COVID-19 on reproductive health remain uncertain, the virus may have played a role in illuminating an already existing issue in women's reproductive health. Burnout rates among female physicians have reached record highs contributing to reproductive disorders that warrant well-deserved attention to this issue. Initiatives should focus on fertility education in undergraduate medical education, organizational-level interventions, better insurance coverage for infertility treatments, and addressing burnout. Collaborative efforts between individuals, institutions, and organizations are needed to prioritize reproductive health among female physicians.

INTRODUCTION

Infertility is estimated to affect one in five women aged 15-49 years in the United States[1] and one in four female physicians within this population.[2,3] Infertility is defined as the inability to conceive after unprotected intercourse or therapeutic insemination for 12 months in women <35 years old, and 6 months in women >35 years old.[4] This definition however may not fully encompass the complex interactions that affect fertility. Infertility goes beyond just the physical and biologic aspects of reproduction. It is important to recognize the impact of multiple interconnected factors including lifestyle, stress, and emotional well-being on reproductive health.

Risk factors for infertility include age over 35 years, stress, metabolic syndrome, eating disorders, substance abuse, and sexually transmitted diseases.[4] For female physicians, these risk factors are further compounded by unique challenges, which are largely understudied. This includes lengthy timelines of medical education, delayed family planning, exposure risks in the workplace, and physician burnout. Infertility implicates both physical and mental wellness. Emotional distress, the toll of therapeutic/assisted reproductive technology, financial burdens, and social stigmatization influence overall well-being. It is crucial to emphasize the mind-body connection and the importance of supporting mental health during the journey to parenthood.

Overall, the discussion of fertility among female physicians is stunted. This review addresses current outcomes, focused risk factors, barriers to fertility, mental health considerations, and future outlooks for reproductive health among female physicians. By acknowledging the interconnectedness of physical, emotional, and environmental factors, we can better understand the challenges faced by female physicians and implement focused strategies for a necessary change.

CURRENT OUTLOOKS

Infertility among female physicians is greater than the general population in the United States. Focused literature on this topic has only recently begun to make headway, with ample room for discussion and systemic changes. A 2023 study by Lai et al. evaluated 4533 female physicians and reported that 35% underwent an infertility evaluation, and 28% underwent infertility treatment.[5] Another 2023 study by Bakkensen et al. evaluated 1056 female physicians at various stages of training and reported that 75.6% delayed family building and 36.8% experienced infertility.[6] A smaller study in 2022 evaluated 262 physicians in South Carolina and reported that of the successful pregnancies (84%) among female physicians, 21% experienced difficulties with their pregnancy and 71% reported seeing a doctor about their pregnancy difficulty.[2] Prior to these studies, research on this topic was scant, dating back to decades prior.[7,8] A consistent finding among the literature however highlights a delay in family planning

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among female physicians driven by the length of their training and career advancements. Trends toward greater infertility among future cohorts of female physicians are expected given historical data.

Factors that may contribute to infertility are abundant and involve various avenues from professional pressures to natural impediments to conception. The average length of medical school and residency amounts to 8-11 years, placing physicians around the age of 32-35 years by the time they complete training, without including fellowship.[9] It goes without saying that the length and demands of medical training have an impact on family planning decisions. In fact, regarding measures taken to accommodate childbearing, female physicians have needed to choose a different specialty (24.8%), taken extended leaves (28.8%), passed up opportunities for career advancements (47.2%), and have left medicine entirely (4.3%).[6] Misconceptions about the risk of infertility, possibly owing to the lack of awareness and advocacy in medicine,[5] are also believed to postpone childbearing in the setting of professional advancement leading to involuntary subfecundity. Along with delayed family planning due to professional pressures and the length of training, comes advanced maternal age and diminished ovarian reserves.[2] As a result, in comparison to the general population, female physicians who waited to have children later in life are more likely to undergo miscarriage (40.7% vs 19.7%), infertility evaluation (35.2% vs 8.8%), and infertility treatments (28.1% vs 12.7%).[5]

There is a reported correlation between long working hours and infertility among women believed to be secondary to circadian dysrhythmia, poor dietary habits, burnout, and hormonal changes.[10] This also extends to other reproductive consequences such as menstrual cycle disorders in health care workers, which are largely understudied in recent years.[11,12] Physician burnout, discussed further in the Mental Health section below, has also exhibited a strong correlation to high-risk pregnancies and miscarriage.[13]

With retrospective reflection, a majority of female physicians report they would have attempted to conceive earlier despite career demands (28.6%), used cryopreservation (7.0%), or gone into a different specialty all together (17%).[7] From a fiscal standpoint, there is surging evidence on the lack of adequate infertility insurance coverage for female physicians.[14] This poses a serious barrier to family planning given a high debt-to-income ratio. In vitro fertilization can cost up to USD $19,000, and after several rounds may accumulate to up to USD $200,000.[14] However, most employee coverage is capped at a lifetime maximum between USD $15,000-$100,000.[14] There should be an ongoing discussion on the support and resources that may be provided in place of inadequate insurance coverage and high costs of family planning options, with the goal of enabling women to make informed decisions about their career and family-oriented goals.

IMPACT OF COVID-19 ON FERTILITY AND OTHER REPRODUCTIVE OUTCOMES

When addressing current factors that perpetuate adversity to reproductive health, it is imperative to consider the toll that the COVID-19 pandemic has taken on health care workers. The prevalence of COVID-19 in front-line workers (2747 per 100 000) is reportedly more than 11 times greater than the general population (242 per 100 000).[15] At present, preliminary studies suggest there is little impact of the virus on female fertility, but there are not enough cumulative data on the link between COVID-19 and infertility among females, let alone female physicians who are at a higher risk of contracting the virus.[16,17] It merits discussion and focused cohort studies because, in many ways, COVID-19 plays a role in illuminating an already existing issue in reproductive health.

Female physicians reportedly experience greater rates of burnout in comparison to male physicians.[13,18] According to the Medscape National Physician Burnout & Suicide Report 2021, one-tenth of female respondents considered the impact of COVID-19 to be so burdensome that they considered leaving medicine altogether.[18] Despite this, and while the relationship between stress and infertility remains controversial,[19] there is a staggeringly limited amount of literature on the direct impact of COVID-19 on female fertility in comparison to male fertility. During the Spring of 2021, various medical schools offered their fourth-year medical students the option of early graduation to join the COVID-19 response.[20] This was to ease the burdens on overworked and understaffed hospitals. The already existing physician shortage in the United States was accelerated by the pandemic, and while early graduation may have been a strategic solution, it is unknown what degree of negative effects it had on the physical, mental, and reproductive health of the new cohort of female physicians. The work-life balance is a sustained and pressing issue among physicians and the pandemic only served to heighten it. With long working hours, lack of sleep, and quarantine measures among other new stressors of COVID-19, it may be expected that work-related stress had spilled over into a physician's personal life. Such stressors served as obvious and unavoidable impediments to those physicians who were actively family planning.

The impact of COVID-19 on other reproductive outcomes is reported but is largely unvoiced for female physicians. The virus is associated with amenorrhea, dysmenorrhea, changes in cycle length, and irregular menses likely owing to its direct impact on the expression of genes during menses coupled with pandemic-related stress.[17,21] There are currently no data on menstrual cycle changes among female physicians postinfection in comparison to the general population, but this would shed light on the differences in reproductive outcomes between these populations. Overall, the effects of COVID-19 on reproductive health remain scant for female physicians, perhaps owing to the recency of the virus. This issue calls for a joint effort among scientists to bring awareness to this topic through novel cohort studies that evaluate the correlation between COVID-19 and female fertility.

MENTAL HEALTH

Burnout is defined as a response to chronic workplace stress associated with a triad of emotional exhaustion, depersonalization, and feelings of diminished accomplishment.[22] Burnout is classified as a medical disorder, according to the *International Classification of Diseases, 10th edition (ICD-10)*.[22] The physical and psychological implications of unaddressed burnout may lead to serious impacts on overall physician well-being. In a survey done by Medscape in 2021, 87% of physicians reported burnout, and while female physicians have consistently reported higher burnout rates compared to their male counterparts, it was at a record high this year (51% female, 36% male).[18] The lack of personal protective equipment, difficult working conditions, and grief over losing patients associated with the impacts of COVID-19 exacerbated an already depleted health care force.[18] The ramifications of increasing burnout rates in the workplace also seep into home and family life with foreseeable implications. In 2020, female physicians aged less than 45 years reported combining parenthood and work as the most concerning challenge in their career, followed by managing work-life balance as a close second.[18] While many health care providers experience burnout, the disproportionate impact on family life in female physicians remains a prevalent issue and may deter young physicians from pursuing reproductive options altogether.

The correlation between emotional burnout and the development of reproductive disorders creates a causative relationship that produces circulatory impacts. It is well established that psychological stress can have negative outcomes on reproductive efforts, however, the inability to conceive also leads to emotional distraught, creating a cyclical ongoing effect. In a recent national survey of 850 US surgeons, 42% of female surgeons reported a pregnancy loss and 75% took no time off work following the loss.[23] Working more than 40 hours per week and consistent night-shift work are associated with higher risks of miscarriage.[24] Scheduling accommodations for pregnant physicians should be considered to mitigate pregnancy losses. Although the mental health impacts associated with reproductive problems are well understood, the amplification of such impacts among female physicians remains poorly researched, nor is it advocated for appropriately.

FUTURE OUTLOOKS

Though this review focuses on female physicians, fertility issues in all health care individuals warrant discussion. With greater infertility rates and poorer reproductive outcomes in health care personnel, it begs the question of what is being done to address this. Adverse emotional, physical, financial, and social outcomes of one's well-being merits room for attention to the topic of infertility in health care. As previously addressed, future literature in the style of focused cohort studies will shed light and bring this topic well-deserved consideration. Future studies should aim to evaluate the numerous avenues that affect fertility in health care personnel from current events, COVID-19, career pressures, and natural impediments.

The transfer of knowledge on infertility should begin in medical school. As humanities and ethics in medicine are core components of the medical school curriculum that draw attention to essential issues in health care, incorporating a topic like this may prompt progressive discussion. Understanding the academic rigor and duration of medical education spanning over a decade, it is imperative to include medical students to participate in the conversation. The notion of delaying family planning in the setting of professional advancements should be actively discussed. Support during the rigors of residency/fellowship training in the form of positive workplace environments, professional and psychological support, and time coverage should be further explored among programs for those receiving fertility treatments. Recently, a call to action was pursued by the American Women's Association in the form of an infertility task force, which held a national physician fertility summit in 2021. This summit advocated for egg freezing, insurance coverage, mental health, and more accommodations for physicians who wish to conceive. Future initiatives of similar intent will draw the necessary focus to this topic with potential for fewer infertility outcomes in female physicians and all persons in health care.

Targeting issues at the organizational level is more efficacious than addressing them at the individual level.[25] The impacts of COVID-19 reached beyond the negative effects on physical health as the stress, long hours, and mental anguish began to compound, ultimately leading to widespread burnout among physicians. From a financial standpoint, the lack of infertility insurance coverage among physicians should be reconsidered. Residency programs and private institutions might consider partnerships with insurance providers that offer adequate coverage for those seeking fertility treatments. While individuals and institutions should collaborate on advocacy for mental health, ultimately accommodations for perinatal loss, grief counseling, and burnout should originate at the organizational level. Reasonable and humanistic benefits need to be pre-established for physicians pursuing family planning and undergoing infertility and reproductive issues, without fear of consequences or burdening their colleagues. Reproductive issues are unpredictable, necessitating systems that are already in place to alleviate the psychological, physical, financial, and cumulative burden of unforeseen fertility. There are numerous opportunities to address infertility and reproductive health with ample room for positive improvements for the future of health care.

CONCLUSION

Female physicians are at greater risk of infertility than the general population due to delayed family planning, professional pressures, and medical training demands. Advocating for holistic care in reproductive health means considering the broader context in which individuals work and live. The COVID-19 pandemic illuminated an already existing issue in reproductive health calling for joint efforts to bring awareness to this topic. Female physicians experience higher rates of burnout, highlighting the need for policies at the organizational level to advocate for work-life balance and psychosocial support. There is a need for continued discussion of fertility among female physicians and focused strategies to implement change. Prioritizing this issue may enable female physicians to balance their professional, personal, and family goals.

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